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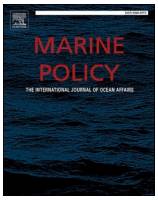

Oceans justice: Trade-offs between Sustainable Development Goals in the Seychelles

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ABSTRACT

The marine environment represents an important resource for the promotion of sustainable development. The Sustainable Development Goal (SDG) 14, Life Below Water, highlights the need to balance the economic, social, and environmental dimensions when using the World's oceans. However, trade-offs arise between the implementation of SDG goals and the well-being of different groups of people. The use of justice mechanisms is critical for achieving social equity outcomes from ocean use. Trade-offs in implementation between SDG14 and other SDGs in the Seychelles are examined through the lens of distributive and procedural justice. Content analysis of grey and policy literature and qualitative data derived from stakeholder workshops and focus group discussions are used to examine trade-offs between expanding marine protection through the Blue Economy initiative and Marine Spatial Planning (MSP), and the livelihoods and well-being of artisanal fishers. MSP limit fishers' access to marine resources through spatial, temporal, and permanent prohibitions on access to key fishing areas and gear use that negatively impact upon food security, subsistence livelihoods and well-being. These trade-offs reduce capacity to attain other SDG goals linked to alleviating poverty, hunger and good health and well-being. Consultation processes, by not giving adequate voice to fishers concerns and local knowledge, raise issues of procedural fairness. Trade-offs are largely borne by weaker socio-economic groups, leading to a failure to address issues of distributive fairness. Our research shows that the promotion of sustainable futures in the Seychelles remains elusive unless matters in relation to distributive justice are addressed and procedural fairness is provided. How justice mechanisms can be used in pursuit of social equity from ocean use is explained, and avenues for further research outlined.

1. Introduction

The United Nations, *2030 Agenda for Sustainable Development* includes 17 Sustainable Development Goals (SDGs) that aim to end poverty, protect the planet and support prosperity for all [1]. A 'win--win' language is common in international conservation and development organizations to describe the achievement of environmental protection, and economic and social development outcomes [2,3]. However, many studies are questioning this optimism at the national implementation stage when competing social, economic, and ecological goals are confronted. There is increased recognition that winners and losers are created through policy, such as between the well-being of different groups of people [4]. Limited attention has been devoted to examining how such trade-off decisions are made and by whom. In addition, understanding of interactions between SDGs remains limited [5]. Tensions between SDGs have the potential to undermine the international framework for the promotion of sustainable development, which aims at ending poverty and inequality while protecting the planet.

This paper addresses SDG14, Life Below Water, which aims to 'conserve and sustainably use the oceans, seas and marine resources for sustainable development' [8]. The 'blue economy' is playing a central role in shaping the future use of the world's oceans, including progress towards SDG 14 [9]. The blue economy also plays an important role in addressing other SDGs, including goals relating to poverty alleviation, food security, affordable and clean energy, and climate action. The blue economy forms part of a shift towards a more planned economy in the oceans, aimed at managing competing uses, allocating 'ownership' and

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establishing mechanism and governance systems. It aims to provide opportunities for growth and development, as well as protecting threatened and vulnerable ecological spaces [9]. The paper examines the implementation of SDG 14 through a justice lens, focusing on a case study of the Seychelles. It begins with a discussion of how trade-offs in the implementation of SDGs can be viewed through the lens of procedural and distributive justice. We examine the methods and processes by which such decisions are made and their consequences for social equity. The paper then examines SDG 14, and the expectation that the oceans can be used to promote economic growth and maintain local livelihoods, while protecting the marine environment. The paper presents the case of the Seychelles, where SDG 14 is examined in the context of the government's Blue Economy policy, and where issues relating to social equity and decision making on trade-offs come sharply to the fore. Finally, the paper returns to the issue of trade-offs and matters in relation to justice, making recommendations as to how social equity outcomes can be better promoted in the governance of the blue economy.

2. Trade-offs and synergies

Trade-offs can occur spatially or temporally and may or may not be reversible [11]. Social learning and technological developments can mitigate against trade-offs and the capacity of society to exercise such agency makes research into trade-offs important. Different approaches have been adopted to investigate trade-offs and synergies between the SDGs. Some point to the failure of negotiations to consider incompatibility and feedbacks, especially between economic development and ecological sustainability goals [12].

Research, using existing or new analytical frameworks [14] has helped to map the goals and their interlinkages [15]. Allen et al. [16], for example, adopted a multi-criteria analysis to examine feedbacks and to map policy alignments and gaps. Similarly, Nilsson et al. [17] used a rubric to map and assess interactions between the SDGs. Others have adopted an empirical approach, revealing that interactions are highly heterogeneous in both location and impact type, highlighting the importance of assessments at specific locations. Pradhan et al. [18], examined correlations between SDG indicators for 227 countries, ranked at the country and global scales, to identify the most frequent interactions. Barbier and Burgess [14], explored the welfare effects using a willingness-to-pay approach and found that progress has occurred in goals largely associated with economic or social aims, with less success in attaining environmental SDGs. They also found that reducing poverty and improving other social and economic SDGs may trade-off with environmental goals, such as SDGs 11–1.

Landuyt, et al. [19] looked at ecosystem services provision, quantifying interaction among ecosystem services through pairwise comparison of ecosystem service indicators. In addition, research has focused on the interactions between specific goals. Scherer et al. [21] for example, examined interactions between two social Goals (SDG 1 Poverty and SDG 10 Inequality) and three environmental Goals (SDG 13 Carbon, SDG 15 Land, and SDG 6 Water) using data from 166 counties. They found that pursuing social goals is generally associated with negative environmental impacts [21]. Developing country or region specific studies have also been undertaken, such as synergies and trade-offs related to energy (SDG 7), clean water and sanitation (SDG 6), food security and sustainable agriculture (SDG 2), and poverty alleviation (SDG 1) [22].

However, few studies have examined how trade-offs are decided, by whom, and to the benefit or determent of which social groups. Hutton et al. [23] provides the exception, showing that few countries opt to reduce economic growth for the sake of maintaining stable resource stocks, explicitly favouring SDG 8: *Decent work and economic growth* over SDG 14: *Life below water,* and SDG 15: *Life on land.* This paper takes the uneven distribution of trade-offs as its starting point but adopts a different framework for analysis. It begins with recognition that there are multiple factors, domestic and international, that shape how trade-off decisions are made and to whom their social consequences accrue. External market forces, including trade, alongside local conditions, such as the practice of good governance, influence to whom benefits or disadvantages are distributed [24]. This adds a distributional dimension, requiring examination of how benefits are captured by one stakeholder, or social group, at the expense of others. It also focuses attention on matters in relation to justice, fairness, and equity in public policy decision-making.

Equity is increasingly recognised as being central to the overall ambition of the UN Agenda 2030 to 'leave no-one behind' [25] and more specifically, to achieving the SDGs, including SDG 1 (Ending Poverty), SDG 4 (Education), SDG 5 (Gender Equality) and SDG 10 (Reduced Inequalities). SDG 14 (Life below Water) has several equity-related targets, such as Target 14.7, which seeks to increase the economic benefits to SIDS and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture, and tourism. Pursuing equity in the development of the ocean economy is also morally important to align with principles of democracy and good governance [26].

The literature examining social equity within ocean governance uses the term to refer to the recognition and fair treatment of all groups that would benefit from, or be impacted by ocean industries; their inclusion in development plans and policies, and the achievement of a more just distribution of benefits and burdens [27]. The term 'blue justice' is used to refer to a sustainable and fair blue economy for all [10]. However, in this paper we wish to make a distinction between social equity and justice. Social equity we use to refer to outcome, while we use the term justice to refer to processes or mechanisms by which such outcomes are reached. Social equity focuses attention on both the historic and current inequality outcomes for groups within society arising because of public decisions. It has a normative underpinning, based on moral values and concerns. Drawing upon the seminal work of Rawls, we see justice as an attribute of the social system, where the practice of distributive justice and procedural fairness are critical mechanism or actions that are used to bring about equitable outcomes within society [28]. Thus, addressing sustainability and equity demands attention to governance. It has been argued that one reason for the inequitable distribution of benefits and costs may be lack of genuine participatory form of governance, that promote consultation and engagement in decision by different groups within society [26].

Recognition and procedure are two key features of governance that support equitable outcomes from public policy [29]. Recognition involves acknowledging the diverse groups that exist within society, paying attention to how policy outcomes impact upon each. Procedure focuses on matters of procedural justice [28]. It requires that planning processes are visible and accessible to different social groups, drawing attention to how policy decisions are made, and stakeholder groups engaged. It is also important to recognize that diverse social groups have different perceptions of the value and benefits of nature and conservation, well-being and development, therefore viewing decision-making outcomes differently. Trade-offs often accrue to particular social groups due to the ability of some to draw benefits for themselves, while displacing negative externalities to others, where power distribution shapes who has access to and control over policy making processes. This can shape which individuals or groups benefit from decisions and those subjected to negative impacts [4]. In short, the promotion of a sustainable and equitable blue economy is seen in this paper to require justice, both distributive justice in the allocation of benefits and trade-offs among groups in society; and procedural fairness, which refers to the recognition of rights and needs of all groups. The inclusion of marginalised groups through participation in decision-making is critical for the achievement of equity outcomes from ocean development [25,27]. Although stakeholder participation is a recent development, it is seen as a hallmark of good governance for sustainability [30]. To investigate this, attention is turned to SDG 14, Life Below Water, and how the trade-off issues are generated and governed.

Table 1
SDG14: Targets and Indicators [35].

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development Targets	Indicators
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	14.1.1 (a) Index of coastal eutrophication; and (b) plastic debris density
14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	14.2.1 Number of countries using ecosystem-based approaches to managing marine areas
14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations
14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	14.4.1 Proportion of fish stocks within biologically sustainable levels
14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	14.5.1 Coverage of protected areas in relation to marine areas
14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation	14.6.1 Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing
14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism	14.7.1 Sustainable fisheries as a proportion of GDP in small island developing States, least developed countries and all countries
14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries	14.a.1 Proportion of total research budget allocated to research in the field of marine technology
14.b Provide access for small-scale artisanal fishers to marine resources and markets	14.b.1 Degree of application of a legal/regulatory/ policy/institutional framework which recognizes and protects access rights for small-scale fisheries
14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"	14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources

2.1. SDG 14 Life Below Water

The role marine systems play in the promotion of sustainable development is well recognized, as are the pressures that society places on the marine environment. The UN has declared 2021–2030 the 'Decade of Ocean Science for Sustainable Development' [31] and SDG 14 highlights the need to balance the economic, social, and environmental dimensions of sustainable development in relation to oceans. SDG 14 also points to the importance of addressing overfishing, and illegal unreported and unregulated (IUU) fishing, seen as key pressures effecting marine ecosystems (see Table 1 below).

SDG 14 interlinks with other SDGs and targets [33]. Coastal targets 14.2 and 14.5 have positive, reinforcing, and bi-directional interlinkages with addressing poverty (SDG 1), hunger (SDG 2), sustainable economic growth (SDG 8), settlements (SDG 11), and climate change (SDG 13) [34]. But negative interactions on poverty eradication can arise from marine protected areas when restricting access or creating competition for scarce resources [34].

Implementation of SDG 14 is expected to create new economic growth opportunities in the marine and maritime sector [33,36,37]. The 'blue economy', is offered as a way to implement SDG 14 [38], through 'the improvement of human well-being and social equity, while significantly reducing environmental risks and ecological scarcities' [38,39]. This economy encompasses traditional maritime industries as well as new industries, such as blue carbon, aquaculture, marine renewable energy, bio-products (pharmaceutical and agrichemicals), and desalination production [40]. The creation of multiple use marine protected areas and enclosure of marine spaces through ocean zoning are key governance mechanisms [41]. Here marine spatial planning (MSP) becomes the primary tool for effective conservation and the sustainable development of coastal and ocean resources [42].

The blue economy and its related MSP is nonetheless controversial. On the one hand, it can be seen as integral to the development of SIDS and critical to maintaining the livelihood of small-scale fishers [43]. On the other, it emphasizes the oceans as 'natural capital,' a weak model of sustainable development that perceived the oceans as the 'new economic frontier' [44]. This has led to concerns about 'ocean grabbing', expanding the reach and operations of the global food and fish industry, investment in large-scale aquaculture, and seabed mining [45].

Development of blue economy is ripe with opportunities but also endangers, in that it may replicate existing patters of power and maldistribution, including fisheries. There is strong evidence that current access to ocean benefits and resources is distributed inequitably [25]. There are also concerns that the intensification of economic use of the ocean and coasts can reinforce the weak position and vulnerability of small-scale fishers [25]. The seemingly a-political nature of the term 'blue economy' also can stifle debate around the difficult choices and trade-offs that can be made between the different dimensions of the blue economy; for example, between economic and environmental sustainability [46]. MSP, for example, is presented as offering significant benefits through organizing and planning competing and conflicting activities in a 'rational' manner [9]. However, ocean development concepts, like the 'blue economy or 'blue growth', should not been seen as neutral, but be subjected to critical examination, including in terms of what they imply for economic and social development and thus social equity [10,43]. Better understanding is needed as to how the implementation of SDG 14 through the blue economy approach is dealing with trade-offs between multiple interests and objectives, their consequences and for whom. This means exploring "who gets what, when, and how", requiring a closer look at the specific context and social relations within which national governments implement the blue economy approach. This will help to ensure that current efforts to govern the

oceans navigate towards both inclusive and sustainable development [47].

3. Methods

Mixed qualitative methods and documentary analysis were used in researching SDG14 in the Seychelles. A content analysis was undertaken of 'grey literature', that is, policy literature from public authorities and bodies including:

- Finance and partnership frameworks from relevant international bodies (UNDP, World Bank, and Indian Ocean Commission).
- Strategic policy documents on marine planning.
- Planning documents and fisheries management plans from the Government of the Seychelles and relevant Ministries.
- Government reports of MSP progress and stakeholder engagement workshops.
- Report, policy documents and public information material on marine conservation from NGOs.

The analysis was conducted to provide information on (i) the role of international agencies and agreements in shaping fisheries policy, changes in governance, finance and planning for marine conservation, including the MSP; (ii) equity objectives and how these were addressed through management strategies; (iii) ecological management strategies and rationales; (iv) stakeholders participation in the planning processes (e.g. fisheries management plans, MSP and aquaculture); (iv) the positive and negative impacts of proposed changes on the fisheries sector; and (v) how these proposed changes relate to SDG 14 and other SDGs.

Primary data was collected through mixed, qualitative methods, namely a stakeholder workshop, focus group discussions (FGDs) and key informant interviews, collected during July 2017. A one-day stakeholder workshop, 'Environment/Security Nexus at Sea: Reaching UN SDGs through Ocean Governance', was held at the Blue Economy Research Institute, University of Seychelles (July 18, 2017) with 20 workshop participants. Participants were identified with the assistance of our partners at BERI, and through desk-based research to select actors from government departments and agencies, international organisations, environmental NGOs, and academics. Participants were drawn from: University of Seychelles, the British High Commission, United Nations Development Programme, Department of Ministry of Finance, Trade and the Blue Economy, Seychelles Maritime Safety Authority, Seychelles National Parks Authority, and the Marine Conservation Society. The workshop began with presentations from participants on the benefits and trade-offs in achieving marine conservation, and food and marine security. This led to participants outlining priorities and potential solutions for achieving more integrated policy actions for marine conservation, based on the environmental and economic values that the marine environment held for local communities, and for the local economy.

FGDs were conducted at the Seychelles Fishing Authority (SFA) (July 20, 2017) with representatives from the Fishing Boat-Owners Association (FBOA) and artisanal fishers (10 people). The aim was to give voice to artisanal fishers and discussions focused on exploring their views of the impacts of fisheries planning on local livelihoods, their perceptions of stakeholder engagement processes and the opportunities and challenges of integrating their voice into marine conservation planning. The FGDs were conducted in English, however, a representative from the FBOA acted as a cultural broker to facilitate the discussions and help with translations to enable Creole speakers to participate.

Interviews were also conducted with key informants from the main NGOs in the Seychelles: Anse Forbans, Marine Conservation Society, Sustainability for Seychelles, and the Green Islands Foundation. The interview framework was designed to: identify the environmental and social challenges faced by coastal communities; elicit information on how NGOs engage with coastal communities; detail tensions between supporting local livelihood, environmental protection, and biodiversity, and current economic, tourism development strategies; and discuss the challenges of integrating the voice of local communities into conservation projects on the ground.

All informants were asked to read an information sheet highlighting the aims and objectives of the research, risks and intended outcomes and asked to sign a participant consent form approved by the lead author's University Ethics Committee. The workshops, FGDs, and semi-structured interviews were audio-recorded, transcribed, and thematically coded and analysed for dominant narratives that explored various aspects of procedural justice: recognition and procedure. In terms of recognition, we identified themes influencing proposed fisheries planning (e.g., fisheries management plans, MSP, and aquaculture) on access to marine resources and local livelihoods, and synergies and trade-offs between marine conservation, marine security, food, and fishing livelihoods. In terms of procedures, we identified dominant narratives identifying issues related to the participation of fishers in influencing marine conservation practice for the proposed fisheries management plans, MSP, and aquaculture. In the following section, quotes from informants and stakeholders are presented as evidence to contextualize the impact of proposed fisheries measures on the livelihoods of artisanal fishers.

4. Findings

4.1. Implementing SDG 14 in the Seychelles

The Seychelles consists of 115 island and an Exclusive Economic Zone (EEZ) covering 1.374 million km^2 (Fig. 1). The marine environment plays a key role in supporting food security and community well-being. At present, the marine environment is under threat from growing tourism and other developments and while there is potential for conservation efforts to support environment and social well-being goals, trade-offs pose significant risks to both.

Through the Blue Economy Initiative and associated MSP, the Seychelles wishes to take a lead international role in the implementation of the SDGs, especially SDG 14 [48,49]. This has provided an opportunity for the Seychelles to present itself as a pioneer on the global stage, and in doing so gain influence and draw in finance [46].

This draws attention to SDG-target 14.5, which aims to conserve at least 10% of coastal and marine areas by 2020 [50]. In 2015, Seychelles created a Department for the Blue Economy and began to translate the blue economy message into practice. The Seychelles *Blue Economy Strategic Framework and Road Map* 2018 is inspired by the sustainable development imaginary 'to develop a blue economy as a means of realizing the nation's development potential through innovation, knowledge-led approach, being mindful of the need to conserve the integrity of the Seychelles marine environment and heritage for present and future generations' [48]. There is also emphasis on the social and cultural value of the marine environment [51]. To help finance the Blue Economy Initiative, the Seychelles government negotiated the world's first sovereign blue bond, in collaboration with the World Bank [52]. The blue bond complements a debt-for-nature swap in 2015 with the Nature Conservancy [53]. Proceeds from the bond support the expansion of marine protected areas, improved governance of priority fisheries and the development of the Seychelles' blue economy. Grants and loans are provided through the Blue Grants Fund and Blue Investment Fund, managed respectively by the Seychelles' Conservation and Climate Adaptation Trust and the Development Bank of Seychelles (DBS) [43,54].

Within this, Seychelles is implementing the Third South West Indian Ocean Fisheries Governance and Shared Growth Project [55]. SWIOFish is a long-term regional program of the World Bank that aims to increase the economic, social, and environmental benefits from sustainable marine fisheries for the countries of the Southwest Indian Ocean. SWIOFish3 is a six-year project that, within the Seychelles, aims to improve management of marine areas and fisheries in targeted zones and strengthen the fisheries value chains. It is implemented jointly by the

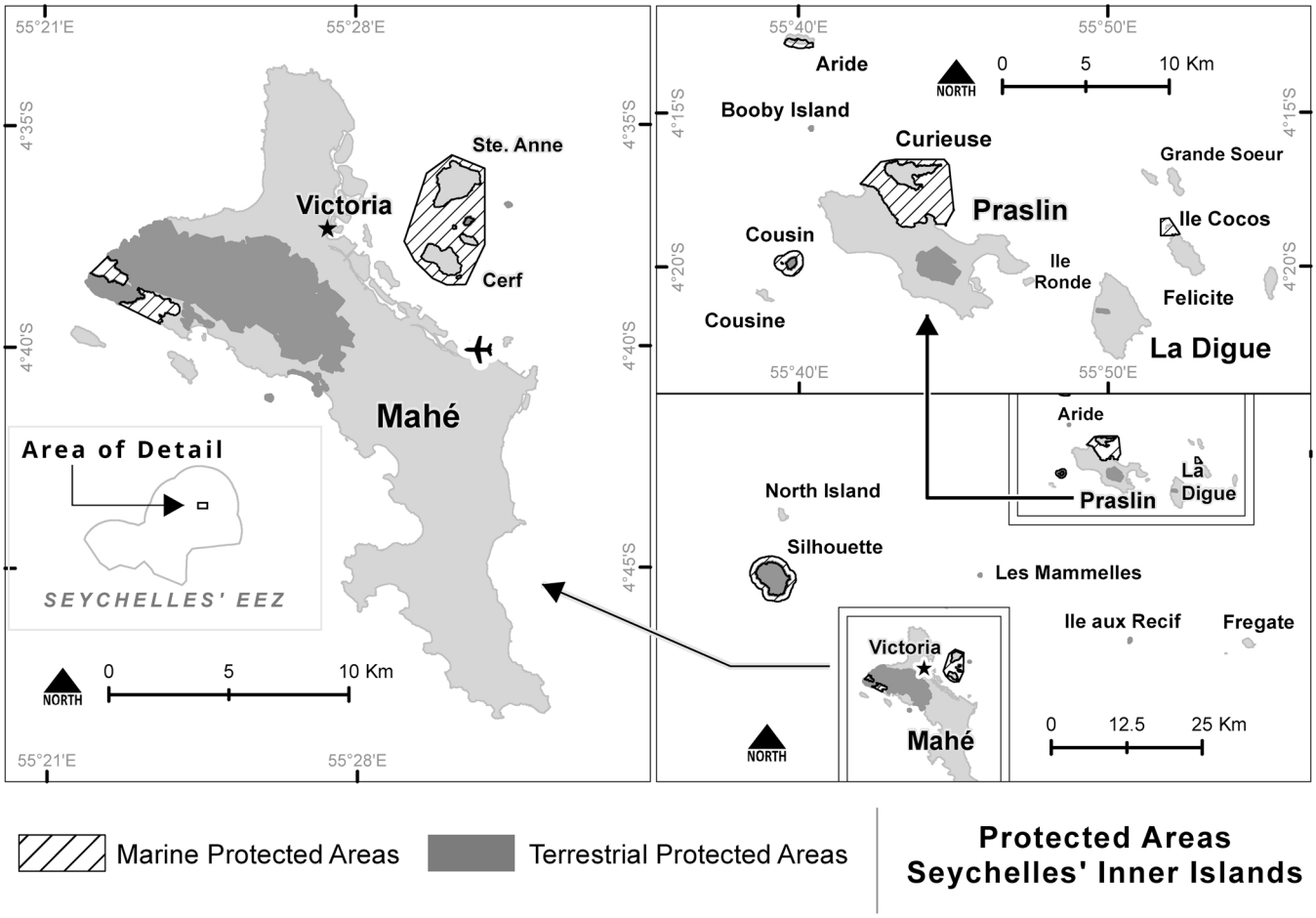

Fig. 1. Map of the Seychelles protected area networks within the Inner Islands.

Ministry of Finance, Trade and Economic Planning, the Ministry of Fisheries and Agriculture and the Ministry of Environment, Energy and Climate Change [55]. The introduction of MSP is critical to this approach [56].

Economically, the Blue Economy initiative focuses on increasing investment in the marine sector. It also involves the formulation and implementation of new fisheries management plans and a MSP, the latter considered the centrepiece of the blue economy approach [57]. The Blue Economy roadmap is guided by several overarching principles that include ensuring social equity, food security and health lifestyles [58]. It requires promoting equity in the development, access and sharing of benefits from marine resources, including the ability to mobilise capacity and manage resources. The objective is to ensure the long-term ecosystem health and sustainable use of the EEZ covering an area of 1,3740,000 km^2 [59] (Fig. 2). Phase 1 (2014–2017) saw 15% or 208,000 km^2 of marine protection zones designated in law. The Government saw this as delivering on the Seychelles' commitment to SDG 14 [56]. Phase 2 (2018–2020) includes proposals for the remaining 200, 000 km^2 for marine protection and for sustainable use zones. Milestone 3 requires area-specific zoning designs for several small islands and offshore waters. In June 2020, this third milestone was achieved, with the legal designation of 30% of territorial waters as marine protected areas [60].

The MSP sets out several equity objectives, including equitable stakeholder consultation through the use of robust governance structures that ensure transparent, participatory, and equitable decision-making processes; and reaffirming the importance of equity in access to and the sharing of benefits from marine resources [62]. It is assumed that this approach to governance will ensure local ownership of the planning process (Table 2). However, new legislation under the remit of the MSP limits the current open access system, replaced by multi-use marine zoning, targeted at different sectors, and uses. Zones are designated 'High Biodiversity Protection,' 'Medium Protection and Sustainable Use' and 'Multiple Use' [63]. Human use is restricted in high biodiversity zones and moderate restrictions operate in the medium zones.

The Mahé Plateau Trap and Line Fishery Co-Management Plan sets out to ensure that management processes are transparent, accountable, participatory and management measures are simple, effective, and equitable [64]. To realise these objectives, a stakeholder communication strategy was planned (Table 2). Attention was also focused on ensuring that fishers had the capacity to input into future decision-making processes to government, as well as developing fair compensation mechanisms to address adverse impacts (Table 2). However, the fisheries management plans will also restrict access.

The Seychelles Mariculture Masterplan (MMP) was framed in accordance with the principles of sustainable development and adopted an ecosystems approach to aquaculture [66]. It also includes the objective of improving human well-being and equity for all relevant stakeholders [66]. To this end, the MMP aims to provide new economic opportunities for fishers to enter the aquaculture industry (Table 2). The MMP involves the development of a Land-based zone, Inshore Zone Aquaculture within 2 km of the islands, Aquaculture Development Zone (ADZ) located 2 km from land, and an Offshore Zone > 5 km from land (Table 2). The MMP will directly affect the livelihoods of fishers and local communities. Artisanal fishing is seen as part of IUU fisheries, as a cost to the blue economy, and as a threat to the country's marine ecosystems. This view legitimizes the need to intervene, govern and control

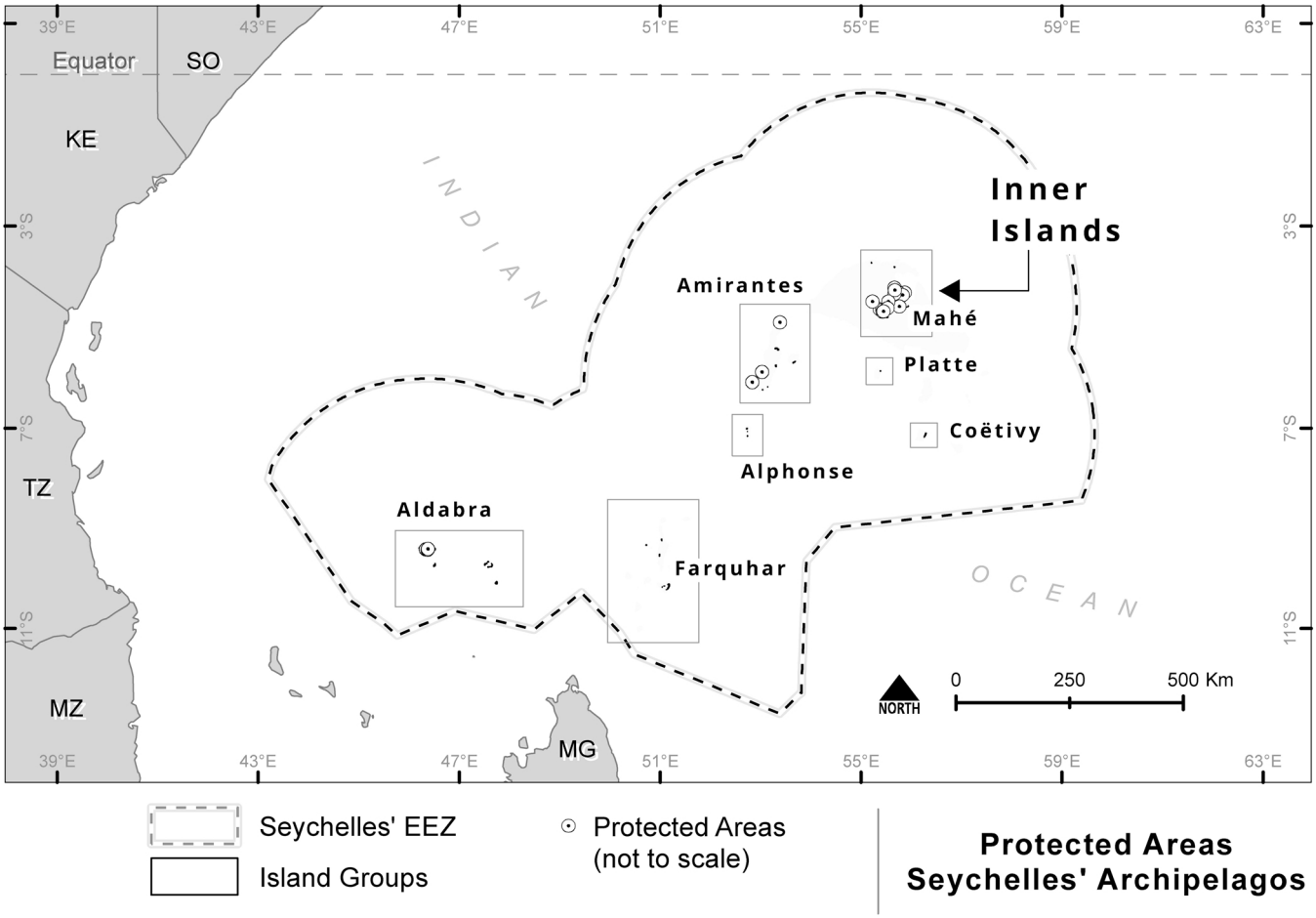

Fig. 2. Map of the Seychelles Outer Islands and EEZ delineation [61].

these fisheries [67]. However, as mentioned, such fisheries provide a vital source of local income, food, and nutrition for Seychellois people.

4.2. Impacts, Trade-offs and Synergies with SDG 14 and other SDG goals

Table 3 presents data on the positive and negative impacts of fisheries planning and on synergies and trade-offs with SDG 14 and other SDGs, alongside proposed mitigation strategies. The benefits emanating from the new fisheries planning process include improved ecosystem health through new management interventions reducing unsuitable fishing practices, improved management of protected areas, and enhanced monitoring, control, and surveillance of the sector. There are several benefits that support improved equity outcomes, through capacity and skills development of local fishers that, when combined with improving stakeholder consultation and governance structures, are designed to ensure management interventions are transparent, supported, and fair. In addition, compensation measures were put in place to reduce adverse impacts. Several measures focus on bolstering fishers' income through sustainable fishing practices, stabilising employment in the sector and opening up new employment and business opportunities.

The objectives of the fisheries management plans support SDG 14.B by improving stakeholder consultation, providing a forum for fishers to advocate for improved access to marine resources and markets; SDG 14.4, to ensure a healthy population of fish stocks, and SDG 14.7, to increase the economic benefits of SIDS and least developed countries from the sustainable use of marine resources; SDG 14.2, to sustainably manage and protect coastal ecosystems through expanding the proportion of national EEZ's managed using ecosystem-based approaches; SDG 14.4, to effectively regulate harvesting and end overfishing and IUU fishing, through the implementation of fisheries management plans and regulations; and SDG 14.5, to expand the coverage of protected areas in relation to the oceans. Some of these measures also synergies with SDG 14.7, as they are designed to lead to the sustainable management of marine resources and therefore, directly, or indirectly contribute to the livelihoods of artisanal fishers in the long-term. The MMP claims to increase stakeholder awareness and participation in the development of management objectives through engagement approaches to support 14. B. Aquaculture will also create business opportunities that increase economic benefits from fish and by-product processing and help mitigate the impacts from limitation of access to fishing, aligning with SDG 14.7 goals to increase the economic benefits to SIDS and least developed countries.

Nevertheless, the government recognizes that implementation of the MSP and fisheries management plans limit local communities' access to marine resources which could negatively impact upon local livelihoods. Controls are spatial or temporal, ranging from short-term closures of certain locations to fishing, to longer-term or even permanent prohibitions on artisanal fishers' access to high biodiversity areas and marine reserves or marine conservation areas, and conditional access in medium zones. There is thus very high potential for conflict over the current MSP, fish management plans and the Blue Economy initiative. Adverse social and economic impacts of marine protection policy will affect local fishers disproportionately, a community already exposed to problems of food insecurity, high levels of inequality and low income.

The Mahé Plateau Fisheries Plan, for example, describes several regulations, including introducing new form of governance (that is, a shift from unregulated to regulated fishing), imposing seasonal restrictions, changing gear use practices (for example, banning certain

Table 2
Equity and ecological management strategies and rationales for fisheries planning [62,64,66,68,69].

MSP and Fisheries Plans	Equity Management Strategies	Rationale	Ecological Management Strategies	Rationale
Artisanal Fisheries in Mahé Plateau Trap and Line Fishery Co-Management Plan				
	Develop and implement stakeholder communication strategy	Meet funding obligations; reduce conflict between stakeholders; improve stakeholder knowledge of fisheries management; improve local input into decision-making	Minimum size limits for Emperor Red Snapper (*Lutjanus sebae*) and Green Jobfish (*Aprion virescens*) of 32 cm (fork length)	Target species identified as overfished; avoid overfishing and allow fish to reach breeding weight
	Employ full-time liaison officer	Capacity enhancement to implement stakeholder communication strategy	Bag limits (per person/day) for recreational fishers (including fishers on sportfishing/charter vessels) of 5 for Emperor Red Snapper (*Lutjanus sebae*) and Green Jobfish (*Aprion virescens*).	Limit overfishing of demersal fishery
	Develop and implement fisheries licensing framework in consultation with fishers	Facilitate greater control and monitoring of fishing	Combined demersal species bag limit for recreational fishers of 20 fish per person per day	Limit overfishing of demersal fishery
	Develop and implement revised incentive scheme for commercial fishers	Provide incentives for fishers to adhere to a licensing system and support closure of open access	Maximum limit of 20 active traps per licensed (commercial) fishing vessel	Limit overfishing of demersal fishery
	Develop framework to facilitate capacity of fishing industry to engage with SFA on management issues	Provide resources to develop clear and simple communication channels for fishing industry in dealing with government; meet transparency requirements	Maximum vessel limit of 2 traps for recreational fishers	Limit impact on demersal species; often juveniles, traditional caught by traps
	Introduce offset provisions to compensate for ecosystem and fisheries protection	Ensure fairness through compensation	Demersal fish bag limit of 20 fish per semi-industrial vessel	Semi-industrial vessels target large pelagic species using long lines, and demersal species at shallow reaches of plateau, removing large numbers of reef and demersal fish. This is to detriment of artisanal fishers who rely on these species for income and/or subsistence
			Licensed fishers limited to maximum of 6 traps per boat per day for 7 days spanning full moon on listed Rabbitfish (*Siganus* species) spawning sites from September -April	Spawning aggregations of Rabbitfish targeted, leading to overfishing and stock collapses
			No traps to be left in sea overnight on listed Rabbitfish (*Siganus* species) spawning sites from September-April	Dinoflagellates attach to trap rope lines at night and fluoresce scare Rabbitfish away from spawning sites, disrupting spawning process and daytime catch rates
			Minimum size limits for selected species Emperor Red Snapper (*Lutjanus sebae*), Green Jobfish (*Aprion virescens*), Yellowspotted Trevally (*Carangoides fulvoguttatus*), Bludger (*Carangoides gymnostethus*), Blue and Yellow Grouper (*Epinephelus multinotatus*), Twospot Red Snapper (*Lutjanus bohar*), Humphead Snapper (*Lutjanus sanguineus*) and Brown Spotted Grouper (*Epinephelus chlorostigma*)	Ensure size limit will be effective in allowing fish to breed before being caught
			Schooners and whalers may not carry more than 2 traps	Limit overfishing by reducing fishing effort
MSP zoning for Seychelles' EEZ				
	Establish governance frameworks to enable implementation and management of MSP	Ensure governance mechanism is balanced, equitable and transparent	Marine Protected Areas and Zone 1: High Biodiversity Protection Zones designated within timelines specified for both phases of MSP. Zone 1 is under an effective management regime that meet its MSP objectives	Zones designated for habitats and species that may be rare, endangered, unique or with narrow distribution ranges; Zone 1 is not suitable for extraction or seabed alteration
	Provide framework to enable communities and stakeholders to be actively engaged in MSP and Blue Economy initiative	Implementation and management depend upon effective stakeholder and involvement and ownership of process	Marine Zone 2 Medium Biodiversity Protection and Sustainable Use Zone is designated within timelines specified for both phases of MSP across 15% of EEZ and territorial waters. Zone 2 is under effective	These zones include habitats and species that have some tolerance to disturbance and human activities; these zones also include regionally and nationally significant areas; Zone 2 is suitable for some extraction and seabed alteration

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Table 2 (*continued*)

MSP and Fisheries Plans	Equity Management Strategies	Rationale	Ecological Management Strategies	Rationale
			management that meets MSP objectives	
	Provide plans that allow oceans to provide diverse ecosystem services	Ensure continued use of Seychelles waters for economic, social, and cultural benefits for local people	Zone 3: Multiple Use Zone are under effective management regimes that support their MSP objectives. Zone 2 is under effective management regime that meet its MSP objectives	Areas are identified for multiple uses and economic activity
Mariculture Masterplan (MMP)				
	Provide new economic development opportunities	Offer alternative economic livelihood opportunities as planning compensation mechanisms	Land based zone Aquaculture built on Mahé	Cultivation of various species including sea urchins, pearl oyster spat, ornamental finfish and finfish fingerlings
	Provide means to give small-scale operations exclusive access to domestic market	Provide entry point into aquaculture sector for local Seychellois investors who do not have capability to establish an offshore farm	Inshore Zone Aquaculture within 2 km of islands of Mahé , Praslin, La Digue, potentially Silhouette and Romainville	Cultivation of pearl oysters and finfish
			Aquaculture Development Zones of Mariculture Master Plan located $>$ 2 km from land	Cultivation of finifish cage cultures
			Offshore Zone Aquaculture established $>$ 5 km from land	Production characterised by fully industrial approach to aquaculture within Seychelles EEZ, with high value finfish cage cultures

fishing gear) and shifting the quality or quantity of resources that can be fished. Specifically, this includes limiting the number of traps set during the day and night for rabbitfish; introducing minimum size restrictions and bag limits for 'high-risk species'; and restrictions on the maximum number of traps for different fishing sectors - recreational fishers, licensed (commercial) fishing vessels, and schooners and whalers.

In summary, the implementation of different measures under the blue economy can support the sustainable management of marine resources in the long-term. Some area-based measures, for example, the prohibition of artisanal fishers from high biodiversity zones, can either directly or indirectly contribute to biodiversity conservation and SDG targets, such as 14.2, 14.4, and 14.5. These measures in the long-term may also address SDG 14.7, to enhance economic benefits generated from sustainable fishing through the recovery of fishing stocks. However, in the short to medium term, all measures will affect the livelihoods of artisanal fishers, given that marine resources will be subjected to new management that will see stricter protection and regulation and therefore, also trade-off with SDG 14.7. Those parts of SDG 14 designed to protect marine biodiversity also negatively trade-off with SDG 14.B, to provide access for small-scale artisanal fishers to marine resources and markets that recognizes the right of fishers.

Changes in access to marine resources can have a negative impact on household provisioning, food security and subsistence livelihoods, making it more difficult to reach SDG 1, no poverty; SDG 2, zero hunger and SDG 3, good health, and well-being. In turn, initiatives under the blue economy, such as the development of aquaculture, while designed to promote SDG 8, economic growth, through adding value to sea food chains, and SDG 9, build industry, innovation, and infrastructure, trade-off with SDG 1, no poverty, SDG 2, zero hunger and SDG 3, good health and well-being, due to the economic displacement of artisanal fishers. Changes to access to marine resources through the imposition of the MSP also trade-off with SDG 8, economic growth by restricting access for fishers to secure income from fishing resources; SDG 10, reduce inequality and SDG 16, peace, justice, and strong institutions.

4.3. Fishers voices: MSP and its consequences

Findings from FGDs with artisanal fishers demonstrate concern that the MSP will restrict access to important fishing grounds, that will negatively impact upon their livelihoods. As part of the SWIOFISH3 project requirements, the Ministry of Finance, Trade and Economic Planning drafted an Environmental and Social Management Framework that sets out a series of guidelines to assess the environmental and social risks and the broader impacts of the Blue Economy and its related MSP [57]. Mitigation strategies for overcoming some of these risks are detailed in Table 3.

Furthermore, between 2014 and 17, the Seychelles' Government held a series of stakeholder consultations, including meetings and workshops, one-to-one consultations, and several public presentations and scientific conferences [71]. The Seychelles MSP Governance Framework established in 2014 has an Executive Committee, Steering Committee, Technical Working Groups, and stakeholder engagement groups. The Steering Committee includes representatives from each sector, while the Technical Working Group on fisheries has representatives from fishing associations across the Seychelles [72]. These Technical Working Groups are also charged with the task of utilising local knowledge to inform planning outputs [72].

The significance of this participatory approach is recognized among the NGO community, particularly given the country's political history. A representative from the Green Islands Foundation described the importance of developing participatory approaches in the Seychelles:

> Because we have been a one-party state for a very long time, it's been top-down approaches in terms of management but that hasn't worked, hasn't worked at all - so now what we want to introduce is a better approach so the fishers would come forward with the measures that they think should be applied, they think are practical and we would put together a plan, a co-management plan we would call it, and these artisanal fishermen propose it to government (Representative from the Green Islands Foundation).

The Mahé Plateau Trap and Line Fishery Co-Management Plan was developed through an stakeholder engagement process involving government agencies and departments, fishers, NGOs, restaurateurs, processors, and those drawn from boating and seafood retail sectors [64]. Stakeholder consultation began in 2014 through a series of workshops on Mahé and Praslin, where stakeholders identified and prioritised key issues affecting the artisanal fishing industry and co-developed suitable management strategies [64]. An Implementation Committee (comprised of 14 members from the fisheries sector) was established, meeting regularly to discuss progress on the Plan and make recommendations to the Minister [64]. Despite the engagement of fishers through this process, one individual complained about the slow pace of progress:

Table 3
Impacts and mitigation strategies of fisheries management on the fisheries sector and SDGs [62, 64, 66, 68–70].

Management Interventions	Positive Impacts	Negative Impacts	Synergies with SDG 14 Targets	Trade-offs with SDG 14 Targets	Synergies with other SDGs	Trade-offs with Other SDGs	Social Mitigation Strategies
Implementation of Fisheries Management Plans for Mahé Plateau	1) Improvement in health of fisheries sector 2) Increased income from sustainable fishing 3) Reduction in unsustainable fishing practices and bycatch losses 4) Improvement in health and safety conditions for fishers 5) Increased capacity for co-management 6) Increased stakeholder awareness and participation in development of management interventions, and decision-making processes 7) Management interventions are locally relevant and supported 8) Enhanced monitoring, control, and surveillance	1) Loss of access to marine resources 2) Change to quality or quantity of household access to resources (e.g., limits on species and size limits of fish caught) 3) Change in seasonal access (e.g., seasonality of when fish can be caught in certain areas) 4) Change in nature of access (e.g., regulated to unregulated system) 5) Change in types of fishing tackle and equipment (e.g., banning certain types fishing gear) 6) Loss of access to areas that support livelihoods or subsistence lifestyles 7) Loss of access to places with cultural and spiritual value 8) Economic displacement, and/or increased food insecurity 9) Loss of fixed physical assets (e.g., ability to maintain infrastructure to support fishing boats and ice due to lack of income) 10) Lack of knowledge, awareness, and support for management interventions 11) Conflicts arising between stakeholders from management interventions	SDG 14.B SDG 14.4 SDG 14.7	SDG 14. B SDG 14.7	SDG 1 SDG 2 SDG 3 SDG 8 SDG 10 SDG 12 SDG 16	SDG 1 SDG 2 SDG 3 SDG 8 SDG 10 SDG 16	1) Careful site selection of project facilities, avoiding inhabited areas or those with important socio-cultural value 2) Early development and implementation of resettlement planning 3) Employment plan, giving preference to local employment 4) Develop detailed baseline of existing reliance on fishery resources in project area 5) Develop compensation measures for affected parties. Introduce offset provisions to compensate ecosystem impacts affecting fishery 6) Transparent and culturally appropriate communication with communities 7) Development of Cultural Heritage Management Plan 8) Provision of community support and development mechanisms for subsistence fisheries/aquaculture 9) Adoption of Stakeholder Engagement Plan, as framework for early and ongoing community consultation and communication 10) Implementation of Grievance Procedure
MSP zoning for Seychelles' EEZ	1) Enhanced protection of high and medium biodiversity zones 2) Improvement of overall health of species and ecosystems 3) Improved management of protected areas and enhanced monitoring, control, and surveillance 4) Better implementation of access controls 5) Increased income from sustainable fishing 6) Reduction in unsustainable fishing practices and bycatch losses 7) Improvement in health and safety conditions for fishers	As above	SDG 14.B SDG 14.2 SDG 14.4 SDG 14.5 SDG 14.7	SDG 14. B SDG 14.7	SDG 1 SDG 2 SDG 3 SDG 8 SDG 10 SDG 12 SDG 16	SDG 1 SDG 2 SDG 3 SDG 8 SDG 10 SDG 16	As above

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Table 3 (*continued*)

Management Interventions	Positive Impacts	Negative Impacts	Synergies with SDG 14 Targets	Trade-offs with SDG 14 Targets	Synergies with other SDGs	Trade-offs with Other SDGs	Social Mitigation Strategies
	8) Equitable and transparent decision-making processes 9) Increased stakeholder awareness and participation in the development of management interventions and decision-making 10) Management interventions are locally relevant and supported						
Seychelles Mariculture Masterplan (MMP)	1) Direct employment of local population 2) Skills development in Mariculture industry 3) Development of value-added businesses 4) Removal of constraints to successful fisheries business 5) Provision of access to financial mechanisms 6) Mitigation of impact from limitation of access to fishing 7) Increased stakeholder awareness and participation in development of management interventions and decision-making processes 8) Management interventions are locally relevant and supported	1) Social and cultural change from inward migration of workers 2) Loss of access to marine resources 3) Loss of access to areas that support livelihoods or subsistence lifestyles 4) Loss of access to places with cultural and spiritual value 5) Economic displacement, and/or increased food insecurity 6) Loss of fixed physical assets 7) Lack of knowledge, awareness, and support for management interventions 8) Conflicts arising between stakeholders from management interventions	SDG 14.B SDG 14.7	SDG 14. B SDG 14.7	SDG 1 SDG 2 SDG 3 SDG 8 SDG 9 SDG 12	SDG 1 SDG 2 SDG 3 SDG 8 SDG 10 SDG 16	1) Multi-level governance approach adopted to ensure those interested in mariculture are given opportunity to learn more about sector and are engaged in decision-making 2) Employ local labour and service providers where possible 3) Formalise skills development through strategic community skills development programme 4) Establish community liaison committee to consult on human resource and social issues 5) Implement comprehensive stakeholder engagement process and grievance mechanism 6) Conduct dive survey in project areas to assess impacts 7) Implement chance find procedures to assess impacts on site 8) Develop mechanisms to allow entrance or joint ventures with maricuture operators and investors 9) Investors must comply with all new MMP regulations, standards, and license conditions to guarantee sustainable healthy fishing practices 10) All opportunities to benefit artisanal fishing industry should be considered and implemented where feasible 11) Establish Mariculture Monitoring Committee to manage sector, monitor price of fish and various conflicts between operators and local fishers 12) Improve capacity building of Mariculture industry

1) **SDG 1:** End Poverty
2) **SDG 2:** End Hunger
3) **SDG 3:** Good Health and Well-being
4) **SDG 8:** Economic Growth
5) **SDG 9:** Industry, Innovation, and Infrastructure
6) **SDG 10:** Reduce Inequality
7) **SDG 12:** Responsible Consumption and Protection
8) **SDG 16:** Peace Justice and Strong Institutions

> We have a management plan for our Mahé Plateau and in over two years we have submitted calls to government on the management plan. We've made proposals to have a catch limit for the recreational and chartered vessel. For two years! Nothing has been done (Artisanal Fisher D).

Consultation did bring some changes to the MSP, including, for example, the introduction of prohibition of semi-industrial fisheries in the Mahé Plateau to reduce spatial conflicts with artisanal fishing. However, while government claims that MSP decisions were 'taken using a transparent governance framework' [54], artisanal fishers have expressed their frustration about not having their voices heard due to poor consultation in practice. They felt that practice fell short of genuine, open participation:

> I do know that FBOA, they are consulted …. I mean they are involved *to a certain extent* … (Representative from the Green Islands Foundation, emphasis added).

An artisanal fisher is more direct in his critique:

> [We have] controversy, over and over on the Plan, on the MSP and reserves, but we have them everywhere, we are not against them, but need proper consultation with us (Artisanal Fisher D).

A similar lack of participation marred the production of the Economy Roadmap, which was released prior to the completion of the three consultation phases promised by government. The consultation that did take place was at a very inconvenient time and was hampered by time constraints [46]. The process was seen by fishers as a failure to recognize how the MSP and related fisheries plans will restrict their livelihoods. The designation of potential high biodiversity zones, which will be no-take, in key artisanal fishing areas close to the inshore waters of the Mahé Plateau is a key source of contention. The Mahé Plateau is an important area for the demersal fishing, supporting local livelihoods targeting the domestic market. One artisanal fisher is blunt in his assessment of such planning:

> It's messy, it leads to difficulties for Seychellois fishers (Artisanal Fisher D).

Several artisanal fishers spoke about their lack of power to influence policy, and that they became the target of restrictions. From this perspective, both formulation of national plans and the subsequent implementation of the MSP is seen as shaped by power imbalances:

> They wanted to make our long line fishing area a controlled area because they can. They can't control the larger boats and so therefore the smaller ones [are] hit instead (Artisanal Fisher E).

Many artisanal fishermen also described the negative impact of other unregulated fishery activities, such as the recreational fishers, which competes with local fishers and negatively impacts upon fishing stocks. As their costs are covered by tourist payments for boat hire:

> [recreational fishers] don't have to fish to cover the costs but can sell the fish to hotels [at a cheaper rate] and this then displaces us as sellers. And the boat is faster, [and travels] 40/50 k and over a larger area and can move quickly [over] large distances and has the latest technology. And the fuel costs are less important to them, and therefore they are not playing on a level field (Artisanal Fisher C).

Some of the MSP zones also include restrictions on long-line fishing by artisanal fishers targeting pelagic fish, yet do not impose restrictions on charters and recreational fishers, highlighting matters of distributional justice. As one artisanal fisher reflects:

> But there has been a major increase in recreational and charter boats, and they go fishing; there are no records [of catch], no restrictions, open access fishing *for them*, no control (Artisanal Fisher C).

Furthermore, restrictions are also perceived to enhance the potential for illegal fishing operations because local fishermen will no longer be able to act as traditional watchers, reporting illegal activity on the ground. This speaks to a lack of recognition of the role local fishers play in marine conservation, including their knowledge base and the significance of traditional practices for marine conservation [61]. The tendency to ignore this knowledge was also reflected in concern that a restriction zone is located on a popular bank commonly used by artisanal fishers:

> There is too rigid an approach given pelagic fishing dynamics and how these fish move (Artisanal Fisher E).

This view contrasts with the more positive assessment provided by one of the environmental NGOs, stressing that the new fisheries management and marine conservation policies will be embedded in law:

> I participated in the marine spatial planning meetings because all of the island is involved …. this plan will fit into national documents obviously and yeah, they will have legal basis because it will be linked to the Act, so we will make sure that it does have more weight than just a report (Representative from the Green Islands Foundation).

The Representative, who played a critical role in the drafting of the fisheries management plans, explained the background to the initiative:

> If you look in fisheries now, there is no management per se, there is a bit of management … with the sea cucumber [and] lobster, so there is management with these two fish, otherwise it's open. … in terms of enforcement, it's quite limited, it's very limited. There is nothing there, so we feel that there should be more because … you know, a lot of the shark species are threatened, there are being looked at as threatened intentionally and the Seychelles have signed conditions agreeing that the fisheries of these species should be banned - but it's not in force, just because it's not popular (Representative from the Green Islands Foundation).

There are also plans to use the MSP to improve the economic contribution of the marine environment through fish farming. A Mariculture Steering Committee (MSC), which included stakeholders from the public sector, semi-state bodies, private sector and civil society, was initiated at the beginning of the project provide a platform for stakeholders to discuss the development of the MMP [66]. Consultation on the Plan was ongoing throughout 2009–2016 [66]. However, considerable concern has arising, as it is seen as being imposed from the top, without learning lessons from previous aquaculture initiatives. The operation of prawn farming (1989–2009) resulted in contamination of lagoons on the eastern side of the island due to the discharge of water heavily loaded with organic matter, mostly from uneaten feed and faeces produced by the shrimps. Both the reef and the marine ecosystem of the lagoons now need restoration [56].

> There was an aquaculture center that went wrong in the Seychelles based on prawn farming that completed destroyed the reef and an outer island. If you go there now -they have left the pens there and left the whole area [abandoned] (Academic Researcher on Marine Conservation).

An Environmental and Social Impact Assessment (ESIA) for the MMP [69] was conducted in 2016 to identify impacts and propose suitable mitigation measures including, for example, site selection to avoid areas regarded as high value by local communities; employment plans giving preferences to local communities; resettlement planning and compensation measures, and an invasive species management plan (Table 3). However, these have not alleviated concern that the Plan was developed without drawing upon experience and expertise from the region. Artisanal fishers also raise concerns that the Plan has been developed using what they deemed as 'foreign ideas', disregarding traditional practices (authors' field notes).

> It's also failed previously in our region; others have complained about shark attacks in Reunion associated with the aquaculture because of the waste produced. We are not learning from our region; we are learning from foreigners…We have local expertise that know how coral reefs function etc … but they outsource their expertise from Norway who farm salmon … They have a masterplan that has been developed by foreigners with no local knowledge input … there is also a problem of escapees, so fish that are reared escaping and destroying the genetics of the wild populations, and the use of antibiotics, and waste, and it's going to open up a new fishery (Academic Researcher on Marine Conservation).

Others point to the fact that the Seychelles allows hotel construction and petroleum exploration in its MPAs, and that the Blue Economy Initiative also allows deep seabed mining with possible risks to marine life (Authors field notes). Findings suggest the socio-economic impact of MSP and fishing management plans are seen by local fishers in the Seychelles as overwhelmingly negative, reducing or denying them access to marine and coastal areas and resources, and threatening local livelihoods.

5. Discussion and conclusion

The paper offers empirical evidence for the argument that planning for the blue economy and its associated MSP may preclude coastal communities from access to local marine resources, and thus limit progress on those SDG targets associated with no poverty (SDG 1), end hunger (SDG 2), good health, and well-being (SDG 3), and reducing inequalities that affect poorer people (SDG 10). The risk of resource-based conflict might also increase, negatively affecting SDG targets aimed at reducing conflict and violence (SDG 16) [73]. In relation to the case of the Seychelles, this paper reveals a noticeable tension within the central strategies of the blue economy, and its related MSP, between creating sustainable wealth, sharing prosperity, and securing healthy and productive oceans. Trade-offs have been found within the SDGs, and manifest in conflicts between international interests, government preferences, and the livelihoods of local fishers.

How these tensions play out in practice was revealed through evidence of the negative impacts the MSP has upon local artisanal fishers. An array of restrictions is being introduced that limit access to marine resources for local fishers, which risk exacerbating already problematic socio-economic constraints on Seychellois fishers' livelihoods. In practice, some consultation measures are seen as poorly implemented and fail to draw upon local knowledge and expertise. The emphasis upon private sector investment, as seen in the development of aquaculture, also raised concerns about the failure of the planning process to provide access for small-scale artisanal fishers to marine resources and markets in ways that recognizes and protects their rights (SDG 14.B).

These findings point to the need to take account of the socio-economic, cultural, and political context to understanding how the SDGs are being implemented in practice. Such contextual understanding can be used to identify how power relations serve to hinder the realization of synergies between the SDGs. This emphasizes the importance of ensuring just mechanisms for prioritizing and analysing trade-offs between competing interests and different mosaics of uses in the SDGs, therefore, ensuring efforts to secure the biodiversity of oceans through opening them up to enhanced economic use does not come at the expense of local livelihoods (SDG 14, versus SDG 1–3). It also reveals how environmental protection measures can be used as a ruse to expand growth orientated models of development and promote only weak forms of sustainability. These risks jeopardizing the higher, normative value of promoting sustainable futures by ending poverty and equality.

This raises concerns about the lack of attention to distributive justice. The development of aquaculture, for example, has the potential to lead to economic displacement of fishers from the sector. This is due to the competition aquaculture may introduce in domestic and international markets and the loss of access to valuable fishing grounds both inshore and offshore [61]. Here fishers risk having to accept western priorities, models and solutions for conservation that undermine local epistemologies and ways, practices, and traditions for engaging with the marine environment [61]. The dominance of western paradigms for conservation here serves to marginalises alternative knowledge contributions embedded in the expertise of local fishers, which also speaks to matters of epistemic justice [61].

Here it also becomes clear how power imbalances shape trade-offs, with the weaker socio-economic group experiencing the most negative trade-off impacts. In this context, there has been a failure to ensure procedural fairness in decision making, needed to promote equitable outcomes. The blue economy vision of the oceans as a new economic frontier has excluded certain sectors and groups from genuine participation in, and deriving benefits from, planning. Schutter and Hicks [74] suggest that the Seychelles is distancing from the 'Oceans as natural capital' in favour of an 'Oceans as livelihoods' approach. In contrast, our findings suggest that the governance of the Blue Economy Initiative in relation to the planning process, has not given sufficient attention to establishing procedures that give voice to marginalized groups. The failure to ensure a sense of procedural fairness was shown to exacerbate conflict, rendering it more difficult to ensure synergies between SDGs.

Substantive changes to policies are needed, as well as reform to existing governance practices to ensure that the blue economy and economic development plans for the ocean become compatible with the SDGs. Numerous mechanisms to ensure fairness include ensuring fair access to financial support, capacity enhancement, including of social capital, changes to physical infrastructure assets, as well as changes to funding priorities, paying greater attention to gender and calls for the endorsement of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (SSF) [25,75]. More transformative approaches have also been targeted, focusing on shifting policy priorities and their underlying values to place equity at the centre of ocean development, international negotiations, and their related instruments [76]. Inclusive governance practices are also seen as required to realize social equity and sustainability, built upon government mandates guaranteeing information transparency and well-designed decision-making processes that ensure all voices are heard and incorporated into decisions [10]. Attention has also been focused on the need to democratise ocean knowledge [25,61].

We started this paper by arguing that recognition and procedure are two key features of governance that support equitable outcomes from public policy. Procedural fairness and distributive justice go hand in hand and serve as critical mechanisms for promoting social equity. We recommend that governance processes associated with ocean development engage in forms of participation that promote procedural fairness. This requires teaching cultural acceptance of the value of fairness within management, acknowledging the importance of drawing upon diverse knowledge type in participatory processes, and ensuring transparency in decision making. The practice of good governance can act as a key mechanism, but this needs to be combined with recognition. Recognition is based on acceptance of the rights of others, including of non-humans, to have their interests accounted in policy making. Combining recognition and procedure will provide mechanism of justice to steer ocean development planning and is an important first step in ensuring equitable outcomes when addressing trade-offs in the implementation of SDGs.

Justice is a systems attribute and further research is needed on the role of justice in system change. By distinguishing between the outcome that we wish to achieve, social equity, and the mechanism to promote these outcomes, namely the exercise of justice in public policy actions and decisions, we sharpen our focus on how social equity can be achieved in practice and on the research that is needed to support those efforts. New efforts are needed to identify trade-offs in the SDGs and how decisions on the distribution of benefits are made and by whom. Further research is also needed into how and in what ways the exercise

of good governance principles, such as transparency and participation, can be institutionalised in practice. Justice and equity are ultimately related, and we hope that this paper has contributed by showing the key role that justice, in its different forms, plays in promoting social equity within the system.

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CRediT authorship contribution statement

Susan Baker: Conceptualisation, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Supervision, Project administration. **Natasha Constant:** Conceptualisation, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Visualisation. **Poppy Nicol:** Formal analysis, Writing – original draft.

Declaration of Competing Interest

None.

Data Availability

Data will be made available on request.

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