



Understanding the perceived conservation benefits of shark-marine tourism in the Global South

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ARTICLE INFO

Keywords:

Wildlife tourism
Elasmobranchs
Solutions-based conservation
Alternative livelihoods
Development

ABSTRACT

Shark and ray populations are declining due to the expansion of both target and non-target fisheries. Shark-marine tourism (SMT) has been advocated as a conservation approach to reduce pressure on shark populations by increasing their non-consumptive value and providing a potential livelihood option. However, diversification via tourism can create complex issues relating to the environment, policy, and local well-being. Additionally, little is known about the ecological or socio-economic effectiveness of shark-based marine tourism operations. This study explores how SMT programs may contribute to shark conservation by exploring practitioner perceptions of SMT and (a) its desired outcomes, success, and factors facilitating success; (b) how those outcomes were measured; (c) its effectiveness as a conservation tool; and (d) how alternative livelihoods or social engagement programs supported positive conservation gains. Semi-structured interviews (n = 15) were conducted with tourism operators and non-governmental organization (NGO) staff. NGOs measured success through population/impact studies or economic valuations of tourism, while operators cited conservation gains or skills training as success indicators. Project effectiveness was either unmeasured or inactively pursued due to insufficient capacity or resources. Tourism effectiveness is perceived to be highly dependent upon the local contexts and increases with active stakeholder engagement. Social and human capital enhancement was viewed as an important mechanism to increase tourism's benefits beyond species protection. This study demonstrates that conservation requires a shift from a species-focus to one that engages effectively with those reliant on elasmobranch resources. Furthermore, it highlights the potential of SMT to generate innovative opportunities for improving elasmobranch conservation.

1. Introduction

Sharks and rays (elasmobranchs) have diverse values that range from their critical ecological role [1], a high income-generating ability [2,3], and maintaining food security [4]. However, the expansion of target and non-target fisheries [1,5] and the globalization of trade markets [6] have exacerbated elasmobranch decline in recent decades, especially in the Indo-Pacific. In the coastal waters in the Global South, targeted shark and ray fisheries are typically small-scale or artisanal. They also tend to be located in relatively poor coastal communities with limited livelihood opportunities that offer comparable financial returns [7], or require skills, access, and knowledge that fishermen do not possess [4]. Furthermore, most resource management institutions tend to focus on the exploitation impact rather than the underlying reasons for such

livelihood decisions [8].

Livelihoods are defined as comprising the capabilities, assets, and activities required for a means of living [9]. Diversified livelihoods are characterized by a portfolio of multiple income-generating activities, while alternative livelihoods attempt to partially or completely replace an activity. Diversification programs or alternative livelihood projects (ALPs) are common intervention strategies promoted by NGOs to protect biodiversity, to reduce community dependence or impact on natural resources, and/or alleviate poverty [10–12]. For example, nature-based tourism is increasingly advocated as a way to alleviate pressure on marine and other natural resources [13]. This concept is based on the assumption that if communities can benefit directly from biodiversity, local actors will be incentivized to protect it [14]. As such, conservationists suggest that shark fishermen could be persuaded to transition

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<https://doi.org/10.1016/j.marpol.2023.105995>

into other appropriate income-generating activities that align better with shark management goals. However, governments in the Global South typically lack the mandate or capacity to support livelihood-based measures, with weak coordination between sectoral agencies [15]. Consequently, international agencies, NGOs and the private sector have attempted to fill this resource gap [16].

Shark-based marine tourism (SMT) offers a potential economic option to incentivize fishing pressure reduction with the claim that “a live shark or ray has more [economic] value than a dead shark”. Although this has been demonstrated [17,18], it is less clear if the economic benefits are realized by those financially dependent on sharks. While dive or snorkel-based SMT theoretically offers a more ‘sustainable’ use of local shark-marine resources, this has been contested [19]. For example, research with shark and ray fishers in Indonesia [7], Malaysia [20] and West Ghana [4] reveal that respondents continue to fish sharks and rays due to a lack of other viable options, as well as the financial, institutional, and skill-barriers necessary for non-fishing activities. Furthermore, tourism is known to have complex issues with its impact on the environment [21], institutional support [22], and local wellbeing [11].

Additionally, while diversification programs are often initiated as development or conservation tools, there is little empirical evidence of ‘success’ [23–25], and considerable ambiguity regarding what ‘success’ looks like. Even less is known about the ecological or socio-economic effectiveness of shark-based marine tourism operations in developing countries (e.g. Global South) and whether these benefits are realized by those dependent on sharks. Thus, the aim of this study was to understand how SMT programs operating in the Global South perceived success in regard to their contribution to shark conservation, and whether that included tangible benefits for both sharks and reliant resource users. Specifically, we interviewed SMT practitioners and researchers to obtain perceptions of (a) the desired outcomes of shark-marine tourism (SMT) programs and factors facilitating success; (b) how those outcomes were measured; (c) the perceived effectiveness of SMT as a conservation tool; and (d) the role that alternative livelihood programs (ALPs) or social engagement (SE) programs played in SMT and subsequent shark conservation initiatives.

2. Methods

A grounded theory approach was used to investigate shark conservation practitioners’ perceptions of how SMT projects support effective shark and ray conservation. The grounded theory approach is an iterative process that collects and examines the data concurrently to aid the conceptualization and refinement of hypotheses to be proved or disproved as insights are further gained [26]. It also recognizes the co-construction of data between participants and the researcher, allowing the observer to better understand how participants view the world. The study focused on SMT practitioners, defined as anyone currently or previously involved in the design, planning, implementation, monitoring, evaluation and/or management of SMT programs or ALPs for shark and ray fishermen in a Global South context. Research protocols were approved by the University Human Ethics Committee (Approval H8346).

2.1. Semi-structured interviews

We adapted a semi-structured interview questionnaire from MacKeracher, Diedrich and Simpfendorfer [27] that included both closed and open-ended questions to elicit a range of perceptions, experiences and opinions around the use of shark-marine tourism. SMT was identified as any operation that endorsed or promoted a specific elasmobranch tourism experience [28]. The interview was tested to elicit pilot feedback about clarity and suitability, and questions were refined to ensure it would elicit the required data. Formal data collection included a variety of respondents to observe information from multiple perspectives (i.e.,

tourist operators, conservation practitioners, NGOs, and conservation scientists). Questions were posed to explore how SMT operations alleviated consumptive dependency on sharks and rays, or supported non-consumptive uses, and if alternative livelihoods were being used as a strategy. Interview questions (Supplementary Info A) first asked respondents about their views on shark and ray conservation importance and value, followed by queries about their shark-marine tourism operation or program, then focused on the local communities they are working with. This allowed for independent reflection on shark conservation, how their operation or project may connect with those values, and the more specific impact in the space they are operating within. Semi-structured interviews allowed for space to explore themes of interest, and follow interesting points not covered by the main interview questions. Interviews were conducted in English and lasted between 40–60 minutes.

2.2. Sampling

Interviews were conducted over Zoom or WhatsApp from March 2021 to May 2021. Eligible participants were SMT practitioners directly involved in SMT programs or ALPs for shark and ray fishermen in a Global South context. Potential interviewees were identified based on a network previously identified in a global review of SMT [28], with additional participants recruited via snowball sampling. With 90 respondents invited to participate via email, twenty-one initially responded, but follow up for a full interview gave a response rate of 17%. Of these, a total of fifteen respondents were interviewed representing eight non-governmental organizations (NGOs) and seven dive-tourism operations in eight different countries (Fig. 1). Most respondents were in executive roles, with four acting as either a scientist or science officer. Six respondents were working in their country of origin. NGO types varied in scale from local (working within one community), regional (working with different communities within one country) and global (big, international NGOs = BINGOs). Project or operation length by respondent varied from 0–5 years ($n = 2$), 6–10 years ($n = 5$), 11–15 years ($n = 4$) and 16–20 years ($n = 4$). Though located in various areas, charismatic elasmobranch interactions included species such as whale sharks, manta rays, bull sharks, tiger sharks, wobbegongs, thresher sharks, and reef sharks.

2.3. Data coding and analysis

Interviews were transcribed using the Sonix.ai online transcription software. De-identified transcripts were manually inputted into Microsoft Excel and divided by interview question and response data for each participant. Responses to interview questions could then be compared and were later grouped together based on relation to major research questions. Transcripts were coded by the first author by labeling text fragments that were later grouped together and identified as part of themes. Thematic categories and subcategories emerged and were iteratively developed from the ideas and experiences of SMT operators and NGOs, as well as from the wildlife tourism and alternative livelihood literature. Two of the co-authors code-matched a random subset of interviews ($n = 3$) to ensure consistency.

3. Findings

Six key markers emerged from the interviews ($n = 15$) with respondents about what constitutes SMT success. These markers of success were grouped into ecological, social and economic, and institutional outcomes (Table 1). Respondents also indicated whether these markers were being actively monitored (‘measured’), if they were not monitored (‘unmeasured’), or if monitoring was aspirational (‘suggested’). However, while markers of success were clearly identified by respondents, data to measure these markers and demonstrate success remained elusive (Table 1).



Fig. 1. Location of shark-marine tourism projects and/or operations to understand current views on the use of tourism for shark and ray conservation. Black stars indicate locations of interviewed respondents, while gray stars indicate locations of respondents that were invited to participate but did not follow up. (Map source: ESRI).

3.1. Outcomes and measurements of SMT success

The most commonly referenced outcome of success was the ecological marker of biodiversity conservation ($n = 8$) (Table 1), which was discussed as either providing tangible benefits to increase the health of shark and ray populations. Other respondents described that it could include increased health of the ecosystem, establishment of species protections or trade restrictions, or demonstration that tourism was not having a negative impact on the shark populations. This outcome marker was also the most commonly measured: five respondents reported active monitoring through population studies, compliance, or impact on shark populations during tourism activities, while three others expressed interest in these sorts of studies. Three respondents referred to conservation gains (MPA or protection laws established) or collaboration with scientists as an indicator rather than active monitoring.

Another success outcome that respondents identified was the ability to instill conservation values (social and economic success marker) through environmental education about elasmobranchs and/or their ecosystems ($n = 8$). Respondents related this theme to misconceptions about sharks, including the public having a “Jaws” mentality [29]. Most respondents viewed that perception change led to increased awareness and advocacy for shark conservation and ocean protection. Respondents believed this change could extend beyond the dive community to local businesses profiting from tourism, or through tourists who go back home and share that knowledge: “You start to connect people to these creatures. The operators that are benefiting from it financially talk about their family. And so...these animals, I think, are something that are seen as a positive rather than a negative” (Respondent 7). The only related measurement to this marker was the use of tourist perception surveys by three respondents.

The last two most common markers were community-based social and economic success markers: non-consumptive economic benefits ($n = 8$) and active community engagement ($n = 7$). Economic benefits gained from SMT were viewed as a channel to support local areas in their own development: “Money is going back into the villages for infrastructure so that that (sic) support and that that funneling vital money into to build up

local communities” (Respondent 11). Most respondents perceived this to help communities connect the non-consumptive value of sharks and rays with livelihood support or local development. All three BINGOs had previously conducted general economic valuations of the tourism industry, while only one BINGO actively conducted socio-economic monitoring, though this latter measurement was suggested as a future metric by three other respondents. One small NGO actively examined local perceptions towards all potential livelihood options, including tourism, while one tourist operation viewed the training and employment of locals as a non-measured indicator of providing a source of human capital. However, three respondents identified the need to better assess how money was going from profit to the community, such as through value chain analysis: “From the government itself, there’s still unclear distribution of how that money will be utilized, let alone ...be benefit [ing] the local communities, because, you know, there are still so many political interests from many different government sectors as well” (Respondent 14).

Interestingly, one BINGO respondent was aware of their unknown impact and that their strategic plan for the year was to identify and assess measurable outcomes, stating “...you often just find yourself going down a road without stopping and thinking how is the best use of the resources that I have...to have the most impact for the things that we’re trying to achieve?” (Respondent 7). Additionally, seven respondents noted that they did not pursue formal assessments as they receive informal feedback related to social and economic markers through their ongoing activities. Lack of capacity was a significant barrier for unmeasured outcomes: at least four respondents stated that capacity or resource limitations prevented them from further investigations.

3.2. Factors facilitating success

Results show that while there is a desire for SMT operations to result in improved conservation of shark and ray populations, it is essential to provide and ensure communities with tangible (e.g. economic and human capital) benefits to instill conservation values and promote stewardship of local shark populations. Nearly half of respondents identified facilitators of success based on the social and economic

Table 1
Summary of categorized key markers identified regarding desired success of SMT programs, and how they are or could be measured.

Categorized outcome markers	Definition	Representative Quote	n	Measurements	n
Ecological success markers - biodiversity conservation and knowledge	Relates to animal-centered conservation, where goals revolve around gaining scientific knowledge on or increasing protection of elasmobranch species and/or their habitat	“ <i>[the] goal was always...the protection of...sharks, shark populations... the advocacy, research and protection.</i> ” - Respondent 11	8	Shark population studies <i>Measured</i> Compliance or impact on sharks <i>Measured</i> Conservation gain (e.g. put in MPA or protection law) <i>Unmeasured</i> Collaboration with scientists <i>Unmeasured</i> Impact on shark behavior <i>Suggested</i> Shark hotspots/population <i>Suggested</i>	3 2 1 2 1 2
Social and economic success markers - active community engagement	Relates to people-centered conservation approaches, where animal conservation efforts seek to inform, include, and/or are supported by the people or community that interact with species or are affected by conservation efforts	“ <i>But in the end, we as[an] outside organization can't really come in and protect your reefs. This is going to have to be something that you're going to want to do. And so... we had to find the angle whereby the local communities felt that this was going to be a benefit to them. And that's really been the key to the success of the whole thing from the outset.</i> ” - Respondent 10	6	Local perceptions <i>Measured</i> Training or employing locals (e.g. human capital) <i>Unmeasured</i> MPA value to communities <i>Suggested</i> Perception research (communities and tourism) <i>Suggested</i>	1 1 1 3
Social and economic success markers - non-consumptive economic benefits	A specific focus on financial or monetary gain or benefits arising from SMT, which could be felt by individuals in the community, the local economy, or the national government	“ <i>...they realized there was definitely a feeling of like, oh, you know, these conservation organizations that keep telling me what we can't do. And so, our approach was to highlight the economic benefits of protecting sharks and rays, specifically to the tourism industry.</i> ” -Respondent 1	7	Economic valuation <i>Measured</i> Socioeconomic monitoring <i>Measured</i> Socioeconomic monitoring/value chain analysis <i>Suggested</i>	3 2 3
Social and economic success markers - instilling conservation values	Support the awareness or education regarding species importance or ecosystem health, with the hope to induce a psychological or behavior shift towards conservation of species/resources	“ <i>At the beginning, all of the authorities and the hotel owners didn't want us to tell anyone that there were sharks in the area. We had to train them to educate them ...to tell them...they've always been here. They will be here. There [has] never been a problem. And they're really important for the area... And I think that environmental education, it's the main way to do it.</i> ” - Respondent 2	8	Tourist perceptions <i>Measured</i>	3
Institutional success markers - strong operational management	Relates to the sustainability of operation through business management, safety for people and animals, profitability, viability, etc.	“ <i>Sustainability, not just from an environmental perspective, but like can the project and can the conservation initiative sort of sustain itself over a long period of time?</i> ” - Respondent 9	3	NA	0
Institutional success markers - strong structural support	Relates to the need for additional support that comes in the form of funding, institutional investment and support, and enforcement or patrol of management or conservation areas	“ <i>Money is really important...economic support, especially for the community based tourism sites, they need the expertise, but they also need...institutional support to be able to do that and same thing for, you know, making sure that you're benefiting the local community who would be partnering with local NGOs or...whatever government agencies to make sure that the benefits are going back to the communities.</i> ” - Respondent 8	4	Political willingness <i>Suggested</i>	1

marker of active community engagement (n = 7) and the institutional marker of structural support (n = 8). Factors included increased stewardship: “*Are the people that are there going to take ownership of it and make it their own?. Is the community going to embrace the project and really fight for it with you? Because if they don't, it's going to be really challenging to make it sustainable*” (Respondent 9). Another NGO respondent highlighted that a thorough understanding of the community facilitated the incorporation of equity and inclusiveness as additional requirements

when working with shark fishermen or fishing communities. Meanwhile, some respondents noted that skillset mismatches or disinterest reduced shark fisher potential to become engaged in SMT. Inequitable benefit sharing could also reduce project success. Participants raised concerns about how financial benefits from SMT were being distributed through local communities, especially to community members not directly involved with tourism, or if the SMT enterprise was foreign-owned. However, respondents believed that equitable benefit-sharing

assurance from tourism operations could generate local stewardship for shark protection, which would act as a facilitator for success. Furthermore, one regional NGO respondent did not view the generation of economic value as a signifier of conservation outcomes, while another local NGO described that revenue may not necessarily inform on long-term outcomes or consequences.

In regard to structural support, respondents discussed the need for enforcement and regulation of marine reserves or fishing activities if conservation activity is to be successful: "...at this moment it's all on...the private sector...to police and report people...[location] is not a huge place by any means, but the fisheries officer...doesn't have a boat" (Respondent 4). Funding was viewed as necessary to better support tourism and conservation (n = 5). Some respondents reasoned that user fees from tourism could provide funding for enforcement or rangers, while others discussed mechanisms needed within governments and/or private organizations to ensure benefits flow back to communities or conservation. An economic transparency need was raised by multiple respondents, with Respondent 6 describing that in one location with user fees, "the money...is not really going towards shark conservation... it would be cool to see that money going back into...management of the industry directly, but also more directly...into...a community development fund...so people can really clearly see that the money from shark tourism is being used to support the local economy." Meanwhile, three respondents viewed regular and effective communication with local communities as necessary to better navigate conflicts and collaborate with other stakeholders who may be mistrusted, such as the government. Respondents also discussed how NGO capacity could be a facilitator of success. Respondents described that larger BINGOs had the long-term resources and capacity to bring attention to and lobby the national government, while local NGOs recognized they would have a smaller impact operating on a singular island or village within hundreds of communities still fishing for sharks.

3.3. Perceived effectiveness as a conservation tool

Results highlight that effective SMT is facilitated by a people-centered conservation approach, where appropriately selected communities receive economic benefits and/or education about the role and value of live sharks and rays. Perceived effectiveness revolved around SMT's ability to provide more value than consequences, specifically in relation to the communities they operate within. While less than half the respondents believed that SMT programs were demonstrably effective conservation strategies (n = 6), many (n = 9) still viewed it as a tool with substantial benefits that depended upon certain criteria. The latter group cited its potential to either generate economic value (n = 5) and/or instill conservation values (n = 5). However, one tourism operator observed that despite supporting awareness and perception change of sharks, they had a limited ability to affect change: "We're still the very first step in the overall conservation process...at the end of the day...it's legislation and it's government and its money that needs to...happen next, but a lot of that's not in our power. But we can lobby for it" (Respondent 4). This demonstrates a difference between tourism operators and NGO-based SMT, as NGO respondents described actions and working in those "next steps" described above. For example, BINGO Respondent 7 stated that "we found a very powerful leverage with governments when we're trying to push for greater protections, whether that species or spatial protections is just simply to give them the economic figures."

Respondents who viewed SMT as effective under certain conditions most often described the need to assess the local context for SMT suitability (n = 5) or operational management assurance (n = 5). The latter is described as minimized impacts from tourism and assurance that codes of conduct were followed. In addition to three NGO-based respondents, one tourism operator was explicit about the long-term nature of conservation and was adamant that "to start to put forward shark and ray conservation as a solution...to protect them and at the same time to develop local economy, it needs to come with a really complete plan and

continuous backup. It's not a five-year project" (Respondent 1). Other context suitability aspects included the locations' accessibility and/or infrastructure, reliability of shark or ray viewing, and assurance that benefits are going to fishers who would otherwise retain sharks. Respondents also described that while governmental support was crucial for conservation, tourism may not always be the most appropriate livelihood method: "Because I think for us working in conservation world, that...it's upon us... to make sure that you introduce a project that is not going to be detrimental to the tradition and also to their social economy in their long run as well" (Respondent 13). The design and management of SMT operations is also critical to ensure that tourism impacts are managed, and communities tangibly benefit in the long-term. Even when SMT programs become successful, "...at a certain point, you have to start worrying about over tourism and limiting the numbers and spreading the impact of that kind of thing" (Respondent 10).

3.4. Role of livelihoods and social engagement

All respondents included social engagement strategies in their respective SMT projects or operations, demonstrating at least a partial commitment to provide benefits for local communities. However, there were differences among practitioners if or how they helped fishers and/or fishing communities shift away from exploitative use of natural resources (Table 2). Almost half (n = 7) of respondents sought or offered alternative livelihoods or economic development initiatives (i.e., tourism, rattan weaving, pig farming). Respondent 1 described that their economic development initiatives aim to have "a very quick turnaround

Table 2
Social engagement strategies pursued and described by different respondents (n).

Engagement strategy	Definition	n	Description	n
Livelihood intervention	Provide or aiding in transition to non-consumptive or non-exploitative occupation	8	Alternative livelihood	3
			Economic development	1
			Direct employment	5
			Compensation to not fish	1
Community development	Strategies seeking to improve standards of living in the local community.	6	School system support	3
			Community health initiatives	1
			Waste program	1
			Structural support (e.g. user fees, ensuring \$ going to locals)	2
Fisheries management approach	Creating and enforcing fisheries policies.	2	Local Marine Managed Areas	1
			Regional fisheries management training	1
Youth programs	Strategies targeted to younger people to influence conservation understanding and behavior.	8	Snorkel club/swim school	4
			Running club	1
			Marine conservation knowledge	6
			Education about alternative livelihood options (to youths specifically)	2
			Fisherman's cooperatives	2
Building human and social capital	Developing relationships and trust, capacity building, etc. to support continued engagement.	11	Local conferences	2
			Provide skills training	7
			Environmental education	6
			Building trust and relationships	5
			Understanding gender roles	1
			Gaining government support	2

of income, which we've identified as something that's very important for the local people, rather than a big long-term project that involves...lots of sustained effort with potentially a much higher reward." Other livelihood interventions included direct employment by operations or organizations (n = 5), or compensation to not fish for sharks during aggregations (n = 1), "...the resorts give the capital to this person and he completely changed, and he stopped the [shark] fishing completely. And I think that that kind of a direct engagement from the...tourism sectors such as resorts...that potentially could work" (Respondent 14). Many respondents also discussed engagement strategies to build human capital, such as the provision of skills or training (n = 7) or marine and conservation knowledge to both youths (n = 6) and adults (n = 6). Respondents perceived actions that supported youth or community development and needs to open a path for building trust and long-term relationships (e.g. social capital) within the community to open dialog later on around unsustainable fisheries practices or alternative livelihoods.

Building human and social capital was the most commonly used engagement activity (n = 11). Increased social capital through trust and relationship development provided a space for communication and collaboration, as well as conflict reduction between respondents and local communities. Half of respondents (n = 8) described efforts to understand the needs and aspirations of the community, and also mentioned this is best done prior to project commencement (Table 2). A local NGO respondent reflected many 'white-savior' conservation approaches that neglected initial community consent often resulted in failed engagement or conflicts, noting "there is no legal requirement for us to ask for that community's consent before we write a project proposal for a donor" (Respondent 13). Furthermore, it was acknowledged (n = 5) that a shift from classic colonial approaches to more inclusive participatory approaches revealed a greater understanding of the drivers of overfishing, increased long-term support of projects, and revealed potentially unexpected information: "...they will not [be] as open as when you have already spent some time with them and really tailor...the needs" (Respondent 14). However, other communities were observed to not have a culture that could support a different livelihood system in the long-term. Three respondents specifically discussed the mismatch between skills or characteristics of shark fishermen and tourism operations: "you can't necessarily immediately retrain fishers, I think, for the tourism industry because it's a different skill set and...they don't always want to" (Respondent 7). In order to protect and ensure respect for the relationships with engaged shark fishermen, one project required an application for tourist participation. The unintentional exclusion of some community members resulted in conflicts (n = 2) as other fishers became envious of the targeted shark fishers who received subsidies or support from the organizations. This revealed the differences among NGO experience, with older and larger NGOs better able to address issues that resulted from past experiences, while newer NGOs faced new challenges from unintended consequences.

Stewardship was perceived as an important outcome of alternative livelihoods or social engagement (n = 9): "Nothing is more important than the people that really are the stewards of that resource to take ownership of it and to have a vested interest in protecting it" (Respondent 4). In some respondents' experiences, locals desired to transition into an alternative livelihood or had cultural values that aligned with conservation goals. In these situations, alternative livelihood development and/or capacity building for the tourism industry was less difficult. More specifically, the creation of human capital via knowledge provision and skills training was emphasized (n = 8) in order to empower these communities to adopt alternative livelihoods (most often tourism). Encouraging communities to shift towards tourism can be a long-term process, with two respondents identifying that "an openness and a willingness to learn is fine...I don't think changing right away...is necessary because that's quite difficult to achieve" (Respondent 5), and that "it's good for us to also point out [and] see what a success looks like [from another SMT location]" (Respondent 13). Respondents (n = 6) emphasized the need to support emerging leaders within the community and/or help shift the mindset of

the younger generation to support uptake of conservation values and initiatives. Two tourism operators believed the employment of local people increased effectiveness of youth programs because kids could witness "people like them" in potential leadership roles rather than foreigners, while educational youth programs or internships were perceived (n = 5) to prepare youth for the dive or conservation industries. Problem-solving and leadership skills were perceived to enhance self-borne initiatives from locals, even if they were not marine or shark-related (n = 3). Scalability and sustainability of these operations were viewed as the ultimate outcome of this capacity building: "For them to eventually be able to lead the similar project on their own... investing that knowledge also to the local community is the way to go" (Respondent 13).

Finally, institutional support was viewed as necessary to further conservation or livelihood outcomes (n = 7). Funding limitations were cited (n = 5), along with the need for increased collaboration and support from both the government and other organizations (n = 5). Some tourism operators (n = 4) noted the need for enforcement of tourism or fishing operational standards by authorities, as operators are sometimes ascribed to the role of identifying poachers or non-compliance. Respondents supported appointment of locals as wardens to provide a potential alternative livelihood opportunity or increased stewardship. However, a lack of resources or cultural norms were believed to prevent local authorities in some areas from being effective. One local NGO respondent specifically described the benefits evident when the local government regulated tourism operators in the region. They viewed that legislative requirements for operators to comply with ecotourism standards (such as using local resources and having water and plant treatment plans), introducing customer number limits, a minimum of 50% staff from local communities, and staff training were "...a brilliant piece of work. And I don't think they understand how much impact it has if we see it right now" (Respondent 13). Additionally, political willingness was viewed as imperative for implementing these regulations. Another local NGO respondent supported this, stating that alignment with government priorities was essential for project longevity. This respondent collaborated with the local district government to provide administrative support, as well as acknowledge students in their NGO's program to inspire and motivate youths to continue in conservation work. However, partnerships were viewed to extend beyond the government, with one BINGO respondent stating that a structured collaboration strategy could provide "...a clearer plan. We can funnel funding. We can put people together with the right people to achieve those goals, and we can disseminate the information to the public and to the stakeholders and so on" (Respondent 7). While some tourism operators desired to work with social scientists to achieve outcomes, a BINGO respondent viewed that better partnerships with developmental organizations could help achieve long-term alternative livelihood transitions.

4. Discussion

This study sought to explore whether shark and ray-marine tourism (SMT) is perceived to support shark conservation in a way that provides benefits to both animals and reliant resource users. The grounded theory approach allowed for the exploration of perceptions by tourism operators and NGO staff working in the Global South and the way they understand effective conservation techniques from their experiences. Interviews revealed that success outcomes and effectiveness of SMT were perceived to increase with the shift from purely biodiversity conservation to a people-focused conservation approach. The non-consumptive economic benefits marker was emphasized the most as both an outcome and a pathway to instill conservation values. However, most outcomes have not been thoroughly assessed or measured, which indicates a serious need to identify how assessment and monitoring can be better supported. The specific livelihood interventions and social engagement strategies that respondents implemented highlight the importance of considering context-specific needs and aspirations of

communities to decrease conflicts. Directed support of both capacity building techniques and institutional mechanisms may also improve the stewardship and sustainability of conservation initiatives. Still, the historical and cultural context of community SMT initiatives should be considered and understood via collaborative project design to reduce dispossession and colonial conservation approaches.

4.1. Shift in conservation priorities: animal-centered to people-centered

This study demonstrated that those working in the SMT sector commonly view that conservation success requires a shift from a species-focus to one that engages effectively with the people who rely on elasmobranch resources. Conservation can be broadly defined as the sustainable or non-consumptive use of a resource without its complete destruction or conversion [30], and thus implies that human impact is a driving force for biodiversity and species restoration or decline. As elasmobranch species are known to be both in global decline [31] and drivers of tourism [32], emphasis on the non-consumptive economic benefits is discussed as a mitigation strategy for overexploitation [18, 32]. Participants viewed SMT as a means to leverage investment in non-exploitative industries by local and national governments, and thus encourage spatial or species protections [33]. Still, SMT's ability to protect multiple elasmobranch species is not as clear [34], specifically when tourism values may not compare favorably with fisheries values. Furthermore, while economic valuations [32,35–37] can demonstrate broad-scale financial benefits of SMT, they are often model-based or analyze broad statistics and may not demonstrate whether benefits reach local communities. With a study in Fiji finding that tourists were willing to pay more for an operation that directly and clearly contributes to community education or conservation [38], the absence of transparency could reduce SMT economic value and benefits, as regularly viewed as a concern by respondents here.

Most conservation areas are placed within complex socio-ecological systems [39], and the importance of providing meaningful benefits to stakeholders to enable successful conservation outcomes has been previously emphasized [14]. Respondents believed this could be achieved by funneling monetary benefits into the local economy, which is known to occur via direct economic links with tourism [40]; though evidence of this is not as clear. Some participants felt that they accomplished direct linkages through training and/or employment of locals, which has been shown to improve conservation outcomes [41]. For example, local employment in wildlife tourism in Botswana significantly reduced economic leakages from local to international expenditures [42]. However, in a more rural Botswana park authors concluded that there is limited employment capacity in the wildlife park itself, especially when considering over tourism [43]. Therefore, the facilitation of complementary economic or livelihood activities could help integrate other community members into the supply chain [43] if tourism is to support claims of it having secondary or tertiary economic value [21]. In this study, operations were perceived to be ultimately effective when there is a shift towards ownership or stewardship of marine resources by local communities, which was observed to occur through either tourism-based livelihoods, or some other engagement activity that was supported by the SMT operation. Our results therefore suggest that conservation benefits of SMT have greater impact when livelihood-based or development approaches are applied.

Respondents also endorsed the establishment of financial savings mechanisms via tourism fees or fund management systems to support community development and effective conservation and management. Although user fees have been examined on the basis of willingness to pay or how they may help fund conservation [44,45], there is a lack of understanding of how the funds reach community members or institutions and translate to conservation effectiveness [46]. Even in areas that have been deemed effective, equity issues can occur regarding fee distribution [47]. Ensuring equity and consequently human well-being within marine conservation interventions can prove to be difficult [48], and

tourism can create new hierarchies or power dynamics within communities [15,49,50]. In this study equity, justice, and inclusiveness of community members were specifically cited as important considerations for maximizing conservation success, which has been identified to be critical when working with small-scale fishers specifically [51]. Here, ignorance of socio-cultural contexts or failure to approach other members of the community were observed to result in conflicts. Thus there is a need to understand what local stakeholders perceive as fair [52], which should be identified early on via participatory analysis [53] so preferences can be integrated into planning and evaluation processes [54]. Focusing on equity may result in more success than focusing directly on livelihoods with limited resources [55].

4.2. Need for better assessment

Respondents supported shark and ray conservation by actively pursuing on-ground conservation action, promoting key issues within different scales of government policy, and advocating among the public via outreach and education [56]. However, there is a need to better identify and assess whether desired outcomes are being achieved. While big, international NGOs (BINGOs) cited the use of socio-economic evaluations, most respondents discussed obstacles preventing them from measuring salient social outcomes that could better validate direct benefits between SMT and local communities. Specific challenges cited included the desire to achieve broad-based goals that are at scales beyond means [57,58], the species range and dispersal patterns extending beyond project boundaries, the time lag between intervention and impact [58], and limited capacity and resources for rigorous monitoring and evaluation [59]. While value chain analysis (VCA) was proposed by NGOs to better understand the distribution of money into local economies from government sectors, there is limited capacity to pursue such analyses. Furthermore, VCA approaches may not appreciate the various aspects of sustainable development, though a cost-benefit valuation for interventions in addition to VCA could serve to integrate social justice, economic efficiency and ecological sustainability [60,61]. Thus, the implementation of appropriate, flexible, and scalable evaluation tools is necessary to measure environmental and social and human well-being outcomes and to help guide appropriate local interventions and conservation investments [62].

4.3. The role of livelihoods and social engagement in conservation

SMT initiatives can provide a foundation for sustainable development [16] and facilitate stakeholder networking [63] to improve community wellbeing and empower them with the knowledge and impetus to sustain and steward their natural resources. Respondents' desires to provide tangible community benefits align with the literature that states it is a requisite for cooperation, compliance and success of conservation initiatives [64]. Respondents also provided insights into the mechanisms they perceived to enhance community members' ability to adopt alternative livelihoods or shift their value system towards a non-consumptive or more sustainable use of marine resources. Respondents perceived that strong community engagement best supported positive conservation (namely stewardship) or livelihood outcomes. More specifically, that engagement provided knowledge and skills training (human capital), allowed for trust and relationship building (social capital), and/or helped advise on and guide institutional support.

Various forms of social capital have been found to support successful collective action by promoting trust among actors [65]. In South African game reserves, NGOs played a key role with new tourism-based livelihoods in bridging networks of stakeholders and strengthening cooperation of natural resource management [63]. In this study, some operators and NGOs enhanced social capital with local community members through either initial participatory processes or providing much needed services that enhanced their wellbeing (e.g. supported school system, created toilet block). Stakeholder mapping has been

identified as a crucial initial step for any livelihood enhancement scheme in order to understand how interventions may impact different groups [61], especially when participatory approaches can often be captured by the elite [66]. Working in-situ gives operators the opportunity to inform and engage stakeholders via youth or community programs and demonstrate trustworthiness [67], which provided pathways to discuss more sensitive topics such as livelihood diversification or fisheries management. However, respondents noted that a lack of engagement by funders during project scoping can reduce project effectiveness and community support. Given the ongoing calls for just, equitable, and ethical conservation approaches, perhaps a new engagement model needs to be explored. For example, the non-profit organization Rare is known for its collaborative and community-led project design and lists their ethics regarding behavior change clearly (see <https://rare.org/behavior-change/#ethics>). With new projects, there may be an opportunity to additionally demonstrate evidence of community support after the initial participatory process prior to funds being allocated to full project investment.

Social capital was further strengthened between NGOs or operators and community members through the building of human capital. This occurred mostly through education or training programs which initially aimed to inform locals on the importance of marine conservation, as well as alternative opportunities (often tourism) to exploitative occupations. Greater leadership skills are essential for long-term conservation [68], which were supported here through an enabling environment (e.g. accessibility to information, emotional support, and funding). Leadership development was especially important when targeting younger generations, who were inspired by seeing people “like them” in non-traditional (i.e. non-exploitative) livelihood roles (Supplementary Info B). Additionally, respondents viewed tourism training as an important skill to provide, which the literature states would be necessary for non-skilled community members to eventually market and manage a competitive tourism business themselves [69,70]. However, those who engaged directly with shark fishers acknowledged that their skills, characteristics, or desires did not always transfer well to tourism. Additionally, although fishing may not always be the primary income source [71], it can be a critical pursuit to maintaining nutrition or income security if other strategies fail [72], or more simply viewed as part of their personal identity [73,74]. Since tourism is vulnerable to outside influences such as macro-economic policies or external factors (e.g. the COVID-19 Pandemic) [75,76], participants may be forced to return to shark or commercial fishing if tourism becomes unviable. Therefore, tourism may be limited in its ability to effectively conserve sharks if the goal is to ensure long-term social and economic benefits to target fishers and community members. Tourism thus may be better viewed as an option for a diversification strategy rather than the only strategy [73, 77]. This is reinforced by participants who perceived effectiveness of SMT to be dependent upon its ability to meet certain criteria or only pursued in contextually appropriate areas.

Respondents from this study identified conservation scalability as a success outcome, which has been supported in similar projects by using lessons experienced from practitioners in the conservation and livelihoods space [78]. However, scalability requires additional governance mechanisms and/or partnerships, especially when the major issues affecting shark and ray conservation are transboundary in nature, requiring cooperative action on a wider scale [61,79]. The provision of favorable policies and a conducive macro-environment by central governments can have a significant impact on the efficiency of local or provincial governments to develop rural tourism [80]. However, this synergistic relationship between government agencies has proved to be rare in developing countries [15], though when it does occur it can result in notably positive outcomes. For example, one respondent described a local investor selection mechanism that ensured clear linkages to the local economy and required 50% in-country staff for all tourism resorts. This mechanism was viewed by the respondent as a major factor in one location’s success as a tourism destination. In this

study, NGOs were perceived to help bridge gaps between governments and communities or support the formation of local working groups that empower communities to engage in larger policy contexts. However, to make significant changes within country, NGOs must work collaboratively with government stakeholders and foster multilateral support for community development or conservation initiatives [81]. While this collaboration can be difficult to achieve at the scales at which most of the participants are operating, this study highlights the potential to make significant social gains by using shark conservation as a method for community engagement, livelihood development, and natural resource stewardship.

5. Conclusions

This study used a grounded-theory approach to understand whether shark and ray-marine tourism (SMT) was perceived success in species conservation and its links with local livelihoods by operators and NGO staff in the Global South. Observed categories that indicated success in SMT included: biodiversity conservation, instilling conservation values, ensuring economic gains, and the building of social and human capital. While SMT tourism *can* be an effective conservation strategy, its success depends on context suitability and its ability to provide tangible and/or economic benefits to local communities. SMT practitioners recognized that the shift from an animal to a people-focused approach enhanced conservation outcomes. However, measurements of success were not as evident often due to capacity or resource limitations. Meanwhile, conservation gains such as the creation of an MPA or legislative protections were viewed as indicators of success by some respondents, while others reflected on the need to provide demonstrable benefits of tourism. Communication of benefits to the wider public was perceived to increase collective action on non-consumptive or sustainable marine resource use. Finally, we found that social engagement strategies and alternative livelihoods were critical to supporting success. Alternative livelihoods, economic and community development, employment, and/or educational programs were pursued either initially or naturally resulted from via relationship and network development. These interactions revealed that shark and ray conservation gains are supported by the uptake and sustainability of operations, with their initiatives mechanized by the enhancement of social capital with communities. More specifically, skills training (human capital), trust and relationship building (social capital), and acting as an institutional support liaison between stakeholder groups (e.g., community and government) was observed to support positive conservation outcomes.

While results of this study are discussed in the context of the wider published literature, it is important to note that our results may not be representative of the global context given the relatively small ($n = 15$) number of respondents interviewed. However, our results uncovered several unanticipated dynamics and factors that are likely to influence the success and effectiveness of SMT programs. While in-depth investigations of these topics were beyond the scope of this study, future research could examine how power, finance, and ‘pedigree’ or reputation of NGOs influence community engagement, biodiversity, and long-term sustainability in shark tourism.

Shark and ray-marine tourism programs provide important opportunities to explore collaborative conservation approaches, especially considering calls for conservation science that can both advance understanding and contribute to decision making [62,78]. Nevertheless, there is a need to understand how to assess conservation outcomes for both practitioner and academic understanding [82]. While certain (and often tourism-oriented) shark and ray species are admittedly over-represented in conservation science [83], this study shows that operations can leverage the profile of these charismatic megafauna to progress broader elasmobranch conservation aims, with an anthropocentric approach that integrates conservation with social, economic and political issues occurring in the Global South [16]. Importantly, our study revealed how most NGOs are increasingly recognizing the importance of

empowering and engaging local resource users in marine management and conservation. Given ongoing calls and recognition of the need to understand the historical contexts, effects, and dynamics of colonialism and capitalism in creating conservation crises, further consideration of best practice principles in engaging local communities should be developed and applied. While it is beyond the scope of this paper to discuss how this may occur, the socio-cultural contexts of communities should be considered and acknowledged prior to project implementation via historical research and participatory processes. Encouragingly, our study revealed NGOs that use people-centric approaches to engage local communities in management, conservation and tourism had higher levels of success. Therefore, future research and work that unpacks the science and ethics of engagement and participation is therefore likely to benefit potential engagement models. Though this may lead to the advocacy of resource sustainability and pursuit of independent or co-managed conservation initiatives, communities should ultimately decide the path they want to pursue.

CRedit authorship contribution statement

Siddiqi Aliya: Conceptualization, Investigation, Writing – original draft. **Bergseth Brock:** Writing – review & editing. **Diedrich Amy:** Conceptualization, Methodology, Writing – review & editing. **Chin Andrew:** Conceptualization, Supervision, Writing – review & editing.

Declaration of Competing Interest

None.

Data availability

Data will be made available on request.

Acknowledgments

We would like to thank all participants and their organizations for generously donating their time and sharing their insights. Research was conducted under James Cook University Human Research Ethics approval H8346.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.marpol.2023.105995](https://doi.org/10.1016/j.marpol.2023.105995).

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Glossary

Biodiversity conservation: Conservation of biodiversity is protection, upliftment and scientific management of biodiversity so as to maintain it at its threshold level and derive sustainable benefits for the present and future generation. From: [84].

Goals: policy targets or operational objectives. From: [62].

Human capital: “the skills, knowledge, ability to labor and good health and physical capability important for the successful pursuit of different livelihood strategies.” From: [9].

Measure: quantifies goals and progress towards them. From: [62].

Social capital: ‘features of social life – networks, norms, and trust – that enable participants to act together more effectively to pursue shared objectives’ [85].

Stewardship: “Local environmental stewardship is the actions taken by individuals, groups or networks of actors, with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological contexts” [86].

Value Chain Analysis: Value chains are described as ‘a sequence of related business activities from the provision of specific inputs for a particular product to primary production, transformation, marketing and up to the final sale of the particular product to consumers’ (GTZ, 2007:6). Value chains include the enterprises and entrepreneurs that undertake these activities, including producers, traders, and distributors (GTZ, 2007:6). VCA is used to map the value chain in order to understand how actors interact and who captures the value. From: [42].