Poverty and gender considerations in marine spatial planning

Conceptual and analytical framework

Swedish Agency
for Marine and
Water Management

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Summary

Marine spatial planning (MSP) is a strategic and adaptive process for spatial planning of human activities in marine areas, at national, subnational or regional scale. It is hailed as fostering the sustainable development of marine and maritime sectors, in order to achieve ecological, economic and social objectives. MSP has gained traction globally over the last two decades, including in developing countries in recent years.

This report provides an approach for ensuring that MSP does not worsen poverty and gender inequality in developing countries, and that potentially marginalised groups are appropriately considered and engaged in the MSP process. Although concerns have been vocalised, very little research has been carried out on mainstreaming poverty and gender perspectives in the MSP process and its impact on marginalised groups. Furthermore, the plethora of guidelines and tools to carry out MSP do not explicitly address these concerns.

In this report we suggest that a scorecard is used to guide and certify the social sustainability of the MSP process, and as part of the requirements of this scorecard, that indices for specific criteria pertaining to the wellbeing of potentially marginalised groups such as poor communities and women are used in the multi-criteria analysis of planning options considered as well as in the monitoring of MSP outcomes. These criteria include power and voice, resources, opportunity and choice, community security, and domestic harmony. The criteria are based on the multi-dimensional poverty assessment framework by the Swedish International Development Cooperation Agency (Sida).

Guidelines are provided for the steps of a more inclusive MSP process. Moderately comprehensive social surveys were undertaken in Kenya, Tanzania and Madagascar, to test the metrics for incorporating gender and poverty dimensions into MSP that were developed in the framework. Data availability varied from country to country which made it necessary to collect suitable data to undertake MSP, particularly as the impacts on vulnerable communities and groups need to be taken into account. The questionnaires did result in a large amount of data which could be reduced in future collection procedures, for example by simplifying some measures to a single question. Income was used as a measure of access to resources and was undoubtedly the most important metric. Most indicator values varied little within each country; there was greater variation between countries.

This report forms part of the Swedish Agency for Marine and Water Management's efforts to support MSP implementation in the Western Indian Ocean.

Summary in Swedish / *Svensk sammanfattning*

Havsplanering är en strategisk och anpassningsbar process för fysisk planering av mänsklig verksamhet i havet på nationell, subnationell eller regional nivå. Den anses främja en hållbar utveckling av marina och maritima sektorer för att uppnå ekologiska, ekonomiska och sociala mål. Havsplaneringen har fått ett stort genomslag globalt under de senaste två decennierna, på senare år även i utvecklingsländerna.

Den här rapporten innehåller ett tillvägagångssätt för att se till att havsplanering inte förvärrar fattigdom eller ojämlikhet mellan könen i utvecklingsländer, och att potentiellt marginaliserade grupper beaktas och engageras på lämpligt sätt i havsplaneringsprocessen. Även om oro har uttryckts har mycket lite forskning genomförts rörande integrering av fattigdoms- och jämställdhetsperspektivet i havsplaneringsprocessen och dess inverkan på marginaliserade grupper. Dessutom tar de många riktlinjer och verktyg som finns för att genomföra havsplanering inte uttryckligen upp dessa frågor.

I den här rapporten föreslår vi att en checklista används för att vägleda och säkerställa den sociala hållbarheten i havsplaneringsprocessen. Som en del i denna checklista bör ett index för specifika kriterier som rör välbefinnandet hos potentiellt marginaliserade grupper som fattiga och kvinnor användas i multikriterieanalysen av de planeringsalternativ som övervägs samt i övervakningen av resultaten av havsplaneringen. Dessa kriterier omfattar makt och inflytande, resurser, möjligheter och valmöjligheter, trygghet i samhället och harmoni i hemmet. Kriterierna bygger på Sidas ramverk för bedömning av flerdimensionell fattigdom.

Riktlinjer ges för de olika stegen i en mer inkluderande marin planeringsprocess. Pilotstudier med begränsad omfattning genomfördes i Kenya, Tanzania och Madagaskar för att testa dessa metoder för att införliva jämställdhets- och fattigdomsdimensionerna i havsplaneringen i enlighet med det utvecklade ramverket. Tillgången till data varierade från land till land, vilket gjorde det nödvändigt att samla in ny lämplig data för att kunna analysera effekterna på utsatta samhällen och grupper av havsplaneringen. Frågeformulären resulterade i en stor mängd data som skulle kunna minskas i framtida datainsamlingar, t.ex. genom att förenkla vissa åtgärder till en enda fråga. Inkomst användes som ett mått på tillgång till resurser och var utan tvekan det viktigaste måttet. Värdet för de flesta indikatorer varierade lite inom varje land, men variationen mellan länderna var större.

Den här rapporten är en del av Havs- och vattenmyndighetens insatser för att stödja genomförandet av havsplaneringen i västra Indiska oceanen.

Preface

During the last two decades marine spatial planning (MSP) has emerged as a powerful framework to enable conditions for a sustainable blue economy, founded on ecosystem-based management and sustainable ocean governance. MSP has the potential to help countries to address the Sustainable Development Goals of the UN Agenda 2030.

However, MSP is also a centrally driven process, and its applicability requires specific attention to be given to the needs of poorer or marginalized groups. This report presents a way forward to mainstreaming poverty and gender considerations in MSP.

This study is a result of SwAM Ocean our international development cooperation SwAM Ocean. With SwAM Ocean we aim to increase the opportunities for people to get out of poverty thanks to sustainable use of the sea. Together with our partners we strengthen the capacity to plan the future of the ocean, to take care of the ocean and to use the ocean – for the joy and benefit of all.

The MSP framework presented in this report aims to ensure that marine spatial planning does not worsen poverty and gender inequality in developing countries, and that potentially marginalised groups are appropriately considered and engaged in the process. The framework builds upon findings from three pilot field studies in Madagascar, Kenya and Tanzania.

Our goal with this work was to contribute with new knowledge on how marine spatial planning can contribute to more socio-economic development and gender equal societies, how more equal opportunities and participation can realize sustainable development goals, and to minimize user conflict and lessen environmental impacts, while democratizing the use and management of the sea.

Already, findings from our work are incorporated in the IOC-UNESCO and EU international guide on marine spatial planning published 2021. This clearly underlines that the ability to strengthen and mainstream perspectives such as poverty and gender increases the usefulness of MSP in a wider context. I hope that you will enjoy using our report.

Thomas Klein
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Introduction

Marine spatial planning (MSP) is a strategic process for spatial planning of the use of the sea designed to bring about sustainable development of the "blue economy" through ecosystem-based management[1] and sustainable ocean governance (Douvere, 2008; Ehler & Douvere, 2009; Schaefer & Barale, 2011). It is defined as a "*public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that are usually specified through a political process.*[2]" It is advocated by the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) as a participatory, adaptive approach that involves the use of spatial zonation to reduce user conflict and cumulative negative impacts on marine ecosystems.

Through its stakeholder engagement approach, integration of sectoral interests and approach to dealing with conflicts of interest, MSP provides the potential for a paradigm shift to democratise the management of the seas (Frazão Santos et al., 2014; Katsanevakis et al., 2011; Pomeroy & Douvere, 2008). It is viewed as an important step in the implementation of comprehensive ecosystem-based management[3] while also promising to deliver on sustainable development goals (Ntona & Morgera, 2018). However, there has been considerable criticism of MSP in practice. This includes that MSP is being seen primarily as a means to unlock "blue growth"[4], with environmental and social considerations often taking a back seat (Frazão Santos et al., 2018; Jones et al., 2016; Qiu & Jones, 2013; Silver et al., 2015; Trouillet, 2020). Because MSP sometimes tends to be sectorally-focused, there is a risk that it does not take all of the complex social issues around space into account, such as the value of certain areas for marginalised groups (Flannery et al., 2018). Coastal communities associate oceans and seas with a sense of belonging, meaning, identity and self-worth, and derive both material and immaterial well-being from activities, engagement with a place and locational experiences (Fincher, 2016). Different groups affected by MSP have different values, attitudes, perceptions, beliefs and experiences about the marine environment, all of which must in some way be taken account. There have been important gaps in MSP relating to the assessment of social values, including the lack of spatial representation of 'social connections' to the marine environment and consideration of non-market values (Domínguez-Tejo et al., 2016)

MSP has gained momentum over the past 15 years (Ehler, 2017; Ehler et al., 2019). To date 2022, about 102 countries have already embarked on the process, with some having already developed and implemented their plans (IOC-UNESCO, 2022b). Lessons learned and technical guidelines from across the world are shared among the international practice of MSP and support countries in revising their national legislation and mandates (UNESCO-IOC/European Commission, 2021). In 2012, the African Union adopted the "2050 Africa's Integrated Maritime Strategy" which supports the concept of MSP and strives towards an efficient and sustainable use of marine resources. South Africa, Namibia, and Angola, all part of the Benguela Current Large Marine Ecosystem, were the first African countries to promote sustainable ocean use and implement MSP. Planning of MSP is underway in other African countries as well. For example, in

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[1] This entails adherence to the Malawi Principles. http://www.fao.org/3/y4773e/y4773e0e.htm

[2] http://mspglobal2030.org/about/

[3] This entails adherence to the Malawi Principles. http://www.fao.org/3/y4773e/y4773e0e.htm

[4] The economic growth derived from development of the marine and maritime sectors, including renewable energies, offshore aquaculture, extraction of minerals, and fibre optic cable

Kenya, a multi-sectoral working group was established under the Department for Fisheries, Aquaculture and the Blue Economy to guide the development of MSP (IOC-UNESCO, 2022a).

It is important to consider MSP in a developing country context, where large-scale planning of this nature will come with many challenges, including major power and information asymmetries, different cultural, political and institutional contexts, and capacity and data shortages. The Swedish Agency for Marine and Water Management (SwAM), which is supporting the implementation of MSP in the Western Indian Ocean (WIO) region[5], had identified that there was a research and practice gap on how to incorporate gender and poverty perspectives in MSP (Havs- och vattenmyndigheten, 2019). SwAM therefore commissioned the Environment for Development (EfD) at the University of Gothenburg to assist with the development of an approach to doing this, and to refine aspects of the approach through case studies. The key questions that were posed are:

1. How can the MSP process take people living in poverty in traditional coastal societies into consideration?

2. How can planners ensure that the MSP process integrates gender when working in a context where access to information and resources, the labour market and participation in public and political process are gender segregated?

Outline of this report

The report starts with an outline of MSP, and a discussion of its poverty and gender dimensions. It explores how these groups are affected by MSP process and why this matters, and considers the potential for MSP to contribute to gender equality and poverty alleviation in developing countries. It then outlines an approach for designing a more socially-sustainable MSP process that ensures that the needs of marginalised groups are fairly taken into consideration in the MSP process. The report then provides some guidance on the collection of information on marginalised communities and women for use in a socially-sustainable MSP process. This draws on pilot studies conducted in Kenya, Tanzania and Madagascar. Finally, some recommendations are made on the way forward in order to further improve this aspect of MSP.

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[5] WIO countries include Comoros, Kenya, Madagascar, Mauritius, Mozambique, Réunion (France), Seychelles, Somalia, South Africa and Tanzania.

Overview of MSP

IOC-UNESCO, the United Nations body responsible for supporting global ocean science and services, has developed guidelines for MSP[6]. They suggest a 10-step process that includes the engagement of stakeholders and analysis of the existing situation and potential future scenarios in the production of a Marine Spatial Plan (Figure 1; see Ehler & Douvere, 2009). The ten steps are not a simple linear process; rather, some steps create feedback loops to others. A public participation process is included for the majority of steps in the MSP process (shown in orange in Figure 1). The process is typically centred on a marine zonation plan which delineates areas in terms of the different marine activities that are prioritised.
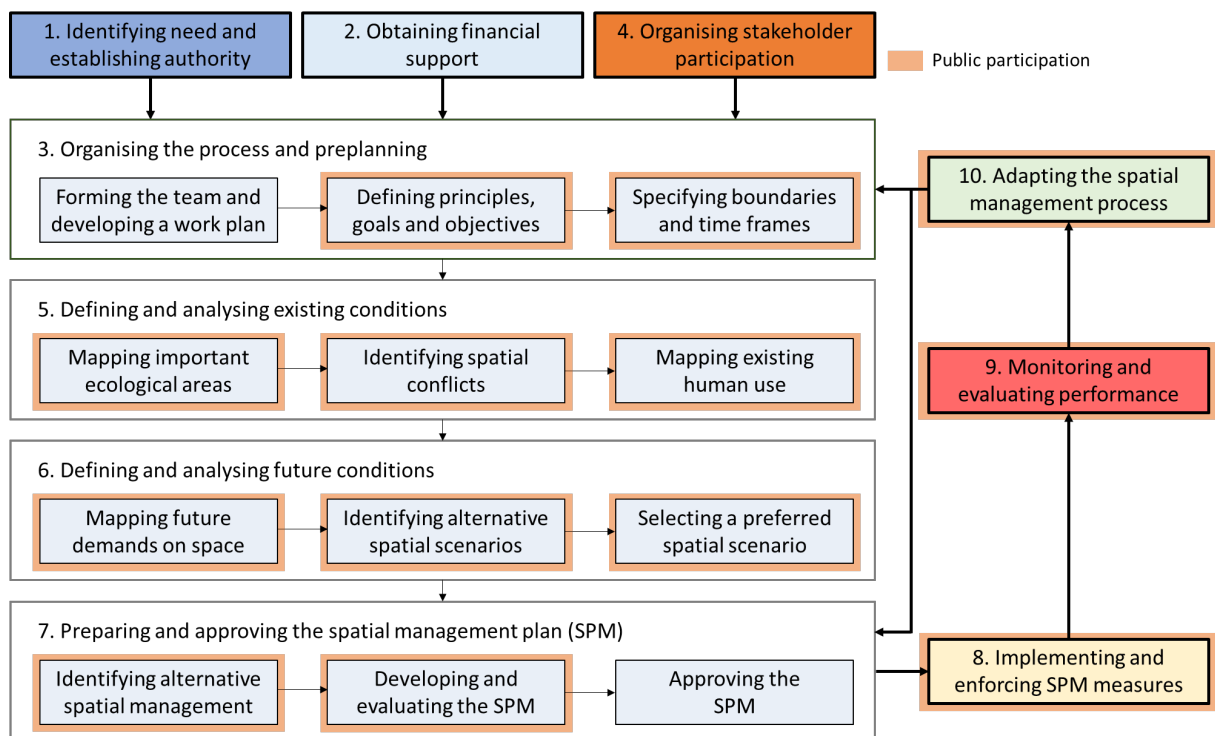
Figure 1. The ten step approach to marine spatial planning (adapted from Ehler & Douvere, 2009).

MSP is not intended to replace existing management paradigms such as integrated coastal zone management (ICZM), ecosystem-based management (EBM), ecosystem approach to fisheries (EAF) or MPAs, but rather integrates these established tools (UNEP-Nairobi Convention Secretariat et al., 2017) (UNECA, 2016).

Overall, the IOC-UNESCO guidelines (Ehler & Douvere, 2009) define an effective MSP process as one that is:

1. Ecosystem-based, balancing ecological, economic, and social goals and objectives toward sustainable development;
2. Integrated across sectors and agencies, and among levels of government;

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[6] http://www.mspglobal2030.org/resources/key-msp-references/step-by-step-approach/

3. Place-based or area-based;
4. Adaptive, and capable of learning from experience;
5. Strategic and anticipatory, focused on the long-term; and,
6. Participatory, with stakeholders actively involved in the process.

Table 1. Summary of the outputs of the ten steps of MSP. Source: Ehler & Douvere (2009).

Step		Outputs
1	The identification of need and establishing authority.	(a) a preliminary list of specific problems to be solved through marine spatial planning
		(b) a decision about what kind of authority is required for developing marine spatial planning
2	Obtaining financial support.	A financial plan that:
		(a) estimates the costs of the MSP activities
		(b) identifies alternative means to obtain financing for those MSP activities
3	Organising the process through pre-planning	(a) organisation of a marine spatial planning team with the desired skills
		(b) a work plan that identifies key work products and resources required to complete the outputs of planning on time
		(c) defined boundaries & time frame for analysis and management
		(d) a set of principles to guide development of the marine spatial management plan
		(e) a set of goals and objectives for the management area
4	Organising stakeholder participation	(a) a plan indicating who, when and how to involve stakeholders throughout the marine spatial planning process
5	Defining and analysing existing conditions	(a) an inventory and maps of important biological and ecological areas in the marine management area
		(b) an inventory and maps of current human activities (and pressures) in the marine management area
		(c) an assessment of possible conflicts and compatibilities among and between existing human uses
6	Defining and analysing future conditions	(a) a trend scenario illustrating how the MSP area will look if the present conditions continue without new management interventions
		(b) alternative spatial sea use scenarios illustrating how the management area might look when human activities are redistributed based on new goals and objectives
		(c) a preferred scenario that provides the basis for identifying and selecting management measures in the spatial management plan
7	Preparing and approving the spatial management plan	(a) an identification and evaluation of alterative management measures for the spatial management plan
		(b) identification of criteria for selecting alternative management measures
		(c) a comprehensive management plan, including if needed, a zoning plan
8	Implementing and enforcing the spatial management plan	(a) clear identification of actions required to implement, ensure compliance with, and enforce the spatial management plan.
9	Monitoring and evaluating performance	(a) a monitoring system designed to measure indicators of the performance of marine spatial management measures
		(b) information on the performance of marine spatial management measures that will be used for evaluation
		(c) periodic reports to decision makers, stakeholders, and the public about the performance of the marine spatial management plan.
10	Adapting the marine spatial management process	(a) proposals for adapting management goals, objectives, outcomes and strategies for the next round of planning
		(b) the identification of applied research needs

MSP can and should accommodate the 12 Malawi Principles for an ecosystem approach to biodiversity management, agreed upon in a CBD workshop in Malawi in 1998 (Box 1). This approach also includes the involvement of all relevant sectors of society.

Box 1. The Malawi Principles on the ecosystem approach to biodiversity management

1. Management objectives are a matter of societal choice.

2. Management should be decentralized to the lowest appropriate level.

3. Ecosystem managers should consider the effects of their activities on adjacent and other ecosystems.

4. Recognizing potential gains from management there is a need to understand the ecosystem in an economic context, considering for example mitigating market distortions, aligning incentives to promote sustainable use, and internalizing costs and benefits.

5. A key feature of the ecosystem approach includes conservation of ecosystem structure and functioning.

6. Ecosystems must be managed within the limits to their functioning.

7. The ecosystem approach should be undertaken at the appropriate scale.

8. Recognizing the varying temporal scales and lag effects which characterize ecosystem processes, objectives for ecosystem management should be set for the long term.

9. Management must recognize that change is inevitable.

10. The ecosystem approach should seek the appropriate balance between conservation and use of biodiversity.

11. The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

12. The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

As per the guidelines, the final output of MSP is a comprehensive, strategic document that provides the framework and direction for decisions related to specific management actions. This identifies when, where, and how management actions will deliver desired outcomes for a chosen marine spatial vision. This is typically centred on a marine zonation plan which delineates areas in terms of the activities that are prioritised, for example biodiversity protection, shipping, industrial fishing.

Because MSP is such a complex and large-scale undertaking, a considerable amount of effort has gone into developing tools that can be used to streamline the process (Lagabrielle *et al.*, 2018a; Metcalfe *et al.*, 2018; Weig & Schultz-Zehden, 2019; Stelzenmüller *et al.*, 2013). These include tools that are used to understand the spatial use of the marine environment and interactions between activities, spatial conservation and development planning tools (see Stanford *et al.*, 2013), tools to assess cumulative risks of human pressures (for example the GIS-based *Symphony* tool - Hammar *et al.*, 2020), and decision support (DSS) tools to evaluate scenarios.

Poverty and gender dimensions of MSP

Poverty

The poverty reduction imperative

The UN's 2030 Agenda for Sustainable Development acknowledges that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. The first Sustainable Development Goal (SDG 1) aims to "*End poverty in all its forms everywhere*". The seven associated targets aim to eradicate extreme poverty for all people everywhere, reduce at least by half the proportion of men, women and children of all ages living in poverty, and implement nationally appropriate social protection systems and measures for all.

Developing countries typically try to address poverty through economic growth. Increasingly, coastal countries are looking at the potential for blue growth, and MSP is seen as a means to facilitate this. However, in addition to concerns about sustainable limits to sectoral growth (Dasgupta, 2021), there are concerns that this approach may not necessarily serve the interests of the poor, since many poor coastal communities rely on resources that may be impacted by the higher-value sectoral activities that are favoured. Thus, the way in which MSP affects the poor requires further attention.

Understanding and measuring poverty

Agenda 21, the non-binding action plan for sustainable development produced at the UN Conference on Environment and Development in 1992, emphasized that poverty is a complex multidimensional problem with origins in both the national and international domains. The measurement of poverty comprises both *identification* of the poor and *aggregation* of data on poverty into an overall index (Tsui, 2002). Understanding and applying poverty dimensions is critical in incorporating poverty perspectives in MSP processes.

Two broad approaches have been used in the identification of people affected by poverty – the income or poverty-line methods, and multidimensional poverty approaches. Both involve collection of household data and, in the case of the second, other contextual data. These approaches are discussed in more detail below.

The *income or poverty-line method* has attracted considerable attention and involves determination of a threshold level of income. This is most commonly defined in *absolute* terms, with the threshold being the amount deemed sufficient to attain minimum basic needs. For example, the World Bank defines the extreme poverty line as $1.9 per person per day. Many countries have also defined their own poverty line. A variation of this is *relative* income poverty, where an individual is deemed poor if their income is much smaller than the income standard in their society, risking social exclusion (Decerf, 2021). Here, the relative poverty line is taken to be a set fraction (for example 60%) of the mean or median income. While addressing absolute poverty is key, policy makers are also concerned about reducing relative poverty, since this is a result of high income inequality. It is also worth noting that an individual's relative income status also affects their preferences (Cruces et al., 2013). Various aggregate "poverty measures" have

been compiled based on defined poverty-lines, using indices such as the head-count ratio (the proportion of individuals below the threshold) or the poverty-gap ratio, which indicates the depth of poverty. Some indices combine measures of absolute and relative poverty.

The poverty-line or income method introduces a number of practical problems such as measurement errors (Browning et al., 2003; Deaton, 2010), and objective assessments may be somewhat misleading (Alem et al., 2014). Thus, it can be useful to supplement objective income-based measures of poverty subjective measures (Nándori, 2011). One subjective measure of poverty simply asks people whether they perceive themselves poor or not (Alem et al., 2014). Depending on how the questions are framed and the responses from the subjects, information from subjective measures of poverty can be used to effectively measure poverty over time and to make poverty comparisons (Ravallion & Lokshin, 2002), and provide more information about deprivation. However, subjective assessments of poverty have been shown to be biased (Cruces et al., 2013), and could be expected to be more of an indication of relative income poverty than absolute poverty.

The *multidimensional poverty approach* takes a broader view of poverty that also considers a range of factors that would influence a household's ability to escape poverty. The income approach (above) presupposes that markets for all basic needs exist, but this is not always the case. This and other considerations have made the multidimensional approach to poverty measurement gain popularity especially among development economists and development agencies.

In the multidimensional poverty analysis (MDPA) framework developed by Sida (2017), poverty does not simply mean the lack of resources, but also lack of opportunity and choice, lack of power and voice and/or lack of human security. A person living in poverty is resource-poor *and* poor in one or several of the other dimensions as discussed hereunder and depicted in the inner circle in Figure 2;

- Poor in terms of resources means not having access to or power over resources that can be used to sustain a decent living standard, meet basic needs and improve one's life.
- Poor in terms of opportunities and choice concerns one's possibilities to develop and/or use the resources to move out of poverty. These opportunities include access to productive employment, education, health clinics, infrastructure, energy, markets and information affect the choices available and opportunities to escape from poverty.
- Poor in terms of lacking power and voice relates to people's ability to articulate their concerns, needs and rights in an informed way, and to take part in decision-making affecting these concerns.
- Poor in terms of human security means that violence and insecurity are constraints to different groups' and individuals' possibilities to exercise their human rights and to find paths out of poverty.

These four dimensions of poverty are interlinked in complex ways, where changes in one or several dimensions could lead to positive and negative consequences in others. The Sida model (Figure 2) asks who is poor and in which dimensions? This starts with an understanding of the situation, needs, preconditions and priorities of individuals. The *who* can be characterised by gender, age group, ethnicity, etc. The four dimensions under the Sida poverty framework are therefore objective by construction.

Figure 2. The Swedish International Development Cooperation
Agency's multi-dimensional poverty assessment (MDPA) framework
(Sida, 2017)

The context of the household, represented by the outer circle, is important and warrants discussion as it influences how resources, opportunity and choice, power and voice and/or human security interact. The economic and social, political and institutional, environmental, and, peace and conflict contexts highlight the underlying causes and help identify pathways out of poverty. The *economic and social context* covers the size and growth rate of the economy, the key macroeconomic variables, fiscal policy, structure of the economy and exports, use and dependence on natural resources, education system, health system and demographic developments. The *political and institutional context* refers to the formal and informal political institutions, norms, rule of law and human rights. The *peace and conflict* context refers to factors such as social cohesion, trust, conflict resolution mechanisms, justice, and arms control on the one hand and violence, tensions, grievances and conflicting interests on the other. The *environmental context* includes the need to understand the environmental situation, trends and consequences in the country of region – for example climate change, loss of biodiversity and ecosystems services, pollution, water quality – and the causes and drivers of degradation.

The influence of MSP on the multiple dimensions of poverty

MSP processes are multi-faceted with multiple objectives, but the overall objective is to maximise long term benefits from the ocean through optimal levels of development of the various marine sectors. Through stimulating blue growth, MSP is expected to lead to increases in national income and with that, a reduction in poverty. However, it could lead to the exacerbation of poverty in certain coastal areas. The potential effects of MSP on poverty in the WIO are discussed below in terms of the four dimensions of the MDPA framework.

MSP can affect the primary dimension of poverty – **access to resources** – in a number of ways. In the WIO region for instance, small-scale fisheries and mariculture play an important role in food security, livelihoods, and wealth generation for coastal communities (Matsue et al., 2014). Marine

and coastal centred tourism is also an important source of income in the region, and is focused on sandy beaches, mangroves and corals, the latter of which have significant economic value in terms of dive tourism (Barton, 1994; Crabble & McClanahan, 2007). There are also extractive industries taking place in the region, both formal and informal, include coral and limestone quarrying, sand mining, salt production and mineral extraction from sand dunes (UNEP-Nairobi Convention and WIOMSA, 2015). In spite of the rich array of livelihood sources, the coastal communities of the WIO include some of the poorest and most vulnerable communities in Africa. Decisions about the use of marine areas could impact directly on people's access to subsistence and small-scale fisheries (that is artisanal fishing), the abundance of resource stocks, and the quality of the environment. This could in turn affect livelihoods and social networks, for example by changing distances and times involved to maintain benefits from coastal activities. They could also impact on opportunities for income from employment in tourism and industrial sectors, as well as in other sectors linked to these. There is little evidence from the literature on any of these types of impacts, however. Poor households engaged in small scale activities tend to carry out those activities in coastal and inshore environments. Thus, it is important that plans for and impacts on the users of these environments are taken into account in MSP.

MSP could also have a significant impact on the levels of **opportunity and choice** facing households. For example, commercial and industrial activities such as oil and gas extraction offer significant blue growth opportunities for the developing countries in Africa (UNECA, 2016; Adewumi, 2020). As set out by the African Union's Agenda 2063, the blue economy is perceived as the continent's future because its benefits extend beyond the shores of coastal states and create opportunities for adjacent landlocked communities and countries (AU, 2015). Recognizing the significance of the blue economy as the "next frontier" for Africa's development in its Agenda 2063 of the "Africa we want," the African Union (AU) declared that the blue economy is "Africa's Future" (UNEAC, 2016). In addition to the employment opportunities created by blue growth, it can have an important indirect impact through generation of tax revenues. These allow improvements in services such as education, health care, infrastructure, electricity and water supply, and the internet. Thus, benefits to poor households should not only be seen in terms of direct access to small-scale sectors, and the relative contributions of these pathways should be carefully considered. Very few, if any, applications of MSP have considered these effects.[7] These potential benefits of blue economy growth need to be weighed up against the potential impacts on inshore environments and their users.

MSP could also play a role in addressing the **power and voice** of poorer communities through engagement, and it has potential influence on the dimension of human security through its impact on women and hence male-female relations. **Violence and insecurity** can hinder the potential benefits accruing from any intervention including MSP. A potential challenge could be conflicts over resources arising from disgruntled groups or communities whose needs have not been taken care of in the process due to, for example, poor stakeholder engagement. If MSP process is properly conducted however, such internal conflicts can be avoided.

MSP will also influence the *'context'* circle (Figure 2), as the processes in the *'how and why'* circle are expected to interact and influence those in context circle such as socio-economic interactions, politics and institutions, the environment, and prevailing peace/conflict. The reverse is also true as

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[7] https://www.cffacape.org/publications-blog/why-the-current-african-unions-blue-economy-strategy-threatens-small-scale-fisheries

the context circle determines to a large extent the outcomes in the *how and why* circle. Socio-economic interrelations, for instance, are likely to give rise to an environment that impedes or promotes the MSP. The process is also heavily political as it is led by government ministries and agencies whose aim is both managing marine resources and ecosystems as well as to ensure exploitation of the marine economy for growth of the national economy. These objectives might not always be equally prioritized and economic incentives might override others depending on the importance of the marine sector for the economy of a particular country. The MSP process will also depend on the peace or conflict during the planning and implementation phases of the process. Finally the impact of MSP on the environment is critical as most of the coastal societies depend on marine ecosystems for their livelihoods, and any interventions disturbing already fragile ecosystems is likely to drive the communities further into poverty. A successful MSP that incorporates poverty perspectives should be cognisant of the delicate balance of communities' welfare, environment, politics, and potential for conflicts.

Gender

The importance of gender equality

The SDG 5 aims to achieve gender equality and empower all women and girls. On a global level, women still experience legal, social and economic barriers to their empowerment and are under-represented at all levels of political leadership (UN, 2020). Girls tend to be less educated, which means they have limited opportunities in the labour market, and when they do enter the labour market, they tend to do so at lower wage rates than men (Agesa et al., 2013; Nix et al., 2016). This not only puts them in a vulnerable position with respect to treatment by men, but also limits economic growth (UN, 2020). Vulnerable women also tend to have higher numbers of children for cultural or economic reasons, which exacerbate maternal mortality rate and childhood malnutrition (Dasgupta, 1997). Indeed, because of its importance for accelerating the fertility transition[8], the empowerment of women is a key strategy for accelerating poverty reduction in Africa (Beegle & Christiaensen, 2019) as well as for addressing the biodiversity and climate crises (Dasgupta, 2021).

Understanding and measuring gender equality

Gender analysis is used to assess gender relations in a society, and the inequalities therein, by asking: Who does what? Who has what? Who decides? How? Who gains? Who loses? While there is no universal way to undertake a gender analysis, numerous frameworks exist to highlight gendered differences in terms of opportunities, status and standards in society, such as the Harvard Analytical Framework[9] and the Moser Framework[10] (de la Torre-Castro et al., 2017; March et al., 1999). These typically comprise simple tools (for example checklists, tables) to guide qualitative information gathering. These tools have allowed better recognition of the way in

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[8] This is the demographic transition from a situation of high fertility and mortality to one of low fertility and mortality.

[9] The Harvard Analytical Framework comprises 3 tools to describe differences in activities, access to and control over resources, and the factors that influence this.

[10] The Moser framework has modules on (1) gender roles in reproduction, productive work and community work (triple role), (2) gender needs– practical and strategic, (3) control of resources and decision making in the household, (4) planning for balancing the triple role, (4) distinguishing between different aims: welfare, equity, anti-poverty, efficiency, empowerment and (5) involving women and gender aware organisations/planners in planning.

which policy decisions affect women, by considering the gendered differences in reproductive, productive and community roles, the practical and strategic needs of women, and who controls resources, for example.

While gender issues exist throughout society, they tend to be of greatest concern in poor societies. Indeed, gender issues are recognised as a significant factor in Sida's MDPA framework (Figure 2). Thus, women can be seen as impoverished when they lack access to resources, lack voice and power, lack opportunity and choices or when they are insecure in their homes as a result of their roles and position in society. Thus, it can be recognised that the welfare of women, or any other marginalised group, can be analysed in terms of the same framework (Figure 2).

The influence of MSP on women

As for any other marginalised group, the primary potential influence of the MSP process on women is that of their access to marine resources or employment in marine sectors. Women are particularly vulnerable to changes in policy because their range of options is much narrower than those of men, and it also has potential implications for their domestic security.

Poorer women in developing country contexts are particularly vulnerable in terms of their access to **resources** because of they tend to have more limited options than men. In coastal and marine environments of developing countries, their activities tend to be onshore, and close to home, while men work throughout the seascape, and can travel further to trade (Feka, Manzano & Dahdouh-Guebas, 2011; Fröcklin *et al.*, 2013, 2014; de la Torre-Castro *et al.*, 2017). This tendency is linked to reproductive roles[11], with women less able to take advantage of new resources or move to new areas if needed (Fröcklin et al., 2014), and limits their earning power. For example, in Zanzibar, deep sea fishing is carried out entirely by men, while women tend to only utilise shallow areas and coastal forests for the collection of invertebrates and firewood, as well as seaweed farming (de la Torre-Castro *et al.*, 2017a; Figure 3). Similarly, in the rest of Tanzania, men are linked to higher value offshore capture fisheries, while women are linked to lower valued shore-based gleaning (Fröcklin et al., 2013). They are also involved in different forms of aquaculture to men, such as seaweed farming (Steyn Kotze et al., 2018; UNEP-Nairobi Convention and WIOMSA, 2015). Men have also been found to have greater access to post-catch marketing compared to women, including being able to sell the catch further away from the landing site, direct trade with the tourism industry, and access to more profitable market space meaning women have lower access to capital and opportunities (Fröcklin et al., 2013). Because women tend to be more restricted to inshore areas than men, they are particularly vulnerable to how the coast is taken into account in MSP.

The tourism sector tends to be dominated by men (Mshenga & Richardson, 2013, Mangwangi, 2015), but there are examples of women-led initiatives (UNEP-Nairobi Convention and WIOMSA, 2015). Inshore artisanal mining also offers opportunities for women in East Africa, mainly in the form of informal salt production, but to some extent also informal sand mining, coal and limestone quarrying. These activities are time consuming, and earn little cash income (Ngabiire, 2014; J. K. Turpie, 2001). However, women have particularly low involvement in the more lucrative industrial

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[11] **Reproductive tasks** encompass the care and maintenance of the household and its members, such as cooking, washing, cleaning, nursing, bearing children and looking after them, building and maintaining shelter. This is in contrast to **productive tasks**, which include the production of goods and services for income or subsistence.

and extractive sectors (Steyn Kotze *et al.*, 2018; Ngabiire, 2014; Monfort, 2015; de la Torre-Castro *et al.*, 2017), not only because of their reproductive and social roles, but also due to their lower educational status, lack of access to capital and cultural barriers, or due to the physical requirements of the work. In general, women tend to be confined to the small-scale, inshore components of the aquaculture and extractive sectors, or relatively menial onshore employment in the more commercial or industrial sectors. Nevertheless, in Mozambique, women make up half of the workforce in the oil and gas sector (UNEP, 2018).

Terrestrial coastal forest

Activities	♂	♀
Agriculture	78%	100%
Firewood collection	83%	94%
Fruit collection	83%	100%
Building material collection	39%	11%
Collection of twigs for local fish trap	11%	22%
Medicine collection	6%	-
Lime making	11%	17%
Collection of sticks for seaweed farming	6%	6%
Rope making	-	11%
Charcoal making	-	22%

Mangrove forest

	♂	♀
Firewood collection	67%	100%
Building material collection	67%	17%
Invertebrate collection	33%	67%
Charcoal making	50%	17%
Fishing activities	33%	-

Seagrass beds

	♂	♀
Fishing activities	94%	39%
Invertebrate collection	6%	61%
Seaweed mariculture	-	67%
Collection of fertilizer	17%	6%
Collection of fertilizer	17%	

Coral reef

	♂	♀
Fishing activities	56%	-
Tourist activities	11%	-
Invertebrate collection	-	6%

Deep sea

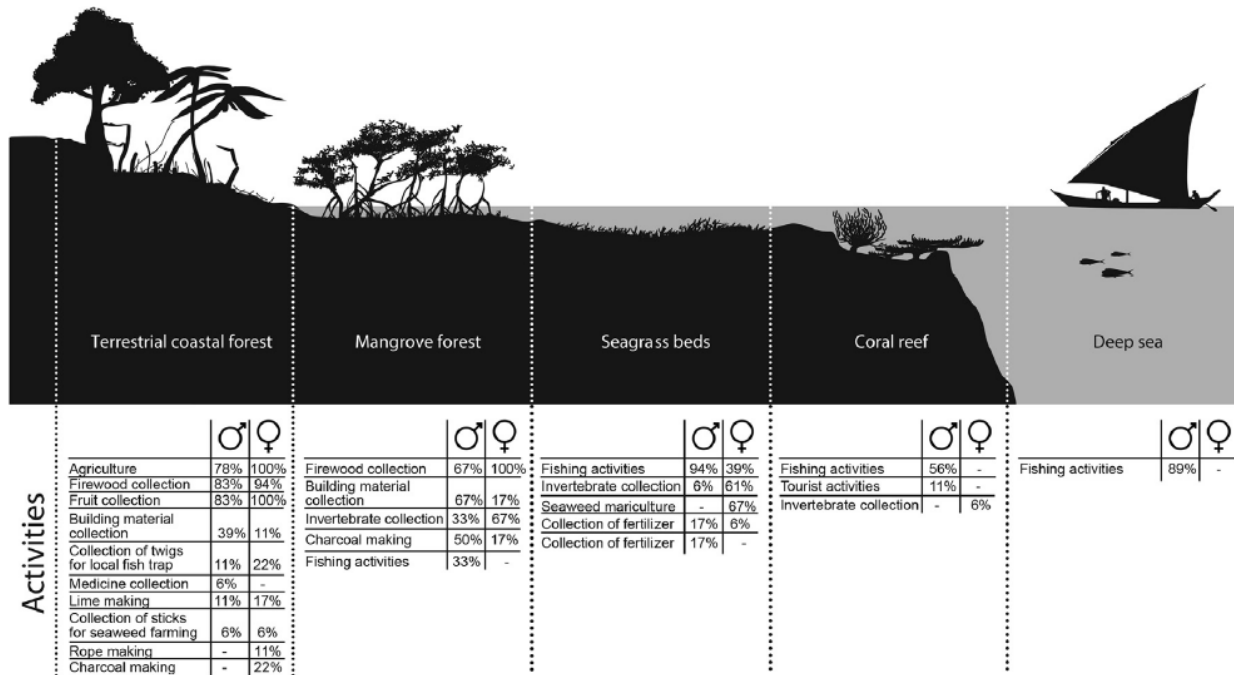|	♂	♀
Fishing activities	89%	-

Figure 3. Gendered use of the Zanzibar seascape (image from de la Torre-Castro et al., 2017).

These strong gender differences in roles mean that different planning alternatives may impact very differently on men and women, and the narrower range of options means that the impact is likely to be more serious for women. In Tanzania for example, shifting markets resulted in an increased value of the lobster resource, and a corresponding shift of men into active harvesting of lobsters, which was traditionally seen as a "women's" fishery. This shift resulted in the exclusion of women from their traditional artisanal fishing grounds, forcing them to move to new sectors, such as farming of seaweed or sea cucumbers (Mwaipopo, 2008; Samoilys & Kanyange, 2008). It is important to stress that one cannot legislate against this sort of shift, or even hope to influence it via MSP. What the planning process can do is ensure that additional costs are not imposed on women simply because they are not present to represent themselves in policy discussions.

As for poor households, the other way in which women's status and wellbeing can be affected by MSP is indirectly, through the redistribution of tax income from blue economy development. This can lead to the improvement of **opportunities and choice**, for example through access to better health services and education. This could be of greater significance to women in the longer term

than direct access to resources. It is well established that better education contributes to women's economic empowerment and more inclusive economic growth (OECD 2012).[12]

As a planning process, MSP can also contribute to giving **power and voice** to women, as for any other marginalised group, by taking them into account and including them in the process. However, it should be emphasised that MSP alone will not be able to change attitudes and cultural norms. MSP will not be able to change gender roles or gender gaps in the industrial workplace, but it can help to ensure that women are not negatively affected by the process. This is explored further below.

Finally, in societies where there are pronounced gender roles, impacts on women's access to marine resources or employment could have knock on effects for their roles in the home, and impact on their own **security** as well as the future wellbeing of their children.

Representation and influence of women in the MSP process

Having a say is instrumental to women's maintaining or improving their access to resources and benefits from marine activities. However, in patriarchal societies, women can be forgotten or side-lined at the planning table (de la Torre-Castro et al., 2017). Understanding the implications of MSP for women affects the sustainability of the planning outcome. This understanding is hampered by the lack of representation of women who work within the system in decision-making positions across sectors — because these women's voices are not heard, the potential gendered differences in resource and spatial use are not accounted for, and the impacts of this use, as well as existing or potential conflicts with other users, are ignored. Existing biases are thus reinforced, negating the "inclusive and democratic stakeholder participation" promise of MSP.

The exclusion (or lack of real influence) of women in planning processes in developing countries such as those of the WIO is linked to the low level of participation of women in more commercial sectors and professional associations (particularly at managerial level) as well as cultural attitudes towards the inclusion of women in decision-making. These differences stem from social and gender norms that shape gender differences in access to support and information, participation in community governance and social organisation, and learning and experimentation (Cohen et al., 2016), as well as in their access to land and resource rights.

Reviews of management frameworks in the WIO reveal a "deep gender inequality" and androcentrism, that is, a practice of placing a masculine point of view at the centre of one's world view, culture, and history, thereby culturally marginalizing femininity, conscious or otherwise. Planning and legislation are entirely focused on male-dominated sectors, with little or no planning, management or monitoring of women's activities (de la Torre-Castro et al., 2017; Fröcklin et al., 2013). As an example, in Tanzania, women's shore-based and near shore catches of both fish and invertebrates are both undervalued and absent from fisheries statistics and management plans (Fröcklin et al., 2013). This under-representation and undervaluing of so-called "women's work" is a global trend, especially in fisheries, despite the essential role played by women. Given that 47% of the 120 million people who work in the capture and post-harvest fisheries sectors are women (Monfort, 2015), gender should be an important consideration (Alarcón & Cole, 2019).

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[12] OECD, *Gender Equality in Education, Employment and Entrepreneurship: Final Report to the MCM 2012.*

It must be noted that gender biases exist within all stakeholder groups, including policymakers, planners, vessel owners and operators, researchers and environmental and social campaigners (Saunders et al., 2020). Around the world, women only occupy a small proportion of jobs in research and development, the oil and gas industry, and industrial fisheries, and an even smaller proportion of executive positions (Monfort, 2015; Urama *et al.*, 2015; Sardelis, Oester & Liboiron, 2017; Gerrard & Kleiber, 2019; Global Energy Talent Index, 2020). Thus, unsurprisingly, women also tend to make up a relatively small percentage of representatives in public forums. De Pryck, (2013) suggests that there are also cases where women are excluded from membership of professional organisations, contributing to their low representation in the planning process. However, formal exclusion from a profession is now extremely rare outside of religious bodies.

Decisions that are made with little or no regard to women's activities, views and interests undermine the sustainability goals of MSP (Monfort, 2015). Regardless of the status and perspectives held by women and men in a society, spatial planning must take gender into account to ensure a well-informed and equitable outcome (Dymen, 2014).

Designing and evaluating a socially-sustainable MSP process

The long-term success of MSP hinges on the three pillars of environmental, economic and social sustainability. However, the social dimensions have received much less attention than the other two (Saunders et al., 2020). It is argued that MSP must include improved representation of a wider variety of (less organised) interests in the decision-making processes; it must rethink the distributions of the costs and benefits associated with MSP; it must increase recognition of distinctive socio-cultural identities specific to certain places; and must include the means to empower "weaker" stakeholders (Saunders et al., 2020). Thus, a properly inclusive process is also more likely to lead to a sustainable outcome.

The Social Sustainability Framework

Using a social justice lens, social sustainability can be conceptualised as being based on three key dimensions of recognition, representation, and distribution (Saunders *et al.* 2020; Figure 1):

- **Recognition** deals with respect in relation to socio-cultural diversity of the group for example rights, needs, livelihoods, lifestyles, and knowledge (cultural influences category). This can be seen as what information is taken into account in devising and evaluating options.
- **Representation** deals with who is included or excluded in decision making, as well as the how and time inclusion indecision making (political influences category). This is reflected in the way in which stakeholders are engaged in the process.
- **Distribution** is concerned with how risks, benefits, pollutants, capacities, and resource/ experiences are distributed particularly in relation to already disadvantaged groups (economic influences category). This is reflected in the outcome of the process – how the various benefits and costs of the marine spatial plan are distributed among different actors.
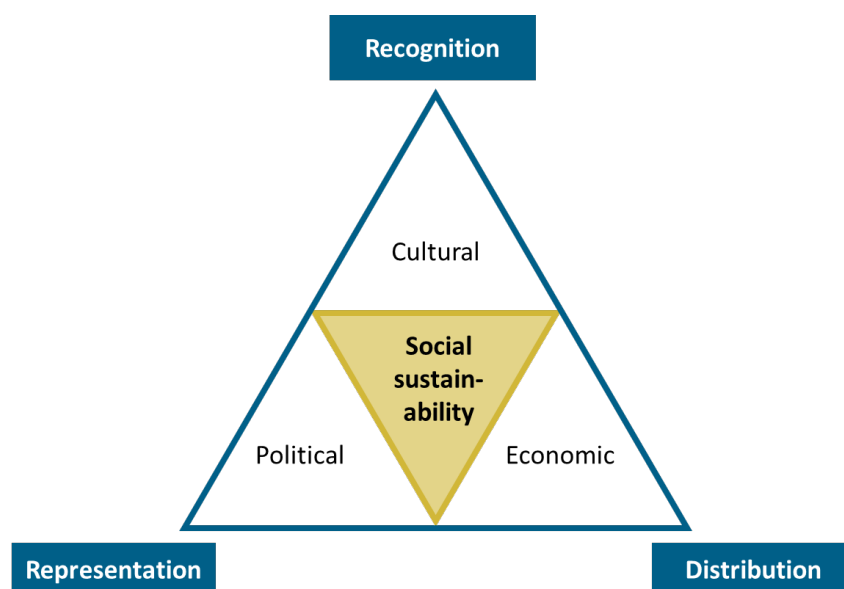

Figure 4. Social Sustainability Framework in MSP. Source: Saunders et al., (2020)

The inclusivity of stakeholder engagement in the MSP process depends on good communication, transparency and perceptions of unbiased decision-making (Flannery et al., 2019). Information has been key to allowing meaningful participation of fishers in France (Trouillet et al., 2019). In the US, stakeholder participation in the Northeast Ocean Planning initiative was limited by a failure to understand that the process was meant to be inclusive; issues relating to governance and scale; and lack of information on what was at stake (Flannery et al., 2018).

Quite often, responsible entities do not engage stakeholders in a timely manner, but only in the final stages when their input is much less likely to be effective (Gilliland & Laffoley, 2008). Also, engagement is often limited to simple communication through public comment, rather than approaches such as facilitation, negotiation and consensus-building, where the decision-making process is shared among stakeholders and governments (Pomeroy & Douvere, 2008; Gopnik *et al.*, 2012).

The MSP guidelines encourage the involvement of stakeholders in the evaluation of options for managing the marine environment. In developing countries, this would require communicating these options and their consequences to people not only from multiple sectors but also from vastly different socio-economic backgrounds. Understanding the implications of different planning options can also be complicated when the scale of management is different to the scale(s) of the ecological processes being managed (Cumming et al., 2006; Lagabrielle et al., 2018). Here, it is easy to see that marginalised groups could be left behind in the complexity of the analysis unless proactive steps are also taken to empower them in the process.

Steps in a socially-sustainable MSP process

In order to achieve a socially-sustainable outcome, the process requires an approach for identifying potentially[13] marginalised communities or groups (PMCs/PMGs), for describing their current position and the impacts of alternative options, and for evaluating the outcomes. This requires conscious efforts in almost all steps of the MSP process (Figure 5). This figure also shows which MSP steps can be better aligned to meet the requirements of recognition, representation and distribution:

- **Recognition**: The preparatory steps are where efforts are made to recognise the potentially marginalised stakeholders, their values and needs, by bringing them into the process and making an effort to understand their situation. This includes a commitment to do so in the establishment of the legal and policy framework for MSP.

- **Representation**: The need for representation of all groups is most pertinently addressed in the Scenario Analysis step of MSP, through explicit inclusion in the decision analysis framework.

- **Distribution**: The outcome, in the form of the spatial management plan and associated policies, can be evaluated in terms of its distributional implications after any mitigation to determine that no threshold conditions (for example relating to human rights) have been violated.

The proposed sub-steps for a socially-sustainable process out are described in more detail below.

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[13] Note that we use the term "potentially" marginalised in recognition of the fact that the process *could* change the status of these groups for the better or worse.
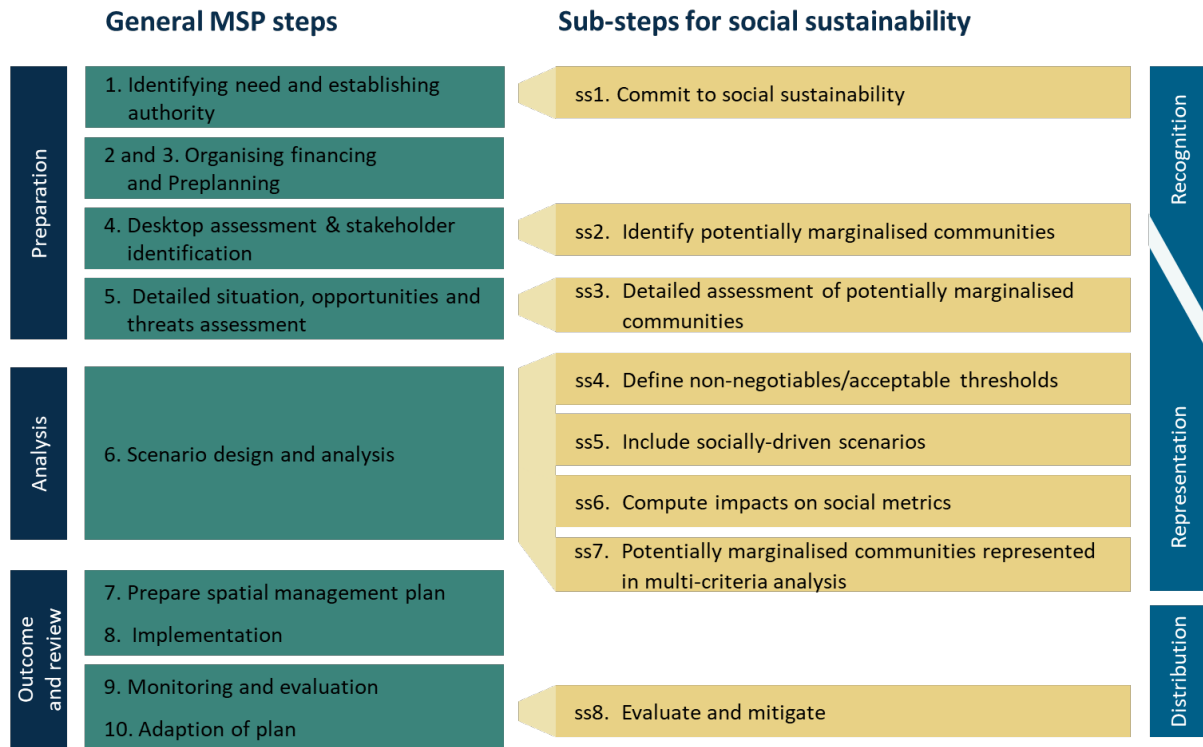
Figure 5. Outline of the sub-steps for incorporating potentially marginalised communities (PMCs) in MSP.

Step SS1: Commit to social sustainability.

In the first step of the process, government should commit to meeting requirements for social sustainability as well as environmental sustainability, based on a Social Sustainability Checklist (see section 4.3 below), and this should be reflected in any policy or legislation developed for the process.

Step SS2. Identification and initial description of potentially marginalised communities or groups.

In this step, potentially marginalised communities or groups are identified. These would be identified as those in which the community as a whole, or a subset of the community, can be characterised as:

a) having a **likely absence of sufficient power and voice** in influencing government policy at local or larger scales
and
b) being **potentially affected by MSP** on a measurable scale.

These could include any communities (defined in terms of geographic location) or groups in which a significant proportion of people would be defined as poor, such as:

- communities that are generally income poor in absolute terms,
- communities in which women with limited alternatives depend on direct consumptive use of marine resources or on employment in a marine industry to maintain their own gendered roles and/or gender relations; and/or

- ethnic or religious groups that tend to be marginalised.

Communities could thus be considered both as a whole (for example poor, marine-dependent communities), and in terms of specific groups within them (for example women). For each of these communities or groups it will be necessary to identify stakeholder representatives who will participate on their behalf in the MSP process.

The potentially marginalised communities or groups need to be identified at an appropriate spatial scale. They would be mapped based on spatial data from the census and on marine habitats and activities, as well as spatial data relating to property rights and access, and any other available information or expert input. The initial description of these communities can be in terms of average household income (for example from census data), main livelihoods and primarily links to the marine environment. During this process, data gaps and uncertainties will be noted. These will inform the efforts in the next step.

Step SS3. Detailed situation assessment, including opportunities and threats.

This step is a very critical step in properly fulfilling the recognition aspect of the social sustainability of the MSP process. The step would involve the collation of existing data, field studies and modelling to describe the communities of groups identified in terms of a range of relevant characteristics relating to household and women's wellbeing that might be affected by decisions made in MSP. This forms the baseline for the analysis. The approach to this is discussed in more detail in Section 5.

This step should seek to provide more data and more depth to the preliminary analysis undertaken in Step SS2, as well as to validate or adjust these estimates. In addition, it should seek to collect the information that will be required to estimate how these measures will change under a business-as-usual scenario and in response to different alternatives. This would involve analysis of existing variation or exploring hypothetical scenarios with experts or stakeholders in order to develop response curves with which to predict scenario outcomes.

This research step will also investigate how these communities perceive threats and opportunities in the marine realm, drawing on their indigenous knowledge. For example, what are their desires for access or management of resources, or for marine-related economic developments in their area. This step can also draw on some of the information being collected for the MSP process on the expected economic impacts of different activities, and on the benefits of marine protected areas for sustaining fisheries and tourism. It would also seek to understand how changes in the nature of marine areas or activities may pose threats to peoples' wellbeing. This can draw on existing MSP activities that describe potential environmental impacts of marine activities and the impacts of climate change. It will be important to take indigenous knowledge into account.

Step SS4. Define thresholds

In this step, we define acceptable thresholds for the social criteria attributes/indicators that were used to describe aspects of the wellbeing of the PMCs in the baseline description that will be applied in the scenario analysis. These thresholds, or non-negotiables, will be based on SDGs, national policies, and stakeholder inputs. It is assumed (and essential) that the broader process will also include environmental thresholds in the interests of planetary health and intergenerational equity.

The 17 SDGs are: (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, (4) Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure, (10) Reducing Inequality, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life Below Water, (15) Life On Land, (16) Peace, Justice, and Strong Institutions, (17) Partnerships for the Goals. MSP has the potential to contribute to most of these, either directly through the promotion of specific activities, or indirectly through facilitating economic growth that increases government revenues. While it might be argued that an MSP should not be regressive in terms of any of these goals, it is conceivable that there may be cases where small losses in some could be part of the cost of generating substantial gains in others.

For environmental criteria, for example, we may define a minimum area of 30% of all habitats under protection, with some minimum level of connectedness to ensure some minimum level of ecological functioning and species viability, etc.

For the social criteria (see next section), the non-negotiable thresholds should at least be no negative change relative to the business-as-usual scenario. In this way any negative changes would be flagged for mitigation in the analysis of options (scenario analysis).

Step SS5. Include socially-driven scenarios

The information collected in SS3 needs to be consolidated and integrated into the consideration of possible alternatives for the scenario analysis in the MSP process. These hypothetical (or what if) scenarios should incorporate potential changes in the social, economic, political, and environmental contexts in an *ex-ante* framework, and should ask how the fortunes of the potentially marginalised communities or groups could change if the scenarios change. These scenarios should be constructed with involvement of the local communities, meaning they should be participatory. For example, an option might be included that accommodates the protection of certain inshore areas for small scale activities, including protection from activities outside the area that pose a threat to its resources.

Step SS6. Compute impacts on social metrics

The research undertaken in SS3, including gathering of relevant indigenous knowledge, will inform the estimation of changes in the social metrics for each scenario. This would be done in a process that involves laying out the heuristic models or assumptions about the relationships between the changes in spatial priorities at a location (under a particular scenario) and the indicators being used to evaluate social impacts. The predictions need to be summarised in such a way that the implications for potentially marginalised communities or groups are made clear to all stakeholders and are presented in context.

Step SS7. Representation in MCA

This step is a very important one to incorporate the preferences of potentially marginalised communities or groups in a fully representative **multi-criteria analysis (MCA)**. This is the process in which social, economic and environmental criteria are brought to the table and trade-offs are analysed to determine the best option. All these criteria will be compared against a do-nothing or business-as-usual scenario. Thus, the MCA will also include consideration of impacts

on the wellbeing of marginalised groups. The following section covers the analytical approach in more detail.

Step SS8. Evaluation and mitigation

Monitoring will use some or all of the methods and indicators used in the step SS3. If the outcomes deviate negatively from the expected outcome, as estimated during step SS6, then the reasons for the deviation will need to be investigated and a solution found to rectify the situation. To accommodate this, it is anticipated that MSP is revisited on a regular basis over time.

MSP social sustainability scorecard

We suggest the use of a checklist and scorecard in order to address the first main area in ensuring the whole MSP process can be considered socially sustainable. We have developed a prototype for this scored based on the principles of the Social Sustainability Framework and the steps outlined above (Figure 6).

The three groups of steps in the checklist are based on Figure 5, which aligns the MSP steps to the three main pillars of the Social Sustainability Framework. A scoring system for this would need to be devised.

We also propose that the social aspects of MSP are considered for all potentially marginalised groups, not just poor households and women, and that these are considered in a single framework. Thus, the analysis should also be able to identify any other affected groups that need to be considered, for example minority cultural or religious groups.

Checklist for social sustainability in MSP

MSP Phase

Checklist

Preparation

- Legalities and finance, and pre-planning, organising stakeholder participation
- Collation and analysis of existing data, initial consultations & filling data gaps, draft situation assessment
- Inputs from stakeholders on the opportunities they would like, threats they are concerned about
- Determination of non-negotiables and possibilities
- A set of feasible scenarios, summarised in terms of appropriate criteria

Recognition

- ☐ Baseline mapping and ecosystem services and activities, and potential conflicts, include the participation, financial and non-financial benefits to marginalised groups and any other criteria of relevance to the analysis of trade-offs
- ☐ Information on baseline, desires and concerns is obtained from/validated by all stakeholder groups
- ☐ To serve the interests of current and future generations, government sets non-negotiables that adhere to Malawi principles, SDG goals and other international obligations
- ☐ All stakeholders are satisfied with that information is provided in terms of all the criteria that they are concerned with (within feasible limits), and in a manner that they can understand

Analysis

- Analysis of a set of feasible scenarios, with iterations as required

Representation

- ☐ Poor communities, women and marginalized ethnic groups are all considered among other stakeholder groups, identified at an appropriate spatial scale
- ☐ Each stakeholder group is represented the multicriteria analysis process, with each group participating in the weighting of and scoring of criteria measured in a clearly understood way, at an appropriate spatial scale

Outcome and review

- Final plan decided by the leading authority, using satisficing subject to non-negotiables and other agreed thresholds

Distribution

- ☐ Final plans do not breach any of the non-negotiable thresholds
- ☐ ...do not deepen any of the dimensions of poverty for any stakeholder group
- ☐ ...do not compromise the welfare of women
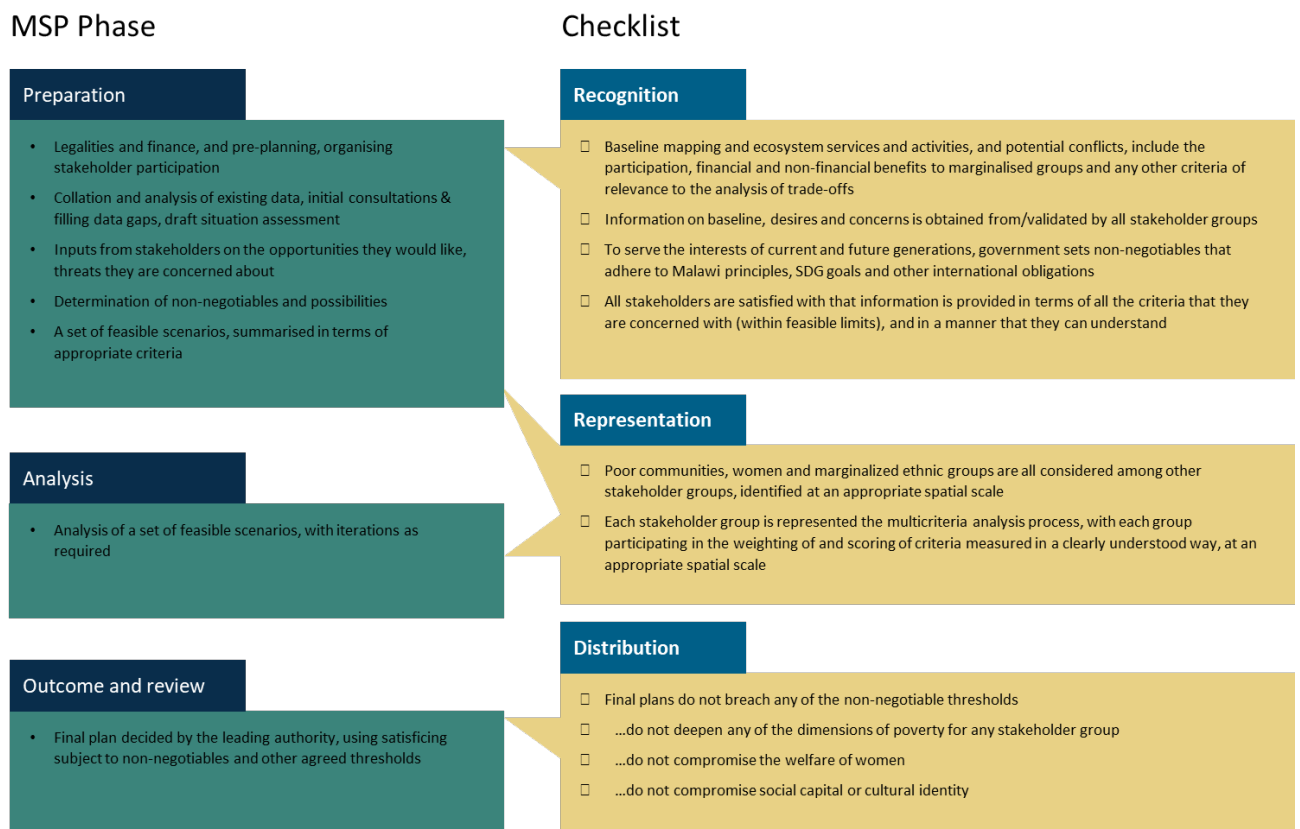- ☐ ...do not compromise social capital or cultural identity

Figure 6. Social sustainability checklist for evaluation of the validity of the MSP process in this regard.

An inclusive analytical framework for MSP

This section focuses on Steps 5 and 6 in the MSP process, namely situation assessment and scenario analysis, which are used to inform the planning. The development of a more socially-sustainable MSP process as outlined above includes incorporation of an appropriate decision-making process that takes impacts on potentially marginalised communities or groups into account, using appropriate analytical tools, data and metrics. Measures that capture poverty and gender dimensions need to be incorporated into the baseline description and in the outputs of the scenario analysis. The latter will also require an understanding of how they relate to the various biophysical and socio-economic factors that would change under different scenarios. The following sections provide a brief overview of the approach to decision analysis, and then delve a bit deeper into the measures required to support this process, and how they are obtained.

Multi-criteria decision analysis approach

MSP involves decisions about who has access to which resources, in which locations, for which productive activities, with the broad objective of maximising societal wellbeing. The analytical problem for MSP is similar to land and water allocation decisions, the approach to which is relatively well-developed (for example Kennedy *et al.*, 2008; Polasky *et al.*, 2008).

Imperfect and asymmetric information are particularly pertinent for MSP. Imperfect information is one of the main constraints to the management of marine ecosystems and resources. Layered on this is the shortage of information available to stakeholders on the relative economic value, social significance and environmental consequences of different activities in the marine zone. Such information, particularly information of a suitable standard, is particularly scarce in developing countries, and often not freely shared where it does exist. Moreover, access to information tends to be asymmetric, with more educated or powerful stakeholders tending to have better information and understanding than more marginalised groups.

Cost-benefit analysis is a commonly-used tool for the evaluation of alternative projects, programmes or policies, but has some limitations in terms of dealing with distributional issues and impacts that are difficult to express in monetary terms. Multi-criteria analysis (MCA)[14], is an alternative approach to Cost-benefit analysis that is able to deal with these shortcomings through the use of scoring and weighting of relevant criteria, in a process involving stakeholders. It requires the dedicated participation of a representative group of stakeholders who can define their objectives, devise a hierarchy of goals, criteria and their relative weightings, and score the alternatives in terms of those criteria to derive aggregate scores for each alternative (Belton & Stewart, 2002, p1-7). MCA is therefore a better approach than standard economic analysis for supporting decision-making in MSP.

MSP will involve the analysis of scenarios, in which changes are measured against the current baseline or status quo (Figure 7). The alternative scenarios are developed in conjunction with stakeholder representatives and then ranked based on a scoring process. Scoring uses a nested structure in which the scores for lower-tier indicators are combined to produce weighted scores of higher-tier indicators (Figure 8), with the weightings also determined in a stakeholder process.

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[14] Also referred to as multi-criteria decision analysis (MCDA)

The criteria can typically be grouped into social, economic and environmental criteria, encompassing the three pillars of sustainability. While the Economic prosperity outcome would typically be evaluated at national scale (or the scale of the planning exercise), overall social and environmental outcomes should be aggregated from community- and ecosystem-level scores. Local level scores allow for the definition of thresholds and recognition of local level impacts which may be overlooked in aggregate scores. Consideration of poverty and gender involves developing criteria or indicators under the social pillar. This is discussed in the following section.
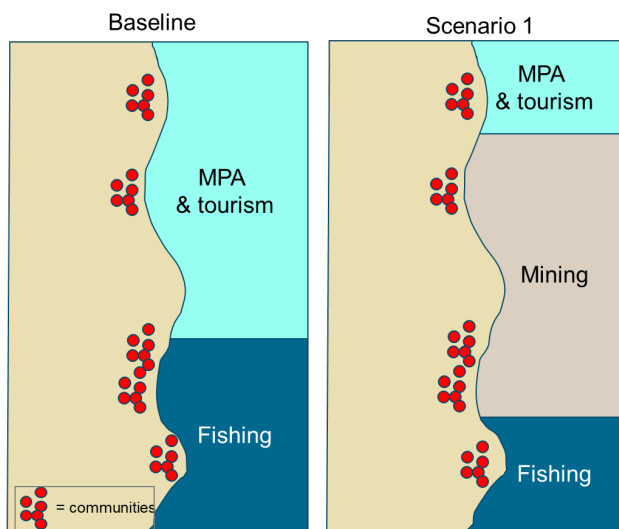
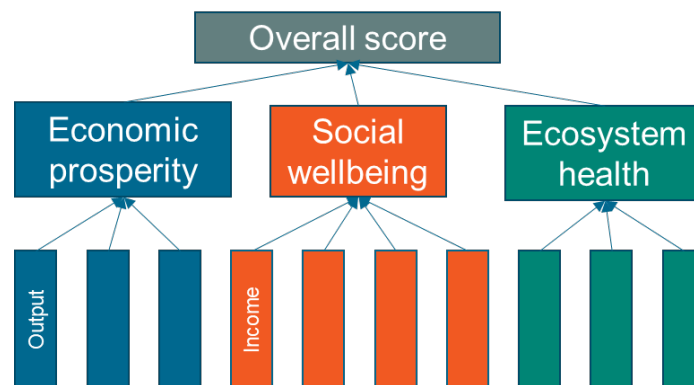Figure 7. Stylised example of MSP scenarios in which different spatial priorities are considered.

Figure 8. Example structure of a scoring system for a scenario analysis, with some example indicators. Such scores can be computed separately for each spatial area/community under consideration and considered separately as well as in aggregate.

Given the inherent limitations of the decision process (for example data gaps, limited number of scenarios, communication challenges)[15], decision makers aim for a satisfactory or adequate result, rather than the optimal or ideal outcome[16]. To this end, it is necessary to set minimum

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[15] This common situation is known in the literature as "bounded rationality" (Simon, 1957)

[16] Known in the literature as "satisficing"

acceptable thresholds relating to economic, social, biodiversity, and sustainability criteria. A scenario can then be considered viable if none of the thresholds is breached.

Social criteria for description, decision-making and monitoring

An inclusive MSP process will need to describe the impacts of the alternative scenarios considered on PMCs/PMGs. This report focuses on poor communities and women, but the approach herein could be adapted for any marginalised community or group. To be fully inclusive, the description of the status quo and how that is likely to change under different scenarios needs to be both comprehensive and accessible. Because of this, there is often a temptation to list too many criteria. While many factors contribute to societal wellbeing, they are often strongly correlated. Thus, the impacts of a scenario can usually be communicated in terms of relatively few, primary criteria.

The criteria used in an MCA need to be mutually preferentially independent, sufficient but not excessive in number and operationally meaningful. The weights are assigned in such a way as to transform all the criteria to a more or less commensurate scale. This allows the comparison of scenarios in a way that is compatible with the notion of marginal utility that underlies cost-benefit analysis, but without requiring the expression of criteria in monetary terms.

It is suggested that the status of the PMCs/PMGs is described in terms of a set of four attributes that correspond four dimensions of Sida's (2017) multi-dimensional poverty analysis (MDPA) framework (Table 2). The four measures are easily adapted to gender equality. For example, in the poverty measure, security is considered at the community-level, whereas for the gender equality measure, we characterise it in terms of domestic harmony.

Table 2. Criteria for the evaluation of the wellbeing of affected communities or groups

Criteria	Household prosperity/poverty	Gender equality	Examples of metrics needed to model impacts of MSP
Resources	Annual income (including subsistence)	Women's share of income	Change in sectoral employment opportunities Change in direct access to resources Change in resource stocks
Opportunities and choice	Access to education, healthcare, electricity and water, markets	Women's' share of the job market	Impacts of change in tax revenue on government services Change in women's share of jobs
Power and voice	Household representation in decision-making bodies Perception of voice	Women's representation in decision-making bodies Women's decision power in the household	Inclusion in management strategies
Security	Community peace and harmony	Household peace and harmony	Sensitivity of security status to a change in marine-related access/income

Figure 8 provides a scoring framework that accommodates two sub-indicators for Social Wellbeing, namely Household Prosperity and Gender Equality. . A third such indicator might be Happiness. Others could be added. Note that positive terms are used (household prosperity instead of poverty), since higher scores will denote that people are better off. Changes in these

attributes would then be predicted under different scenarios being considered, and can be tracked over time after the chosen scenario
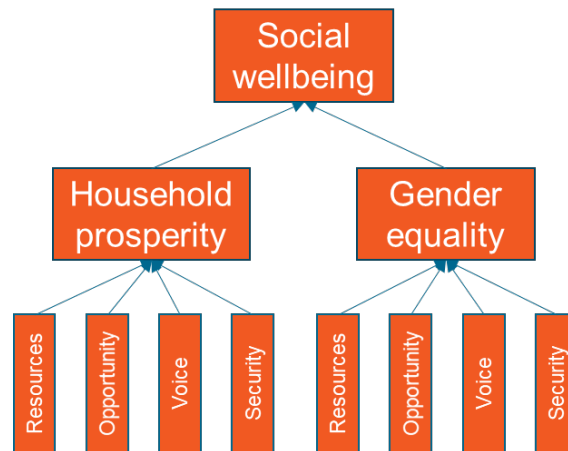is implemented.

Figure 9. Proposed structure of two sub-indicators of Social Wellbeing.

If these indicators are sensitive to variations in coastal resource and management contexts, then this should be revealed in their spatial variation along the coast. Where such variation is significant, then the data can be used to derive models from which to predict changes in the indicator levels under different scenarios. There are likely to be instances where the measures are difficult to quantify or model quantitatively. In other cases, the links to the base indicators may not be spatial in nature, such as the influence of sectoral development on tax revenues and opportunity. For this reason, complex resource allocation problems are often tackled using heuristic models based on a combination of quantitative analysis, qualitative information and expert understanding.

Data collection and computation of metrics

In spite of the array of tools and methods, socioeconomic data is usually a gap in the MSP process. To inform a socially-sustainable process and monitor its outcomes in a way that also meaningfully serves the intention for MSP to be adaptive, the quality of data inputs need to be as high as possible. Up to now, MSP has relied either on existing national datasets or in more data poor situations, on techniques such as participatory mapping (Klain & Chan, 2012; Tolvanen et al., 2019). The lack of data collection has been attributed to its high costs, and the difficulty in the remote detection and monitoring of dispersed activities such as subsistence harvesting. Data availability also varies from country to country, as was
found in this study.

While existing national data sets could be useful to some extent, this may be limited by the fact that they do not specifically focus on communities of interest for MSP and their relationships to the marine environment. This issue is a significant drawback as national MSP requires consistent, comprehensive data. Indeed, given the potential scale of its impacts, the MSP process should begin with a comprehensive baseline assessment which involves large-scale social surveys as well as ecological and other surveys.

As part of this study, pilot studies were carried out in Kenya (Mulwa et al., 2022), Tanzania (J. Turpie, Brühl, & Lokina, 2022) and Madagascar (J. Turpie, Brühl, Chirrute, et al., 2022), in which a total of 1500 households were interviewed, suggested that such efforts are feasible and worthwhile. The case studies involved undertaking moderately comprehensive social surveys which involved desktop reviews followed by focus group discussions, key informant interviews and household surveys. This was labour-intensive, but the act of data collection in the field was also empowering both for the researchers involved in MSP as well as for the participants that had the opportunity to express their preferences. The surveys provided opportunities for capacity-building and gaining first-hand experience and knowledge of vulnerable coastal communities for government officials from the marine and fishery institutions likely to be involved in the decision-making process.

The scale of the pilot studies varied from covering 50 km coastline in Tanzania, to 100 km in Kenya and 200 km in Madagascar. These are a fraction of the overall coastline that must eventually be considered in a national MSP process. Overall, it was deemed that the labour and financial costs of data collection would be manageable and appropriate for scaling up at a national level. The labour needs were reduced by the use of tablets and survey data collection software (Kobotoolbox), which avoided the need for data entry and vetting, and reduced data cleaning time considerably. Furthermore, the technology did not require an internet connection in the field, which was important for some of the more remote areas. The questionnaires did result in a large amount of data, however, which required considerable computational time and expertise. This could be reduced to some extent by reducing the number of questions, but it should be noted that for a given length of questionnaire, the coding effort would not be affected by scaling up to a larger area.

Based on the pilot studies, the suggested methods for data collection and measuring and/or scoring the different indicators are outlined below.

Data collection

The research required to inform the social aspects of the MSP process needs to be carried out in three phases:

1. *Desktop review, zonation and sampling plan*.

This first stage involves the collation and review of available data and information, including spatial data on the geographic, ecological and socio-political context, and detailed census data (Figure 10). Available data need to be mapped as far as possible so as to be able to develop a feasible sampling plan. This process involves dividing the area into appropriate socio-ecological zones that are characterised by relative homogenous contexts. The ecological context can be gleaned from GIS data on geography, land cover, bathymetry, natural habitats such as reefs, mangroves, estuaries and lagoons, and marine protected areas. The economic context can also be understood from land cover data and inspection of Google Earth imagery which shows the location of towns, infrastructure, farming, salt and aquaculture. The scale of the groupings should be sensible for a national-scale analysis. In the pilot studies, the zones were groupings of the smallest administrative unit available, and the resulting level of subdivision was considered to be at a suitable scale for a national study.
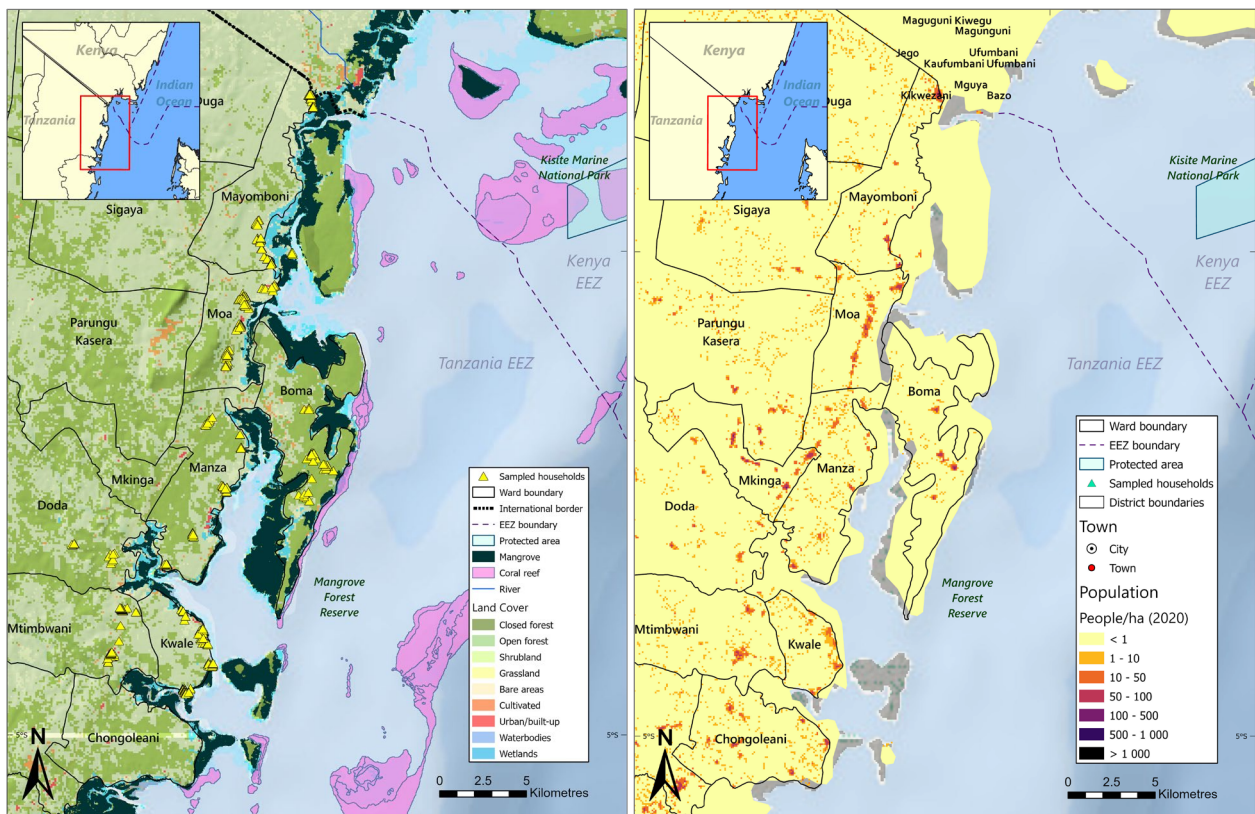

Figure 10. Maps showing the biophysical and population contexts for the pilot study in Mkinga District, Tanga Region, Tanzania. The map on the left also shows the location of households that were ultimately interviewed.

2. Focus group discussions and key informant interviews

Thematic Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) are used to collect information of a general nature on different aspects of people's livelihoods and their poverty and gender dimensions. For example, the pilot studies included:

- Discussions with fishers, aquaculture producers, fish processors and traders on fishery-related livelihoods,
- Discussions with people involved in forestry (particularly mangrove) related livelihoods
- Discussions with women on their opportunities and roles in the community and at home.
- Key informant interviews on farming, tourism and marine conservation, industrial fishing, and the local economy.

Through semi-structured interviews of about one to two hours, this provides information such as descriptions of resources, rules of access, equipment, seasonality, returns to effort, changes in availability, prices and inputs, and who is involved. It is useful for refining the design of household surveys as well as for the interpretation and enrichment of the information collected in those surveys. It also helps to keep the length of household questionnaires as short as possible.

3. Household surveys

Household surveys are the main source of data, particularly quantitative data. Relative sampling effort in each zone would be guided by local-level population information from census data at ward or village level, and then households are randomly selected within that unit. In the pilot studies, 3 zones were sampled in each of 3 countries, and the samples ranged from about 100 to 200 households per zone (Table 3).

Table 3. Sampling effort in three pilot surveys carried out for this study

	Approx coast length	Households	Sample	Percent of households
Kenya				
Matuga	13 km	39 231	106	0.3%
Msambweni	35 km	45 466	216	0.5%
Lunga Lunga	57 km	37 366	130	0.3%
Tanzania				
Mayomboni-Moa	30 km	8 340	217	2.6%
Doda-Manza-Boma	45 km	8 870	161	1.8%
Mtimbwani-Kwale	13 km	5 533	186	3.4%
Madagascar				
Sahamalaza	150 km	3 812	203	5.3%
Mahajamba	200 km	4 111	94	2.3%
Bombetoka	150 km	1 478	193	13.1%
Total			1506	

The survey should target the main decision-makers in the household. It is advisable to carry out the interviews face-to-face, and using smartphones or tablets with software which can be used offline (for the pilot studies, the Kobo Toolbox software[17] was used). This speeds up data collection and minimises error. Global Positioning System (GPS) coordinates should be collected

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[17] Kobo Toolbox is a free open-source software which was developed by the Harvard Humanitarian Initiative for data collection in very challenging environments.

for each of the households surveyed. Normal best-practice protocols for design and testing should be followed.

The questionnaire should include questions on household demographic composition and characteristics, employment and income, and all significant livelihood activities. These inform understanding of income from marine sectors or livelihoods and their significance for overall household income. In addition, the questionnaire should also include qualitative questions to do with opportunity and choice, voice and security. In order to inform the modelling of scenario impacts, the questionnaire can also include specific questions about scenarios, and this can take the form of a choice experiment. Note, however, that this is technically demanding for designers and enumerators, and will also add considerably to the length of the questionnaire. However, it can be a powerful tool for use in MSP. Box 2 provides an outline of the questionnaire used in the pilot study. For details, see the case study reports (Mulwa et al. 2021, Turpie et al 2021a, b).

Box 2. Example household questionnaire structure, as applied in the pilot studies

Section A: Demographics – obtains information on household members, their ages and education

Section B Socio-economic characteristics – obtains information on the residence and neighbourhood characteristics, sources of energy and water, household assets and distances to services and markets.

Section C Employment and income – obtains information for each member of the household on their employment status and economic sector of employment. Here, broad information on dependence on household production activities, pensions, and welfare were also collected.

Section D livelihood activities – obtains fairly detailed information on a wide range of livelihoods, including offshore and inshore fishing, other ocean related livelihood activities (mining for sand and coral, salt production, mariculture, and tourism), agriculture (crop production, poultry, and livestock), mangrove and other forest-related activities (timber, charcoal, and firewood), plant related activities (wild foods and medicines), and hunting. For each of these, respondents are asked to describe their participation, production, sales, and gender roles. Questions are also asked on the location and status of fishery resources harvested.

Section E security and voice - obtains levels of agreement on a number of statements about community and household harmony, questions on membership of organisations and questions on the extent of involvement of women in decision making.

Section F marine resource management – obtains household perceptions of the health of marine ecosystems and resource stocks, existing regulations and their enforcement, and the opportunities provided by different commercial activities in the area.

Section G - choice experiment – elicits preferences on future options for the area.

End section: GPS location, enumerator details, details of who was present at the interview, whether the female(s) present seemed able to express themselves freely, the overall quality of the interview in terms of likely reliability of the information given, and whether the choice question was properly understood.

Computation of metrics

This section provides an outline of the methods used to compute the measures for each of the four dimensions of household prosperity and gender equality (resources/income, opportunities and choice, power and voice, and security) as carried out in the pilot studies. These methods can easily be modified to suit local contexts. For the pilot studies, a scale of 0-7 was used for the indicators. The purpose of keeping to a low number scale was to enable the scale to be converted into words (for example Very poor to Excellent). Alternatively, it could be converted to a more familiar base 10 scale.

Resources / income

Household income can be calculated based on stated monthly income from employment, as well as the production, sales, and consumption from all livelihood activities over the past 12 months. The proportion of this income from marine resource harvesting and other marine sectors is also calculated to inform the situation and scenario analyses. This is the most important indicator, and involves the bulk of the effort in data collection and analysis. Whereas other studies sometimes rely on consumption indicators as a measure of poverty (to avoid the problems of asking people to state their income), it is easier to estimate how income would change in the scenario analysis.

To score the relative level of poverty of the household in terms of resources and income, total household income can be compared to the national poverty line. An example of scoring for a 0-7 scale is to calculate income as % of national poverty line household income x 7, but capped at 7. In other words, if a household's income is equal to or greater than the national poverty line income, it receives the maximum score. This approach is replicable at scale.

Information on household living conditions and their ownership of assets provides a potential additional measure for triangulation or validation of the income indicator. An example of a scoring system (on a scale of 0-7) is provided in Table 4.

Table 4. Components summed in the qualitative index of household income status and their scoring. A higher overall score (out of 7) indicates a household that is better off.

Indicator	Score 1	Score 0
Roof type	Hard materials	Plant materials
Wall type	Cement blocks, bricks	Mud/mud bricks/plant materials
Water source:	Piped tap water, borehole or well	River, other
Source of energy for lighting	Solar panel or grid electricity	Candles, gas, other
Source of energy for cooking	Solar panel or grid electricity	Gas, charcoal, firewood
Household assets	Household owns any motorised or non-motorised vehicle/boat (including bicycle or canoe)	Household does not own any motorised or non-motorised vehicle/boat

Opportunity and choice

The "Opportunities and choice" dimension of poverty is the extent to which people have access to education, health care, infrastructure, energy, markets and information, since all of these factors have an influence on a household's ability to move out of poverty. An index of opportunity and

choice can be compiled based on the answers to a range of questions on these. An example for an index on a scale of 0-7 is provided in Table 5.

Table 5. List of sub-indicators for which scores were averaged to create an index of opportunity and choice

Sub-Indicator	0	1	3	5	7
Level of education of household head	None	Some	Primary	Secondary	Higher
Distance to the nearest school		>30 min	21-30 min	11-20 min	<10 min
Distance to the nearest clinic		>30 min	21-30 min	11-20 min	<10 min
Access to nearest market		>30 min	21-30 min	11-20 min	<10 min
Water source		River or other	Rainwater storage	Borehole or well	Piped tap water
Source of energy for lighting		Candles	Gas or paraffin	Solar panel	Grid electricity
Overall level of government services in your local area, including the quality of public roads	As rated on a scale of 1 to 7				
General availability of marine sector formal jobs for men	As rated on a scale of 1 to 7				

Power and voice

The "Power and voice" dimension of poverty refers to the extent to which individuals are able to articulate their concerns, needs and rights in an informed way and can influence decision-making without discrimination. For the overall household indicator, a score can be based on answers to a series of questions on the household's involvement in decision making in the community and their perceptions of their ability to influence their circumstances, as follows:

- How many of seven broad types of community organisations that any household members (male or female) belong to.
- Households are able to voice their concerns about the use and management of our coastal and marine areas through organisational structures (positive statement, rated from 1 - strongly disagree to 7 - strongly agree)
- I feel that our concerns about marine and coastal management are heard (positive statement, rated as above).

For the analysis of vulnerability in terms of gender equality, the voice dimension can be scored based on the level of women's involvement in community decisions (scored out of 7 as above), and the answers to a series of questions on women's involvement in household decisions.

- How many of seven broad types of community organisations that female household members belong to.
- Extent to which women are involved in decisions on how the household earns an income.
- Extent to which women are involved in decisions on how the household spends its money.

- Extent to which women are involved in decisions on where the household lives.
- Extent to which women are involved in decisions on children's schooling.
- Extent to which women are involved in decisions on having children.
- Extent to which women are involved in decisions on women's occupations and activities.

Security

For the security dimension of poverty, a score can be based on answers to a series of questions on community security where participants provide a rating from 1 (strongly disagree) to 7 (strongly agree), for example:

- Our community is harmonious (positive)
- Life in this area is very peaceful (positive)
- There is conflict over access to resources in this area (negative)
- Local government officials are trustworthy (positive)

Note that for negative statements, the scoring should be reversed, so that a higher score always reflects a better situation. For the analysis of vulnerability in terms of gender equality, the score can be based on the level of harmony with the household, using questions such as.

- My family functions well for all members (positive)
- My family's day to day interactions are peaceful (positive)
- Family members accommodate each other (positive)

Overall measures of relative poverty and gender

Summarising the above, the overall indices of relative poverty and gender equality can be compiled at household level as shown in Table 6.

Table 6. Example composition of the overall scores of relative poverty and gender equality per household. All measures are expressed as a score from 0 to 7, including proportions and ratios. Weighting of the four dimensions is shown in the right hand column. All sub-components of these are averaged using equal weighting.

Dimension	Household prosperity	Gender equality	Weight
Resources/ Income	Household income measured as the sum of cash and subsistence income from employment and all livelihood activities, scored out of 7 based on % of national poverty line household income	Proportion of this income derived by women	40
	Household material wealth, measured as sum of 7 binary scores for roof type, wall type, water source, lighting energy source, cooking energy source, assets.	As for relative poverty	
Opportunity and choice	Level of education of household head	Opportunity and choice score as for relative poverty	20
	Distance to the nearest school		
	Distance to the nearest clinic		
	Access to nearest market		
	Water source		
	Source of energy for lighting		
	Overall level of government services		
	-	Ratio of the scores for general availability of marine sector formal jobs for women vs men	
Power and voice	How many of seven broad types of community organisations that any household members belong to	How many of seven broad types of community organisations that female household members belong to	20
	Ability to voice concerns (rating)	Women's involvement in decisions on how household earns an income	
		Women's involvement in decisions on household expenditure	
		Women's involvement in decisions on where household lives	
		Women's involvement in decisions on children's schooling	
	Concerns about marine and coastal management are heard (rating)	Women's involvement in decisions on having children	
		Women's involvement in decisions on their own occupations and activities	
Security	Our community is harmonious	My family functions well for all members	20
	Life in this area is very peaceful	My family's day to day interactions are peaceful	
	There is conflict over access to resources in this area (reversed score)	Family members accommodate each other	
	Local government officials are trustworthy		

Conclusion and next steps

Fulfilling all the goals of the MSP process is an ambitious undertaking involving the complex interweaving of sectoral, environmental and social considerations in an equally complex geographic, political, legal and socio-economic setting. This raises the risk of developing over-simplified or over-complicated planning processes that if anything, can entrench the marginalisation of certain groups. Indeed, MSP has already come under much criticism, but with little practical guidance on how these problems could be fixed.

This study has developed a framework for incorporating poverty and gender considerations in MSP, and has made some progress in developing metrics for use in the situation assessment and scenario analysis steps of the process. The next steps will be to develop the datasets necessary for modelling the impacts of changes considered in the MSP process. Much of this will come through scaling up of the types of research studies as exemplified by the pilot work for this study. Larger scale studies will enable analysis of spatial variation which is needed to develop some of the models for scenario analysis. Finally, tools can be developed to facilitate modelling, and to enable the spatial and visual presentation of the status quo and alternative scenarios to aid decision making.

The framework developed here could ultimately accompany the other manuals and guidelines used in MSP. It is important to have a pluralistic planning process, and this approach should be seen as one of many tools to support such a process. It would mesh well with more elaborate economic and environmental tools, and can also be integrated into some of the spatial tools that are in use or under development.

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