DEVELOPING METRICS OF POVERTY AND GENDER CONSIDERATIONS IN MARINE SPATIAL PLANNING

A synthesis of case studies in Kenya, Madagascar and Tanzania



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Summary

Across the Western Indian Ocean, many vulnerable social groups largely depend on marine resources for their food security and livelihoods. The Swedish Agency for Marine and Water Management (SwAM) and the IOC Sub-Commission for Africa and the Adjacent Island States (IOCAFRICA) support the implementation of Marine Spatial Planning (MSP) in this region. This report provides an overview of three pilot cases of baseline data collection to better understand local communities' dependence on marine resources and other livelihood activities, with emphasis on understanding the role of marine spatial zonation and resource management on poverty and gender equality.

Pilot studies were conducted in Kenya, Tanzania and Madagascar. In Kenya, the study focused on Kwale county which is the southernmost coastal county bordering the Tanzanian study area in the south. In Tanzania, the study area was the Mkinga District within Tanga Region, which is in the northeast of Tanzania. In Madagascar, the study areas comprised three coastal bays in the north western regions of Boeny and Sofia, namely Bombetoka, Mahajamba and Sahamalaza Bays.

Coastal households in Kenya depended on a number of economic activities including formal employment, fishing and fisheries related activities, crop and animal farming, and trade. Some communities indicated that the resources were dwindling due to extensive harvests, while others indicated that there were fluctuations on the availability of the resources overtime. Across Kwale county, gender differences in livelihood activities were prevalent. These differences were mainly attributed to culture and traditions, risk aversion, and lack of capital to start business enterprises.

In Tanzania, earning income from employment was common and shared equally between men and women across the coastal wards in the Tanga region. Most employment opportunities were within the fishing and fish processing sector. Offshore fishing (in areas best reached using a motor or sail) was more common than fishing from or close to the shore and fishers mainly caught small pelagic fish – on average about 64% of catches were small pelagics. Fishing, both offshore and inshore, was a very male dominated activity – only few households had female household members going out to sea. Inshore fishing was less common among households and also a very male dominated activity.

Households in the Sofia and Boeny regions in the north / north-west of Madagascar had been experiencing the impacts of dwindling fish stocks and were worried that fish stocks will completely disappear in a few years if no actions are taken. Overall, households therefore saw the need for improved MSP in the area. However, fishing was by far households' main income source – both for livelihood activities and for the few households that had some type of paid employment. In Mahajamba and Bombetoka close to 80% of households engaged in offshore fishing. Restricting access to fishing grounds would likely have very large impacts on households' monthly incomes as their incomes were rather undiversified.

Overall, Madagascar ranked lowest in terms of opportunity and choice, power and voice, and domestic harmony and security while households seemed to be relatively better off in terms of income and resources compared to Kenya and Tanzania. Purely using income and access to resources relative to national poverty levels would have given different overall poverty level results for Madagascar.

Foreword

With growing global and national economies, characterised by exploitation of resources and population growth, coastal communities find themselves having to respond and cope within an increasingly competitive environment. Access to the resources they depend on is becoming more restricted and opportunities based on the use of natural resources in general are becoming increasingly limited.

As countries continue to embrace the blue economy approach, Marine Spatial Planning (MSP) has been widely recommended as a means to systematically and sustainably allocate space and understand the interactions among and between resource user groups and the marine environment.

Indeed, MSP is most effective when everyone is involved in governance decisions from the planning stages, including marginalised resource user groups such as youth and elderly adults, individuals in small-scale fishing and coastal communities, indigenous peoples, migrants, and women. These parties should also be informed by current, relevant, and accessible data, which can be visualized in easy to understand and used formats like that of a map, and help them make the best decisions when it comes to their livelihoods.

The findings of this report show that MSP with an inclusive approach can alleviate poverty and gender inequality, or at least not worsen it. It also indicates that gender is a critical organizing category for coastal activities, and is of significant relevance and legitimacy to the MSP process. Specifically, the findings indicate women are often not included in fisheries management or ocean-related decision-making bodies, and do not have equal access to resources, financing, market information, training, and technology, despite their key role in processing.

Integrating gender and poverty considerations in the MSP process has the potential to help countries address and achieve several of the Sustainable Development Goals of the UN 2030 Agenda.

Whereas several countries in the Western Indian Ocean region have made important steps towards integrating the MSP process in their Blue Economy initiatives, it is crucial to acknowledge that several obstacles lie ahead. Development, implementation and evaluation of inclusive marine spatial plans for a sustainable Blue Economy requires a diverse set of resources, including institutional governance frameworks, financial support as well as range of human skills and expertise.

As the global ocean community gears towards achieving the outcomes of the Ocean Decade, UNESCO-IOC is working to ensure that all initiatives cut across gender, geographies, cultures, and generations to ensure all members of society are included and working together in a transformational, large-scale, and innovative campaign to advance, accelerate, and mainstream ocean science in policies and decision-making processes.

UNESCO-IOC and the Swedish Agency for Marine and Water Management will continue to support African countries in MSP and the development of their Blue Economy strategies as part of the implementation of the 2030 Agenda for Sustainable Development and its Sustainable Development Goal 14.



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The technical study was led by Dr Jane Turpie of the University of Cape Town (EfD-South Africa), in collaboration with Prof Richard Mulwa of the University of Nairobi (EfD-Kenya), Prof Razack Lokina of the University of Dar es Salaam
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[1]https://www.mspglobal2030.org/msp-roadmap/

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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 management2 and sustainable ocean governance (Agardy, 2010; UNESCO-IOC, 2009; Pomeroy & Douvere, 2008; Schaefer & Barale, 2011). A recurring critique of MSP is that it tends to be sector focused and fails to take all the complex social issues around space into account, such as the value of certain areas for marginalised groups (Flannery et al., 2018). MSP decisions are sometimes accused of being centrally driven, favouring stakeholders that are resource strong and influential (Flannery et al., 2018; International Monetary Fund, 2007; Jones et al., 2016; Saunders et al., 2020; Tafon, 2019). MSP can thus have negative impacts on vulnerable social groups that largely depend on marine resources for their food security and livelihoods if the development of such policy does not properly take these groups into account. Studies on gender aspects of MSP are scarce, but suggest strong differences in interests in different spatial areas and activities in the marine zone (de la Torre-Castro et al., 2017; Hagedoorn et al., 2021; Schwerdtner Máñez & Pauwelussen, 2016).

The Swedish Agency for Marine and Water Management (SwAM), which is supporting the implementation of MSP in the Western Indian Ocean (WIO) region, has developed a conceptual and analytical framework for incorporating poverty and gender considerations in the MSP process (Swedish Agency for Marine and Water Management, 2022). If following the very first UNESCO-IOC guidelines (2009), MSP is a lengthy 10-step process which involves a preparatory phase in which baseline data are collected, followed by an analytical phase in which alternative planning scenarios are evaluated. The next phases involve the development of spatial and management plans, the monitoring and evaluation of their impacts and adaptation of the plans as necessary. Following the principles of a Social Sustainability Framework, a more inclusive process is proposed, both in terms of the involvement of stakeholders and the metrics that are considered in the baseline description, scenario analysis and monitoring steps is suggested in the framework. It is also proposed that the metrics relating to poverty/-prosperity and gender equality are based on the Swedish International Development Cooperation Agency (Sida)'s multidimensional poverty framework (Swedish Agency for Marine and Water Management, 2022).

In the development of the conceptual and analytical framework, three case studies were undertaken, in selected parts of the coast of Kenya, Tanzania and Madagascar. These studies were undertaken to pilot the baseline description of local communities' dependence on marine resources, sectors and other livelihood activities, with emphasis on understanding the links to poverty and gender equality. This report provides an overview and synthesis of the results of these case studies. The detailed methods and case study findings for Kenya, Tanzania and Madagascar are provided in Mulwa et al. (2022), Turpie, Brühl, and Lokina (2022) and Turpie, Brühl, Chirrute, et al. (2022), respectively. Because the pilot studies were not part of any formal MSP process, they focused on testing methods and metrics to provide a description of the gender equality and poverty aspects needed for the baseline description step of the 10-step MSP process. It is anticipated that the social wellbeing indicators which are developed for household prosperity and gender equality can be used to illustrate how MSP would affect marginalised groups if human activities were redistributed based on new objectives during the scenario analysis step of the process, and could also be used to monitor and evaluate the performance of marine spatial plans.

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

Conceptual Framework

Multi-dimensional poverty approach

Developing countries typically try to address poverty through economic growth. Increasingly, coastal countries are looking at the potential for growing their ocean economies, and MSP is seen as a means to facilitate this. However, 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 might affect the poor requires further attention.

Understanding and applying poverty dimensions is critical in incorporating poverty perspectives in MSP processes. Two approaches have been used in the identification of people affected by poverty. The first is the income or poverty-line method of aggregation, which has attracted considerable attention and involves determination of a poverty-line income sufficient to attain minimum basic needs. Any individual that falls below this line is considered poor or deprived. The second method, which is the multidimensional poverty approach, views income not as intermediary of basic needs, but in terms of shortfalls from the minimum level of the basic needs themselves.

Given the advantages of the multidimensional approach, the Swedish Agency for Marine and Water Management (2022) propose using the Sida multidimensional poverty approach as the method of identification of poverty when incorporating poverty perspectives in MSP. This is because, beyond the advantages of multidimensional approaches over income approaches in general, this tool presents a tractable concentric view of poverty and its determinants that are easy to follow and apply.

According to the multidimensional poverty analysis (MDPA) framework (Figure 1), poverty does not simply mean the lack of resources, but also lack of opportunity and choice, power and voice and/or human security. A person living in poverty is resource-poor and poor in one or several of the other dimensions:

- 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.
- 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. These criteria should be used when evaluating the potential impact that marine spatial plans have on local communities (Table 1).

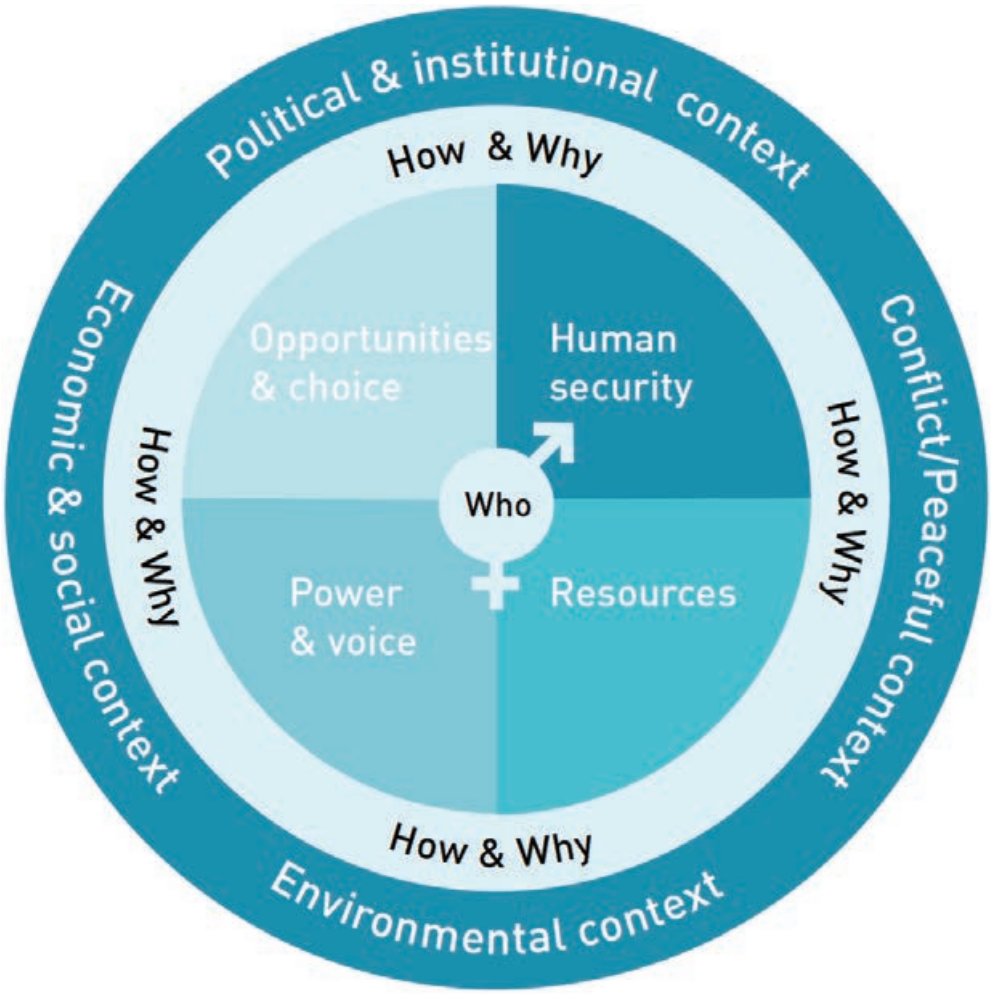


Figure 1. The Swedish International Development Cooperation Agency's multi-dimensional poverty assessment (MDPA) framework (Source: Sida, 2017)

Table 1. Criteria for the evaluation of the wellbeing of affected communities or groups

Resources	The extent to which the benefits from employment or resource use are sufficient to sustain a decent living standard
Opportunities and choice	The extent to which people have access to education, health care, infrastructure, energy, markets and information sufficient to allow them to move out of poverty
Power and voice	The extent to which individuals are able to articulate their concerns, needs and rights in an informed way and influence decision-making affecting these concerns without discrimination
Community security	The extent to which people's rights and livelihood potential are limited by unrest in the community
Domestic harmony	The extent to which households are able to fulfil their family roles and ensure healthy gender relationships

MSP impacts on poverty

MSP will, for example, 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). Decisions about the use of marine areas could impact directly on people's access to subsistence and small-scale fisheries (i.e., 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 opportunities for the ocean economy of developing countries in Africa (Adewumi, 2020; UNECA, 2016). In addition to the employment opportunities created by blue growth (albeit not necessarily to all groups of society), it can have an important indirect impact through generation of tax revenues. These may 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.3These potential benefits of ocean economy growth need to be weighed up against the potential impacts on inshore environments and their users. There is a need to shift ocean economies to sustainable blue economies.

Although MSP cannot be expected to address all the dimensions of poverty, it can 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.

3https://www.cffacape.org/publications-blog/why-the-current-african-unions-blue-economy-strategy-threatens-small-scale-fisheries

MSP impacts 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. This has implications for their domestic security. Thus, the impacts of women can be considered in the same dimensions as for poverty (Table 1).

Poorer women in developing country contexts are particularly vulnerable in terms of their access to resources because they tend to have more limited options than men. In coastal and marine environments of developing countries, their activities tend to be inshore, and close to home, while men work throughout the seascape, and can travel further to trade (de la Torre-Castro et al., 2017; Feka et al., 2011; Fröcklin et al., 2013, 2014). This tendency is linked to reproductive roles[4], 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. 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 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, e.g. 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).

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.

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

[4] 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.

Incorporating poverty and gender considerations in MSP

The 2009 IUNESCO-IOC guidelines for MSP[5] 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 2; see UNESCO-IOC, 2009). In the newly developed conceptual and analytical framework for incorporating poverty and gender considerations MSP (Swedish Agency for Marine and Water Management, 2022) it is suggested that these steps incorporate principles for social sustainability, namely to ensure that marginalised groups are recognized, represented and treated fairly in terms of distribution of costs and benefits. The specific guidance on when and how to do this is summarised in Figure 2.

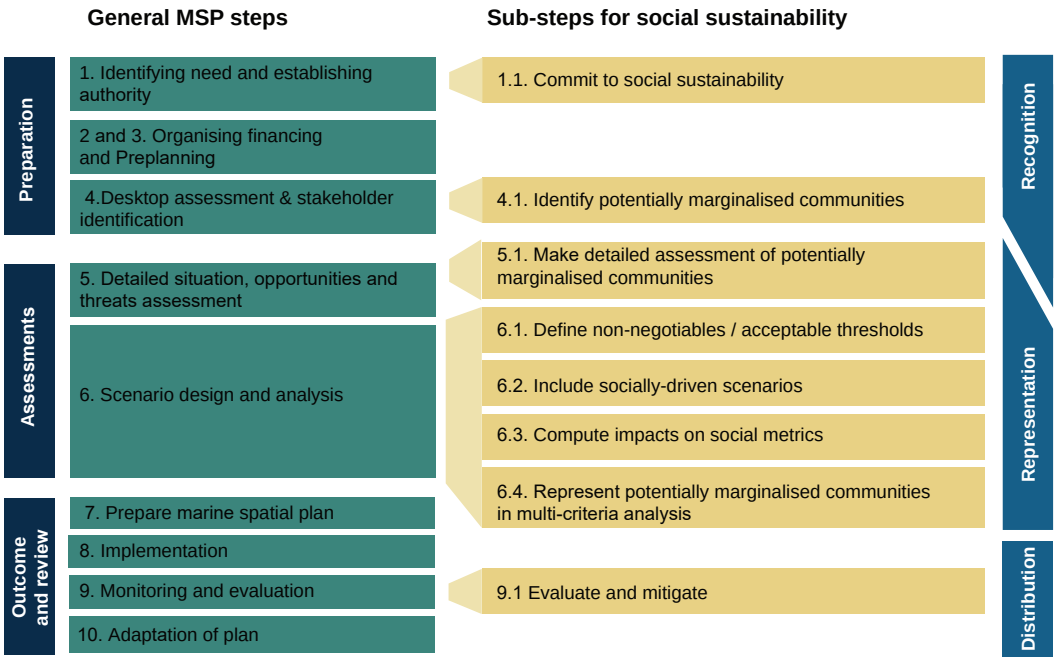


Figure 2. Outline of the sub-steps for incorporating potentially marginalised communities (PMCs) in MSP (Source: Swedish Agency for Marine and Water Management, 2022).

In the scenario analysis step, potential changes under alternative future scenarios would be measured against a baseline or business as usual scenario (Figure 3). Thus, poverty and gender dimensions need to be incorporated into the baseline description and need to be incorporated in the outputs of the scenario analysis. Furthermore, estimating how such metrics will change under the scenario analysis requires a quantitative or qualitative understanding of how they relate to the various biophysical and socio-economic factors that would change under different scenarios.

[5] https://unesdoc.unesco.org/ark:/48223/pf0000186559

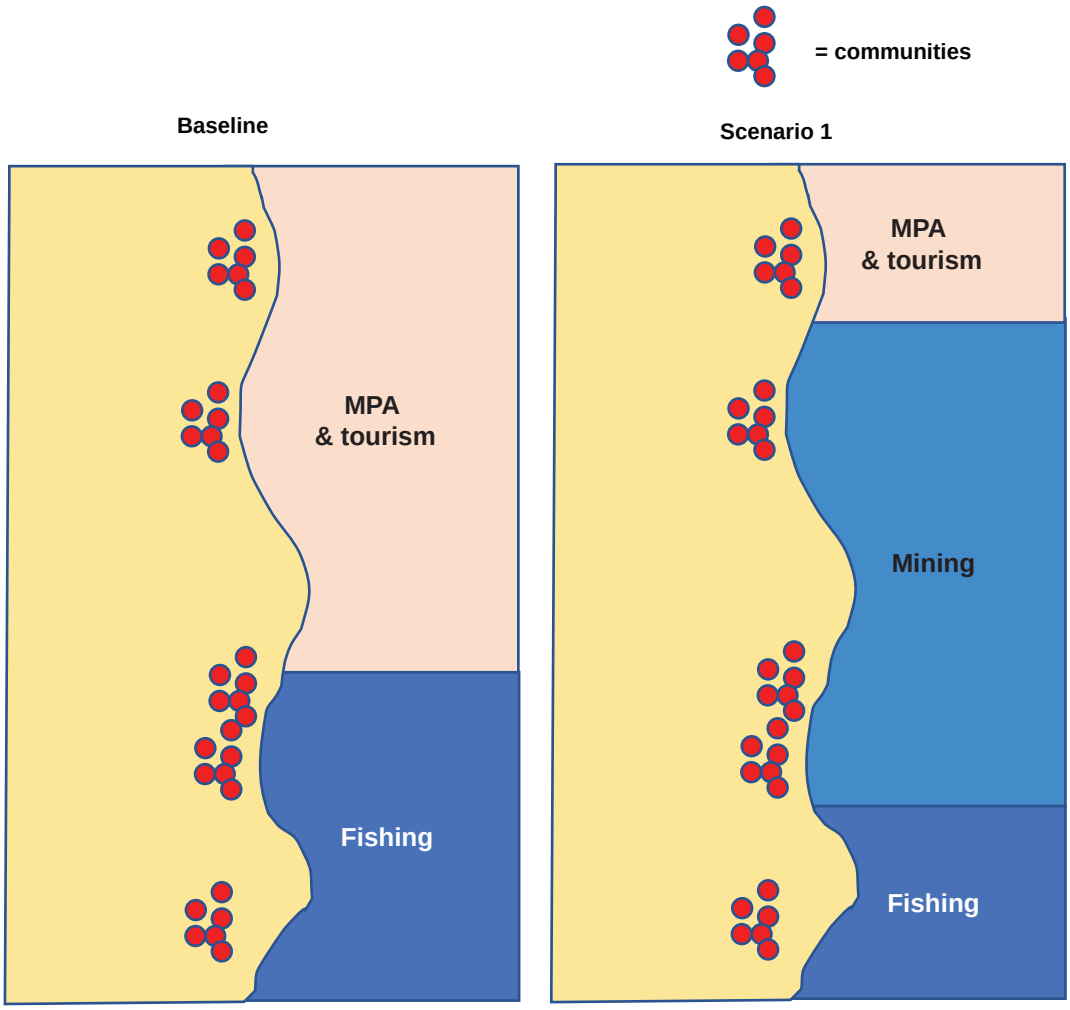


Figure 3. Stylised example of MSP scenarios in which different spatial priorities are considered (Source: Swedish Agency for Marine and Water Management, 2022).

Scenario analysis typically involves multi-criteria analysis (MCA), where alternative planning options are 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. MCA allows for evaluation of both monetary and non-monetary indicators (Figure 4).

The three elements of Figure 4 relate to the three pillars of sustainability. Consideration of poverty and gender involves developing criteria or indicators under the social pillar. While the Economic prosperity outcome would typically be evaluated at national scale (or the scale of the planning exercise), overall social and environmental outcomes are 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.

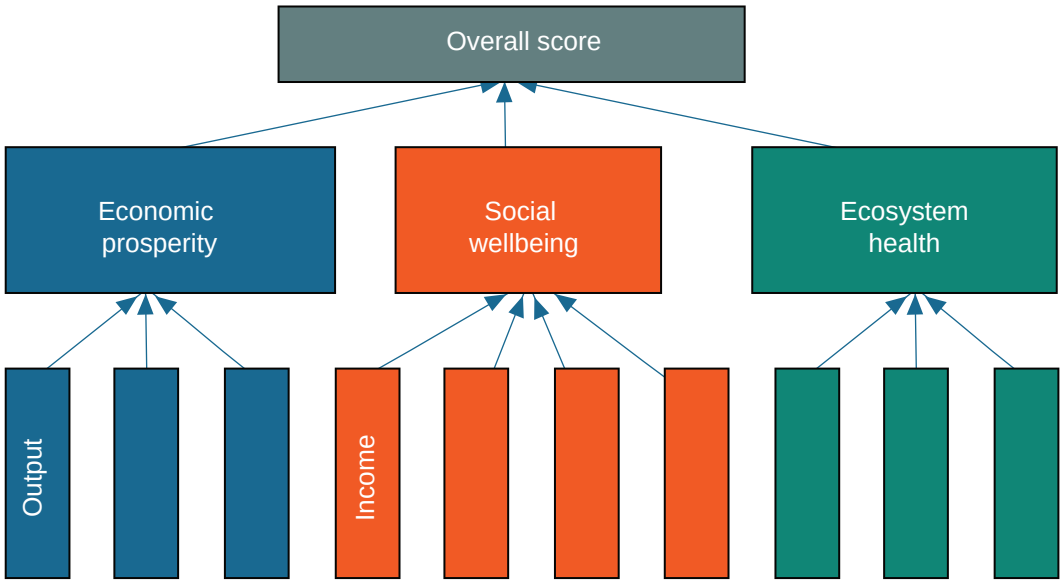


Figure 4. Example structure of a scoring system for a scenario analysis, with some example indicators (Source: Swedish Agency for Marine and Water Management, 2022).

The framework proposes the inclusion of two sub-indicators of Social Wellbeing, namely household prosperity and gender equality. A third sub-indicator could be happiness. This study devises methods for measuring and/or scoring four dimensions of each of these sub-indicators (Figure 5, Table 2).

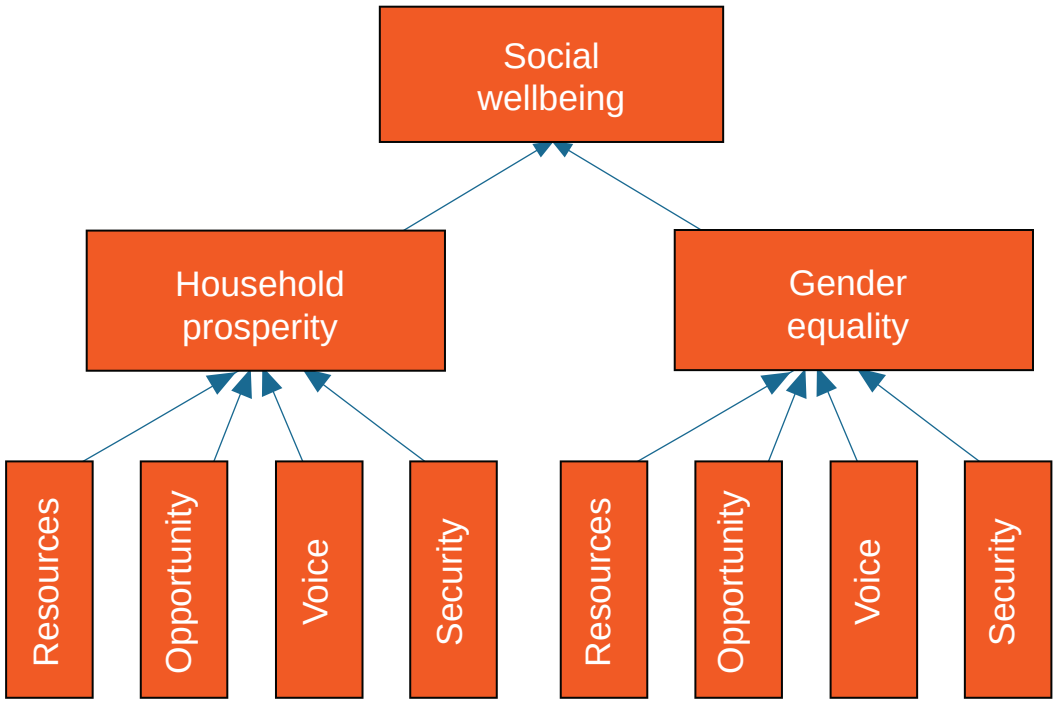


Figure 5. Proposed structure of two sub-indicators of Social Wellbeing (Source: Swedish Agency for Marine and Water Management, 2022).

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

Criteria	Household prosperity/poverty	Gender Equity	Related 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 quality of environment
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
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

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 (Table 2). 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.

Study Areas, Data, and Methods

Overview

Socio-economic data is usually a gap in the MSP process (Ban et al., 2009; Domínguez-Tejo et al., 2016; Khan & Amelie, 2015). 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.

Ideally, the MSP process should begin with a baseline survey which involves desk research, field survey, remote sensing and large-scale social surveys. Household level surveys capture important information on marginalised groups that can assist in developing more targeted interventions. Baseline surveys were carried out in three coastal study areas, in southern Kenya, northern Tanzania, and north-western Madagascar. These study areas were selected because they are all in the Western Indian Ocean, and are in the early stages of planning to undertake MSP. They all represent poor coastal areas within low to middle income African countries, allowing for some cross-country comparison. The study involved collection of socio-economic data using focus group discussions and household surveys in settlements within 10 km of the coast. The surveys were designed to understand the role of coastal activities in household livelihoods, with particular emphasis on poverty and gender. The study areas, sampling design, survey design and survey methods are described in more detail below.

Study areas

Kenya

IIn Kenya, this study focused on Kwale county which is the southernmost coastal county bordering Tanzania in the south (Figure 6). Various ecosystem types are found along the coast, including coastal mangrove forests, sand dunes and beaches, coral reefs, and seagrass beds. Kwale county and its neighbouring county in the north, Kilifi, both have 14% of Kenya's mangrove forest (compared to 61% in the coastal county of Lamu further to the north) which provide a habitat for fish and other species.

According to a 2013 survey by the Kenya National Bureau of Statistics (KNBS) and Society for International Development (SID), Kwale county has the highest poverty levels compared to the other coastal counties (Government of Kenya, 2017). The lack of economic opportunities has accelerated environmental degradation in the area (Government of Kenya, 2017). Mining, particularly for titanium, has contributed to degradation of marine and terrestrial habitats and mineral exploitations are expected to increase in the counties of Kwale and Kilifi in the future.

Fishing provides the majority of income to households along the coast in Kenya and makes an important contribution to household food security (Government of Kenya, 2017). Most fishing is small scale and for a combination of subsistence and cash income. However, over the years, the number of fishers has increased drastically, putting the resource base under increasing pressure (Government of Kenya, 2017).

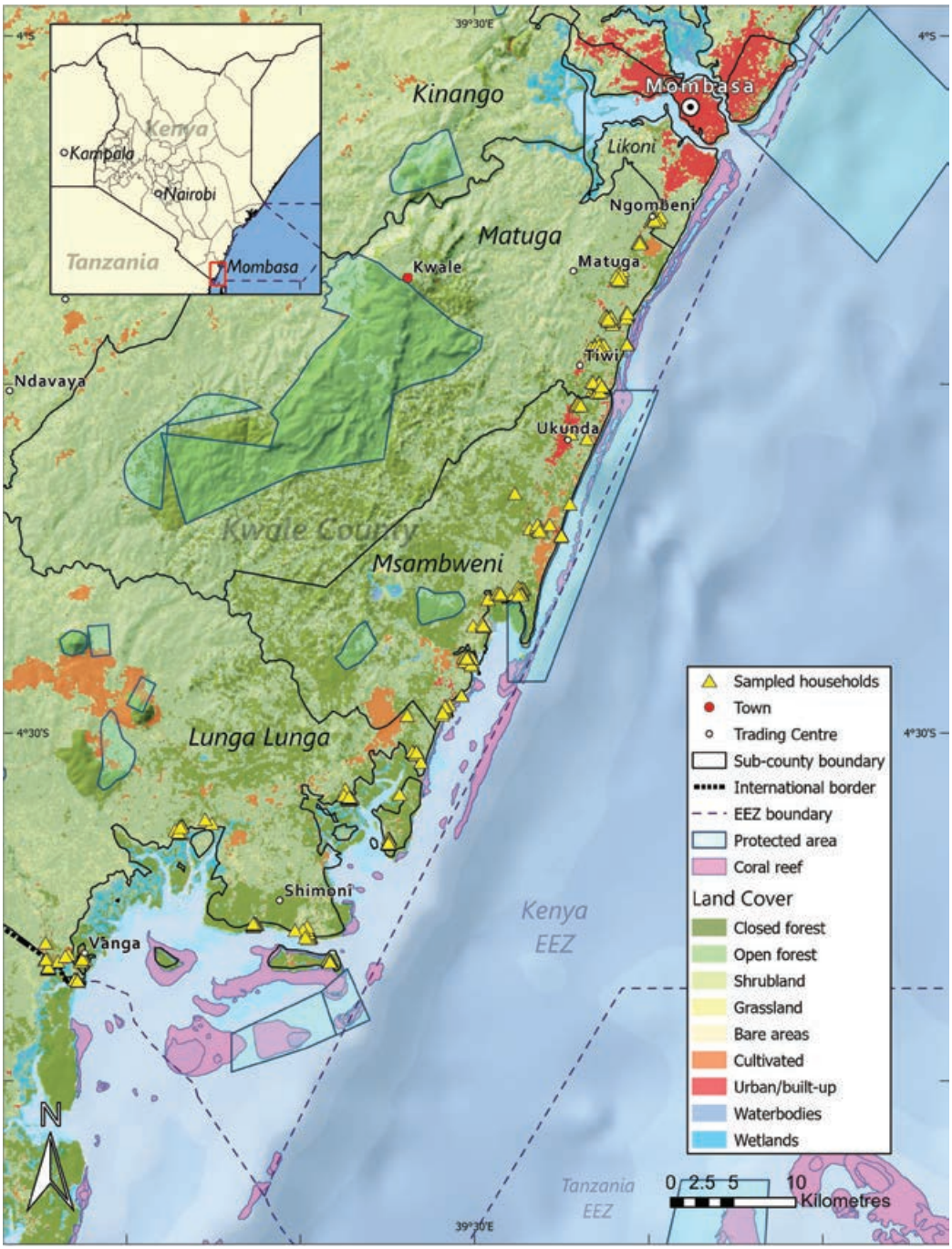


Figure 6. The Kwale County in the south east of Kenya (see insert for location) showing the three coastal sub-counties of Matuga, Msambweni and Lunga Lunga. The land cover, location of mangrove forests, coral reefs and marine protected areas are shown, as well as the location of households sampled in this study (Source: UNESCO-IOC and SwAM, 2024) .

Table 3. Overview of government household statistics from Kwale County, Kenya, compared to neighbouring Kilifi County and the Kenyan average (data source: Kenya Integrated Household Budget Survey 2015-2016)

	Kwale	Kilifi	Kenya average
Household size	4.71 (0.007)	4.29 (0.005)	3.97 (0.001)
Number of habitable rooms	2.39 (0.003)	1.95 (0.002)	2.13 (0.000)
Internet connection	25.4% (0.001)	31.9% (0.001)	30.0% (0.000)
Engaged in farming activities (last 12 months)	75.0% (0.001)	64.8% (0.001)	60.2% (0.000)

According to the most recent household budget survey, households in Kwale on average engage in more farming activities than their coastal neighbouring county in the north and the Kenyan average. Farming households in Kwale focus on maize, cassava, beans, peas and grams and also grow mango and coconut trees. Cash crops are also grown, including cashew nuts, sugarcane, cotton and tobacco (Kwale County Government, 2022). Most agricultural and fishing activities are small-scale. However, sugarcane has become an increasingly more important cash crop in Kwale and there have been developments to farm sugar on a larger scale (Government of Kenya, 2017).

Tanzania

In Tanzania, the study area was the Mkinga District within Tanga Region, which is located in the northeast of Tanzania (Figure 7). Mkinga District borders the Kenyan study area in the north and has a coastline of about 50 km on the Indian Ocean. The coastline of Tanga has approximately 100 distinct coral reefs which are located 1-10 km from the shore (Mcclanahan et al., 2015a). This coastline has extensive mangrove forests and diverse fish species.

Households in the region fish, farm, engage in tourism activities, mine (cement and limestone), grow and process sisal commercially or have small-scale businesses (Kihara et al., 2021). The most common livelihood activities in the region are fishing and farming. The majority of households (63.7%) indicate that they have worked on agricultural (farming / raising livestock) or fishing activities in the last 12 months (Table 4). Households in the Tanga region on average work more on agricultural and fishing activities compared to the average Tanzanian household and compared to households further to the south of the Tanzanian coastline in Lindi. Households in the area of Pwani, just to the south of Tanga, on average engage just as much as Tanga households in agricultural and fishing livelihood activities (Table 4).

Table 4. Overview of household characteristics in the Tanga region (the Tanzanian case study area) compared to neighbouring regions (data source: National Panel Survey published by Tanzania's National Bureau of Statistics in 2018)

	Tanga	Pwani	Lindi	Tanzania Av.
Household head age	445.3 (0.02)	47.4 (0.032)	48.3 (0.035)	43.9 (0.005)
Household head female	26.2%	24.3%	28.8%	28.8%
Household size	4.6 (0.003)	4.2 (0.004)	3.9 (0.004)	4.7 (0.001)
Number of habitable rooms	2.6 (0.002)	2.4 (0.002)	2.4 (0.002)	2.7 (0.000)
Number of children (age 5 to 17)	1.3 (0.002)	1.2 (0.002)	1.3 (0.003)	1.5 (0.000)
Work on household agricultural activities in the last 12 months (including farming, raising livestock or fishing)	63.7%	46.3%	62.9%	55.1%

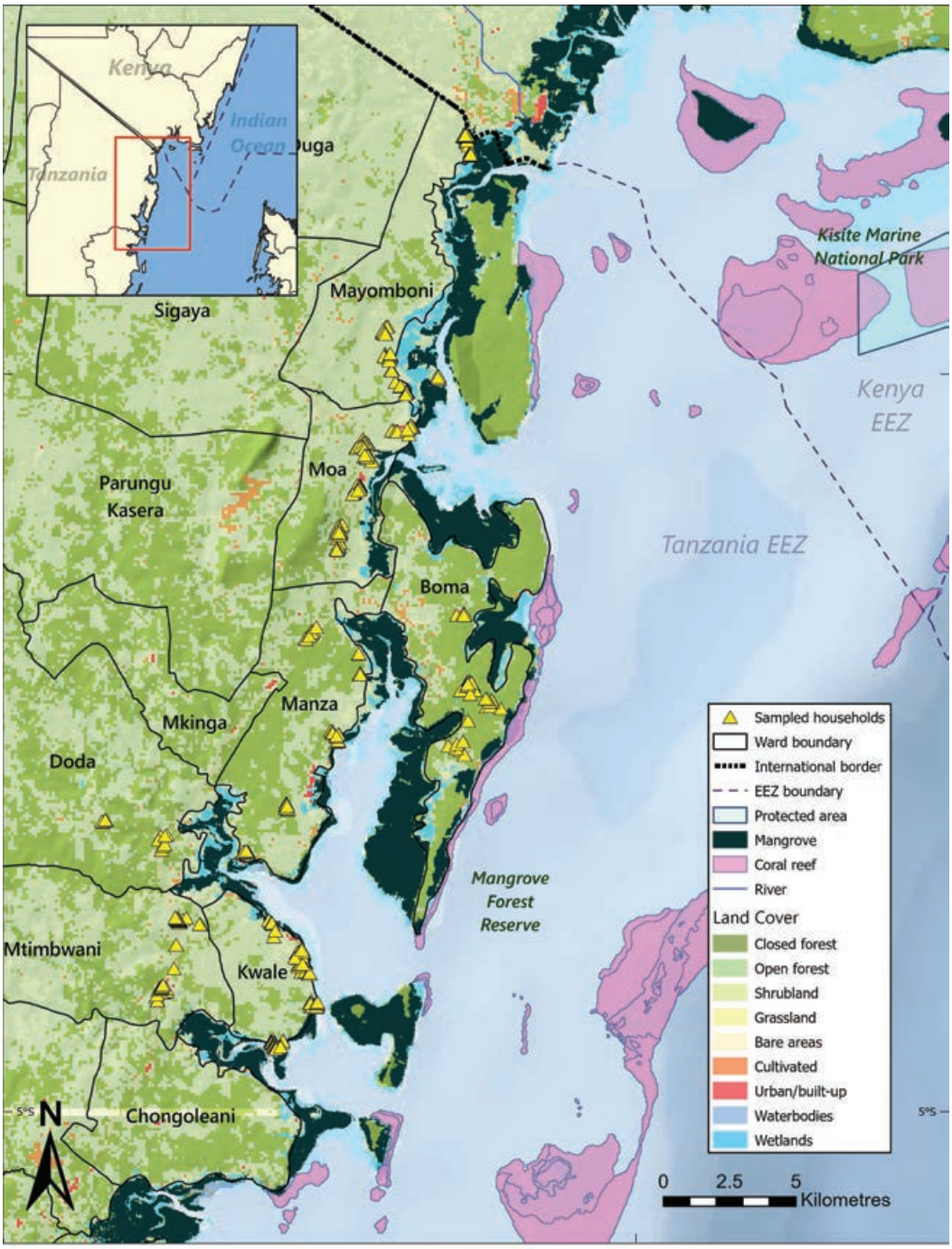


Figure 7. The Tanga region in the north east of Tanzania shows the seven coastal wards of Mayomboni, Moa, Boma, Manza, Doda, Mtimbwani, and Kwale. The land cover, location of mangrove forests, coral reefs and marine protected areas are shown, as well as the location of households sampled in this study. Note that the Mangrove Forest Reserve comprises all the mangroves shown on the map (Source: Turpie et al., 2022b).

The capital of the Tanga region is the port city of Tanga (located just south of the study area) which is expected to grow due to the East African Crude Oil Pipeline project, signed in the beginning of 2021. The oil pipeline will be built between Uganda's oil depots in the Albertine region and Tanga city (Kyeyune, 2021). Shipping activities are recognized as an important sector for the economy with efforts underway to expand Tanga port to allow larger ships to dock in the harbour. However, over the years shipping activities have declined, even before the COVID-19 pandemic, mainly driven by the extra charges at the port due to double handling fees. Key informants on the local economy and shipping industry reported that COVID-19 reduced the amount of imported and exported goods even further which resulted in many shipping lines closing. According to key informants, the region currently imports more than they export which is largely attributed to an increase in port charges, long procurement processes, delays in inspection, corruption, delays in transhipment and poor port equipment.

The region has been experiencing severe degradation of its coastal and marine resources. An increase in fishing activities and the use of seine nets and dynamite for fishing has destroyed large amounts of coral reef (Samoilys & Kanyange, 2008b). As degradation became more apparent, efforts were made to improve the coastal conservation and management in the region to ensure a more sustainable growth of the region (Samoilys & Kanyange, 2008a). The Tanga Coastal Zone Conservation and Development Program (TCZCDP) was established in 1994 and focused on better management of fish stocks in collaboration with local communities. Communities were encouraged to collaboratively monitor and reduce the use of illicit fishing gear. Compliance with gear restrictions is seen as large success factor (Mcclanahan et al., 2015b).

Madagascar

In Madagascar, the study area comprised three coastal bays in the north western regions of Boeny and Sofia, namely Bombetoka, Mahajamba and Sahamalaza Bays (Figure 8). The study was confined to these bays due to the fact that most of the population is concentrated here and the remainder of the coasts of these two regions is largely inaccessible.

Bombetoka, Mahajamba and Sahamalaza Bays are characterised by highly diverse marine ecosystems and contain mangrove forests, coral reefs, and seagrass beds. In fact, this stretch of coast, has some of the highest diversity of corals in the WIO region (>300 species) (Obura et al., 2012). The area around Sahamalaza is also home to some of Madagascar's largest mangrove forests. A little further off the coast one can find island systems which are volcanic, karst, and coral.

The region's marine ecosystems are vital for downstream reefs and for reef recovery in case of unexpected disturbances (Obura et al., 2012). Overexploitation of marine resources has had negative effects on species populations and ecosystem health – primarily driven by traditional and industrial fisheries (Obura et al., 2012). The region's shark population has been severely reduced. The area between Mahajanga and Sahamalaza Bays is also home to the dugong, potentially the only area left in Madagascar where dugongs are still observed, their populations in Madagascar having been depleted by overfishing. Mangrove forests decreased in area by 21% between 1990 and 2010 (Jones T. G. et al., 2016).

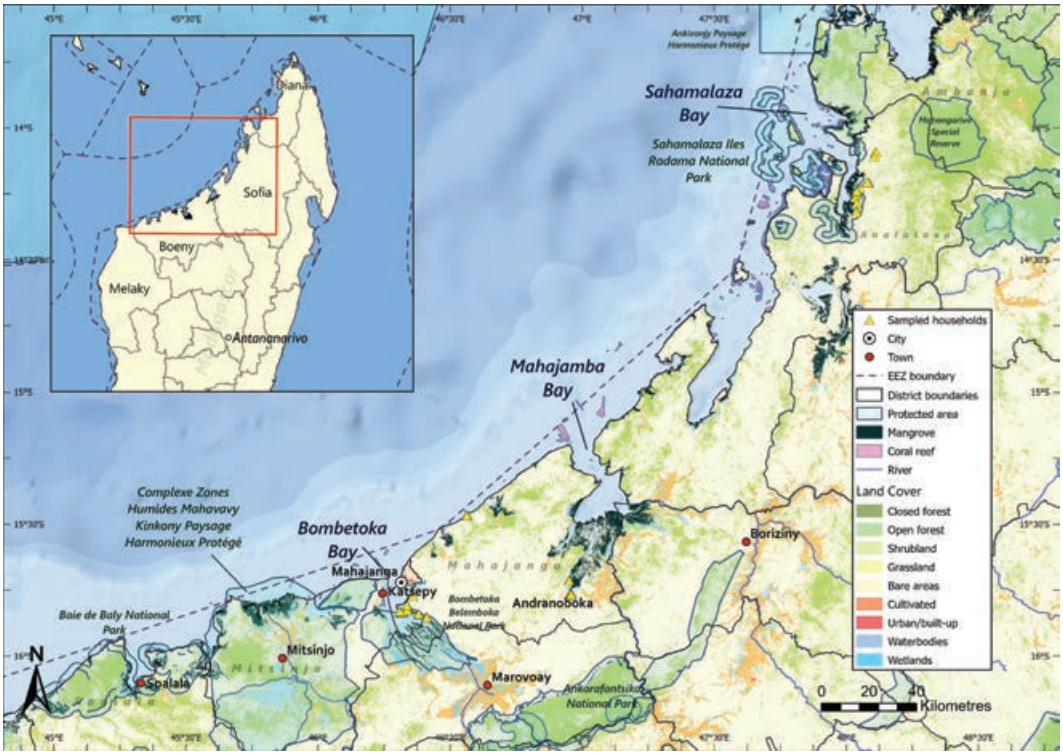


Figure 8. The three bays of Bombetoka, Mahajamba and Sahamalaza in the Boeny and Sofia region of Madagascar. Land cover, location of mangrove forests, coral reefs and marine protected areas are also shown, including the location of the sampled households (Source: Turpie et al., 2022a) .

The most important economic sectors for the local economy are fishing, agriculture, and livestock. There is no industry, such as oil, gas, offshore energy, or shipping, in the region; only maritime transport contributes some income to the local economy. Most fishing is small-scale and done traditionally (68% of total fish production) and men make up the majority of fishers (Nairobi Convention, 2011). Small-scale fishing is vital for household food and income security. However, increasing demand for crabs and changes in human settlements has had strong negative impacts on fish stocks and mangroves (Long et al., 2021). Economic progress had already been slow in recent years before the COVID-19 pandemic. However, COVID-19 slowed down the trade and travel between communities and stalled economic development even further.

Comparing the regions Boeny and Sofia to their neighbouring coastal regions Diana (to the north) and Melaky (to the south) shows that agricultural land ownership differs across regions (Table 5). Percentage of agricultural land ownership is very high across Madagascar (71.7%). While slightly more households in Sofia own agricultural land than the national average, the proportion in Boeny is much lower (52.1%).

Most households are male-headed, there are comparatively more female-headed households in Sofia and Diana compared to the Madagascar average. Households in Sofia also tend to have more children than households in Boeny or the average Madagascan household. Very few households have internet at home, with more in Boeny (16.1%) than Sofia (8.5%).

Table 5. Overview of household characteristics in Boeny and Sofia (the two Madagascan case study areas) and the neighbouring regions of Melaky and Diana, and the Madagascar average (data source: Madagascar Multiple Indicator Cluster Survey (MICS) 2018)

	Melaky	Boeny	Sofia	Diana	Madagascar av.
HH head female	23.1% (3.1%)	24.3% (1.8%)	26.2%(1.3%)	28.8% (1.6%)	22.2% (0.3%)
HH head age	40.6 (1.1)	42.0 (0.6)	42.6 (0.5)	41.32 (0.5)	42.5 (0.1)
Household size	4.7 (0.2)	4.2 (0.1)	4.3 (0.1)	3.7 (0.8)	4.5 (0.0)
No. of children (age 5 to 17)	1.74 (0.1)	1.44 (0.1)	1.61 (0.1)	1.22 (0.1)	1.56 (0.0)
Internet at home	3.6% (1.4%)	16.1%(1.5%)	8.5% (0.8%)	22.5% (1.5%)	13.3% (0.2%)
Owning agricultural land	82.2% (2.8%)	52.1%(2.1%)	76.9%(1.3%)	45.2% (1.8%)	71.7% (0.3%)

Note: The Madagascar Multiple Indicator Cluster Survey (MICS) was carried out in 2018 by INSTAT as part of the global MICS programme which is run by the World Bank.

Data collection

Focus group discussions and key informant interviews

Thematic focus group discussions and key informant interviews were conducted in randomly selected villages to collect information on different aspects of people's livelihoods and their poverty and gender dimensions. Focus group discussions were held on fishery-related livelihoods (including fishers, mariculture producers, fish processors and traders), forestry (particularly mangrove) related livelihoods, and with women on their opportunities and roles in the community and at home. Key informant interviews (see selection process below on 'Household surveys') were held on farming, tourism and marine conservation, industrial fishing, and the local economy. This allowed the research team to collect information of a general nature to avoid unnecessarily lengthy household questionnaires, such as resource descriptions, rules of access, equipment, seasonality, returns to effort, changes in availability, prices and inputs, and who is involved. Discussions took up to an hour and were semi-structured, following a discussion guideline which was developed in advance. Participants were reminded to speak on behalf of the entire community.

Household surveys

In Kenya, a total of 452 households were interviewed face-to-face in Lunga Lunga, Matuga, and Msambweni in the southernmost stretch of the coast, south of Mombasa (Table 6). Households were randomly sampled from 18 sublocations. They were grouped according to the coastal stretches which they accessed which coincided with the administrative breakdown of sub-counties. In Tanzania, a total of 564 households were interviewed face-to-face in seven wards along the most northern stretch of coast. A representative sample of households was selected from a total of 21 coastal villages in the wards of Boma, Doda, Kwale, Manza, Mayomboni, Moa and Mtimbwani. Wards were grouped according to the coastal stretch which they access (Table 6). In Madagascar, a total of 490 households were interviewed face-to-face in the north / north western region of Madagascar. Households were sampled from the Bay of Sahamalaza in the Sofia region and the Bay of Mahajamba and Bombetoka in the Boeny region.

Table 6. Sample size per ward

	Frequency	Boeny
Kenya		
Matuga	106	23.5
Msambweni	216	47.8
Lunga Lunga	130	28.8
Tanzania		
Mayomboni-Moa	217	38.5
Doda-Manza-Boma	161	28.6
Mtimbwani-Kwale	186	33.0
Madagascar		
Sahamalaza	203	41.4
Mahajamba	94	19.2
Bombetoka	193	39.4
Total	1506	

Household sampling effort per village was guided by information on village populations from census data in each country. At the village level, households were randomly selected with the help of village headmen and given unique serial identifiers. Global Positioning System (GPS) coordinates were collected for each of the households surveyed. Enumerators interviewed one or more household members (male or female) who were the household's main decision-maker (and above the age of eighteen). In-person interviews were conducted in people's homes. Each interview took about an hour to complete.

The household surveys were executed face-to-face, using tablets. Using data collection software rather than paper questionnaires allowed for a faster interview process and reduced the likelihood of errors, overall resulting in more accurate data. The questionnaires were in English in Kenya and Tanzania and in French in Madagascar – and interviews were conducted in the local vernacular by the enumerators. Completed questionnaires were checked by the supervisors before final submission to the online platform. The questionnaire design, programming and operation was tested through role play exercises during the enumerator training and in a pre-testing of the survey in the field. After the pre-test, final adjustments were made to the household survey and updated on the enumerator's devices.

Household questionnaire design

The household questionnaire was divided into several sections: Sections A and B covered the demographics and socio-economic background, and the residence and neighbourhood characteristics, and included questions on sources of energy and water, household assets and distances to services and markets. Section C covered employment and income for each member of the household, including economic sector of formal or informal employment. Here, broad information on dependence on household production activities, pensions, and welfare were also collected.

Section D then covered livelihood activities in more detail, fishing (boat-based and shore-based), 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 were asked to describe their participation, production, sales, and gender roles. For livelihood activities, households were first asked to estimate production or income in the last month and were then asked to provide an estimate for the past 12 months. Questions about marine activities included some details on location and status of resources as applicable. Section E covered security and voice. This included 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 went into more detail on the status of marine resources and their use and management in the respondent's local area. These sought to understand household perceptions on the health of marine ecosystems and resource stocks, what they thought about existing regulations and their enforcement, and what they thought about different commercial activities in the area. Finally, at the end of the interview, the enumerators recorded the GPS location, their own details, details of who was present at the interview, whether the female(s) present seemed able to express themselves freely and the overall quality of the interview in terms of likely reliability of the information given.

Analysis of gender and poverty dimensions

Sida's multi-dimensional poverty assessment framework was used as a guide to measure household's level of vulnerability in terms of poverty and gender equality. For poverty status, (1) a monetary measure of income (cash and subsistence combined), as well as non-monetary indices of (2) opportunities and choice, (3) power and voice, and (4) security were used. For gender status, modified measures of these were used, as described below. All scores were standardised to a score out of 7. This was an arbitrary decision which aligned well to the Likert scale, and the criteria for various questions, but further experimentation would be appropriate.

Resources / income

The income measure was estimated based on the household responses on monthly income from employment, as well as the responses on production, sales, and consumption from all livelihood activities over the past 12 months. The proportion from marine resources or sectors was also calculated. To score the relative level of poverty of the household in terms of resources and income, total household income was compared to the national poverty line, expressed in 2021 values. The score was calculated as the percentage of the national poverty line x 7, but capped at 7. This approach was chosen on the basis of its replicability at scale. The quantitative income measure was also compared with qualitative measures of household living conditions and their ownership of assets. Aspects of living conditions that were considered to indicate low income included natural raw materials used for their dwelling roof and walls, the absence of piped water and absence of electricity. Ownership of durable goods is commonly used to measure household welfare status as assets measure material deprivation. The questionnaire covered 16 types of assets. An index was created as the sum of six indicators which were given a score of 1 or 0, as detailed in Table 7, converted to a score/7:

Table 7. Components summed in the qualitative index of higher overall score (out of 6) 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. For this study, an index of opportunity and choice was compiled based on the answers to a range of questions on education, access to schools, markets and healthcare facilities, access to piped water, and access to electricity. Type of energy for lighting was used as a likely more reliable measure of access to electricity services than energy for fuel, the use of which might be influenced by affordability or preference.

In the case of education, the education of the household head was included as well as the distance (in walking time) to the nearest school. Level of household head education was rated on a scale of 0 None, 1 Some schooling but no level completed, 2 Primary, 3 Secondary, and 4 Higher education. For the purposes of consistently scoring out of 7, these were converted to 0, 1, 3, 5, and 7. Access to health was measured by the time it takes to get to the closest clinic by available transport. Scoring of the options presented in the survey is shown in Table 8. In addition, respondents were asked to rate the overall level of government services in their local area, including the quality of public roads, on a scale of 1 to 7. The overall score was computed as the average score of the eight

sub-indicators. For this indicator, there was no differentiation in the way it was computed for assessing vulnerability in terms of women's equality.

Respondents were also asked to rate the general availability of marine sector formal jobs for men, women, and youth in their community (on a scale of 1 to 7) and were asked whether they thought their community is fairly represented in maritime sectors formal jobs in this area. These questions allowed further comment on opportunities for households, and how they differed between men, women, and youth.

Table 8. 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 h/h 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 was 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 eight broad types of community organisations that any household members (male or female) belong to including (1) Church, mosque or other local religious group, (2) Fishing association or co-operative, (3) Farming association or co-operative, (4) Business association or cooperative, (5) Political organisation, (6) Neighbourhood security group, (7) Environmental or conservation association, (8) Educational, developmental or social welfare association.
- 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 was scored (out of 7 as above) based on the number of community organisations that female household members belong to, and the answers to a series of questions on the extent of women's involvement in household decisions on how it generates income, household expenditure, where the family lives, the children's schooling, on having children, and on women's occupations and activities. The latter questions were rated on a scale of 1 Seldom or not at all, 2 Sometimes, 3 Often, 4 Mostly or always. For the purposes of consistently scoring out of 7, these were converted to 1, 3, 5, and 7.

Security

For the security dimension of poverty, a score was based on answers to a series of questions on community security, namely:

- 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)

For the analysis of vulnerability in terms of gender equality, the score was based on the level of harmony with the household.

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

In both cases, the participants provided a rating from 1 (strongly disagree) to 7 (strongly agree). In the analysis, these ratings were reversed for negative statements (e.g. "There is conflict…"), so that a higher score always reflected a better situation.

Overall measures of relative poverty and gender

Summarising the above, the overall indices of relative poverty and gender equality were compiled at household level as shown in Table 9. The overall score was a weighted sum of the scores for the four components. These weightings were set by the authors. In a real-life situation, the results could be shown for a range of different weightings, or the weighting agreed by stakeholders.

Table 9. 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 weightings.

Dimension	Relative Poverty	Relative gender equality	Weight
Resources/ Income	Household income in $ terms, 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 hh income	Proportion of this income derived by women	40
	Household material wealth, measured as the 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 in your local area, including the quality of public road)		
	-	Ratio of the scores for general availability of marine sector formaljobs for women vs men	
Power and voice	How many of seven broad types of community organisations that any household members (male or female) belong to	How many of seven broad types of community organisations thatfemale 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		

Key Findings

Resources / Income

Employment

The percentage of households with income from jobs varied greatly across the three case study countries. The percentage income from jobs was higher in Kenya and Tanzania, where households have a lot more livelihood activities to choose from than in Madagascar.

Table 10. Percentage of household members with at least one member employed and household head gender (in percentage) by country

	% of HHs with employment	% of employed HH members that were male
Kenya	**42%**	**63%**
Tanzania	**73%**	**52%**
Madagascar	**30%**	**78%**

Figure 9 shows the sectoral contribution of jobs in the sampled households. Employment is much more spread across different economic sectors in Kenya compared to Tanzania and Madagascar. The most common employment sectors in Kenya are fishing, buying / selling goods, and the service industry. In Tanzania, the most common employment sectors were fishing, fish processing, buying / selling goods, and the service industry. In Madagascar, almost all the employment is in the fishing sector. Overall, the marine sector accounted for around 35% of employment in Kenya, 59% in Tanzania, and 75% in Madagascar. Income from formal or informal employment was commonly earned in addition to other livelihood activities, predominantly fishing.

Livelihood activities

Households in the three study areas engaged in a large variety of activities, with most households active in several. There were some significant differences between the study areas. For example, agriculture was very prevalent in Kenya and Tanzania and less important in Madagascar, but the reverse was true of fishing. Mariculture and fish trading were practiced by similar proportions of households across the three countries. In Kenya, 82.3% of fish trading was done by female household members, compared to 73.5% in Tanzania and 53.9% in Madagascar. Keeping livestock and gathering upland resources such as fuel wood, plant raw materials and wild foods was also notably more common in Kenya than in the other two countries.

Kenya also had a far higher but still low proportion of households engaged in tourism and mining activities than the other two countries, where these were almost absent. The low percentage of households engaging in tourism activities could be associated with the dwindling level of tourism activities due to the Covid-19 pandemic and ensuing restrictions. Households engaging in tourism activities in Kenya indicated that they earned about 58% less in 2021 than they would have in a typical pre-pandemic year. On a country level, in Madagascar, the contribution of travel and tourism to GDP declined by 66.1% in 2020, compared to 48.2% in Kenya and 48.1% in Tanzania (World Travel and Tourism Council, 2021). The surprisingly low numbers of household engaging in tourism, especially in Kenya, could therefore be attributed to the Covid-19 pandemic.

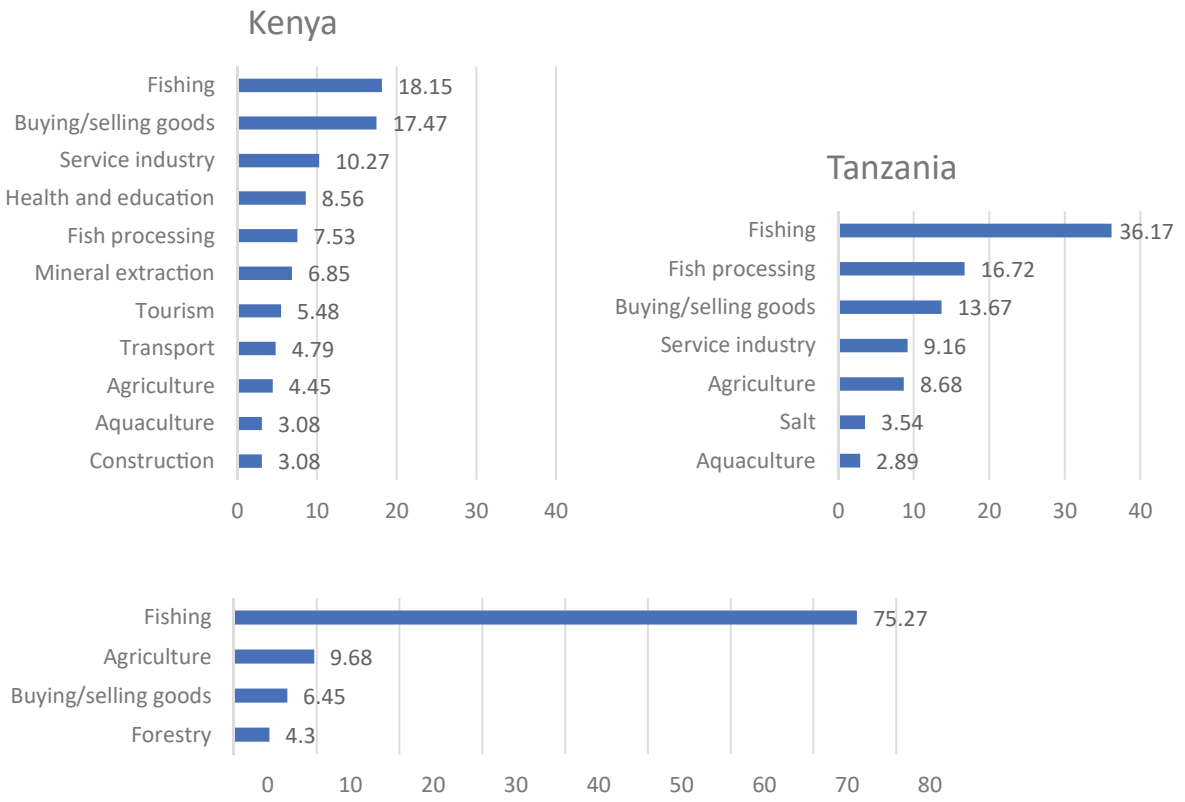


Figure 9. Sectoral contribution of jobs in the sampled households across Kenya, Tanzania, and Madagascar. © UNESCO-IOC and SwAM 2024

Salt making was not reported in Kenya, but was fairly common in Tanzania. Only few households in Madagascar engaged in salt making activities. The relative frequency of petty trade in Kenya and Tanzania compared with Madagascar also points to significant differences in economic opportunities.

Total annual income from all sources

TTotal annual income includes income from any form of employment and all livelihood activities, such as fishing related activities (inshore / offshore fishing6and fish trading), other ocean related activities (salt making, mariculture, tourism, and mangrove harvesting activities), non-mangrove wood related activities (timber, charcoal, or firewood production), the collection of wild food or hunting, and farming activities (cultivating crops and raising livestock and poultry). Median income, in terms of US$ value, was highest in Kenya, followed by Tanzania and Madagascar (Table 12).

The relative level of prosperity in terms of resources and income was calculated by comparing total household income to the national poverty line. The latter was based on the most recent available data and inflated to 2021 values if necessary. The score was calculated as % of the national poverty line x 7, but capped at 7. Relatively speaking, in proportion to the national poverty line, households in Madagascar and Kenya are better off than households in Tanzania (Table 13).

6Inshore fishing includes any fishing activities from or in shallow areas close to the shore and offshore fishing is in areas further from the shore, usually reached by using a motor or sail.

Table 11. Percentage of households engaged in various forms of livelihoods in the three study areas. These are ordered roughly in terms of marine to terrestrial origins. Employment figures are given for comparison.

	Kenya	Tanzania	Madagascar
Employment	442.0	73.0	30.0
Fishing (offshore or onshore)	50.0	48.0	94.9
Offshore fishing	42.5	35.3	61.2
Shore-based fishing	33.6	20.7	82.7
Fish trading	27.4	33.7	25.9
Mariculture	12.6	14.6	15.8
Salt making	0	11.0	3.9
Mining	9.7	1.1	0
Tourism	9.3	0.5	0.4
Firewood	79.9	41.4	30.9
Charcoal	5.1	0.9	5.5
Woody and non-woody raw materials	35.2	6.2	6.8
Wild plant foods	36.6	4.3	4.9
Timber	6.4	0.9	18.8
Hunting	4.0	0.2	3.1
Crops	67.5	50.5	24.9
Poultry	57.7*	49.9	55.3
Livestock		20.9	24.6
Petty trade	20.2	21.9	7.0

* livestock and poultry were combined in the Kenyan questionnaire

Table 12. Total annual income from all sources across countries.

	Mean			Median		
	Local currency	US$1	Int. $2	Local currency	US$	Int. $
Kenya	KSh 217 400	1 901	4 977	KSh 391 424	3 423	8 961
Tanzania	TSh 1 882 500	812	2 119	TSh 3 049 642	1 316	3 433
Madagascar	Ar 3 150 000	788	2 724	Ar 4 317 313	1 081	3 733

1 Using the exchange rate from the 22nd March 2022
2 Using the World Bank's PPP conversion factor for 2022

Table 13. Income score relative to the respective national poverty line across countries

	Mean	S.D	Median	% of hh below national poverty line	Mean	Poverty gap* SD	Median
Kenya	5.0	2.7	7	47%	1033	537	1099
Matuga	4.7	2.9	6.6	53%	1050	594	1168
Msambweni	4.6	2.7	6.1	55%	1041	520	1125
Lunga Lunga	5.8	2.2	7.0	29%	980	509	974
Tanzania	4.4	2.5	4.5	64%	739	338	807
Mayomboni, Moa	4.3	2.5	4.4	63%	756	330	824
Doda, Manza, Boma	4.1	2.5	3.8	69%	747	355	803
Mtimbwani, Kwale	4.6	2.4	5.3	60%	711	331	781
Madagascar	5.1	2.2	6.6	59%	411	227	428
Sahamalaza	5.4	2.0	7.0	49%	416	192	447
Mahajamba	5.0	2.0	5.6	68%	379	203	379
Bombetoka	4.9	2.5	6.3	64%	422	263	438

* in US$ April 28 2022 (1 US$ = 116 KSh; 1 US$ = 2324 TSh; 1 US$ = 4069 Ar)

Across all countries, households were highly reliant on income from fishing, especially in Madagascar (Figure 10). The percentage income from farming was very low across all countries. In Kenya, percentage income from jobs was highest in the northernmost area, closer to Mombasa and decreased in importance for households further along the coast towards the south of the country (Figure 10). Jobs made up a relatively large share of monthly household income in Tanzania.

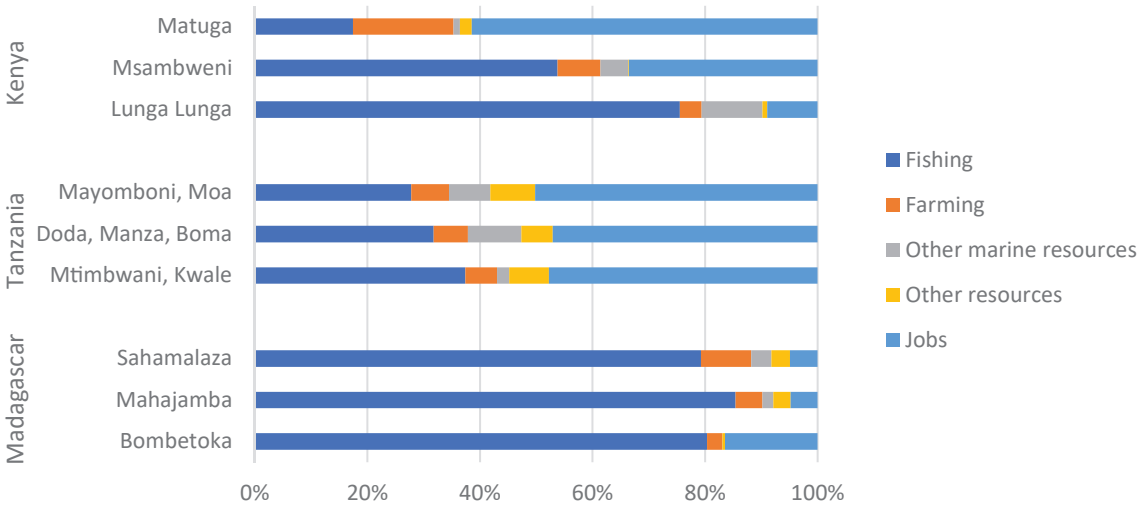


Figure 10. Percentage of income from fishing, farming, other marine resources, other resources, and jobs across Kenya (top), Tanzania (middle) and Madagascar (bottom). © UNESCO-IOC and SwAM 2024

Across the three case study countries, there was consensus that fish stocks had been decreasing dramatically (Figure 11). Households in Matuga, Kenya, felt that fish stocks declined drastically as many households indicated that fish stocks are almost gone. In Madagascar, fish stocks in Sahamalaza seemed to have been declining particularly strongly compared to the fish stocks in the other bays: 42% of households in Sahamalaza, where most of the fishing was done on offshore reefs, indicated that they perceived the fish stocks to be almost gone.

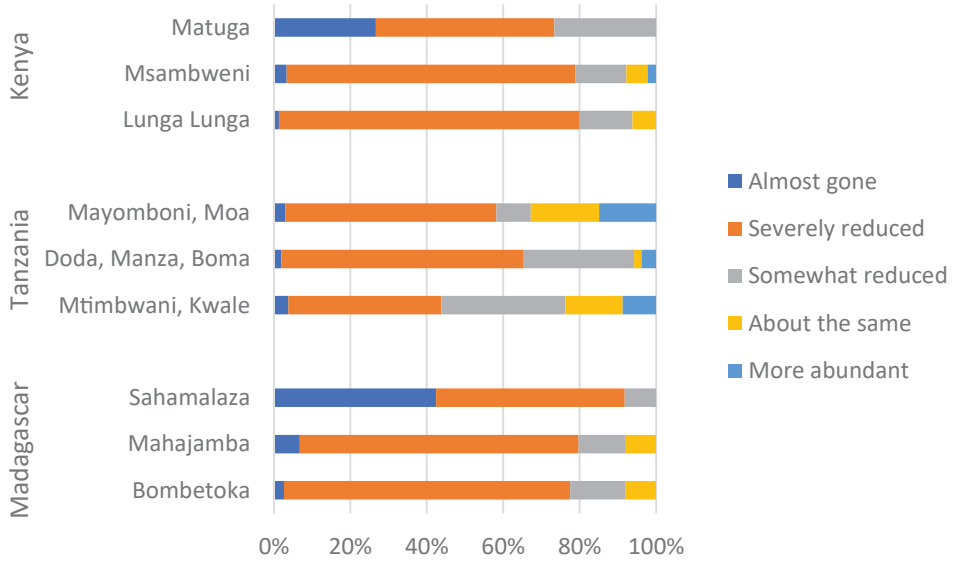


Figure 11. Household's perceived level of abundance of fish stocks. © UNESCO-IOC and SwAM 2024

Women's share in annual income from all sources

In Kenya, 31% of income was earned by women, while in Tanzania, 43% income was earned by women. However, women were much more involved in the production of other marine resources, particularly seaweed farming, and upland resource harvesting than in Kenya. In Madagascar, only 20% of the household income from jobs and various other livelihood activities was earned by women. Women's contribution was largest in fishing related activities in Madagascar.

Households were asked to indicate how much female household members contributed to the various household livelihood activities: Most or all; More than half; Less than half; Little or none. Midpoints were used to calculate the percentage contribution of female household members regarding each activity. Given the challenges this poses for analysis, future studies could test the feasibility of asking households to report in percentages (bearing in mind that this may vary in different parts of the world).

Material wealth index

Household's main source of energy for cooking was firewood and charcoal. The main source of water in Kenya and Tanzania was a well or borehole (71% and 75% respectively). Tanzania and Kenya also on average had more households connected to the public water supply system while there were very few households with a tap in their homes in Madagascar. In Madagascar, there were large differences in water supply source across bays. 31% of interviewed households used the river as main water source in Sahamalaza while no households in Bombetoka indicated that they used river water (Figure 12).

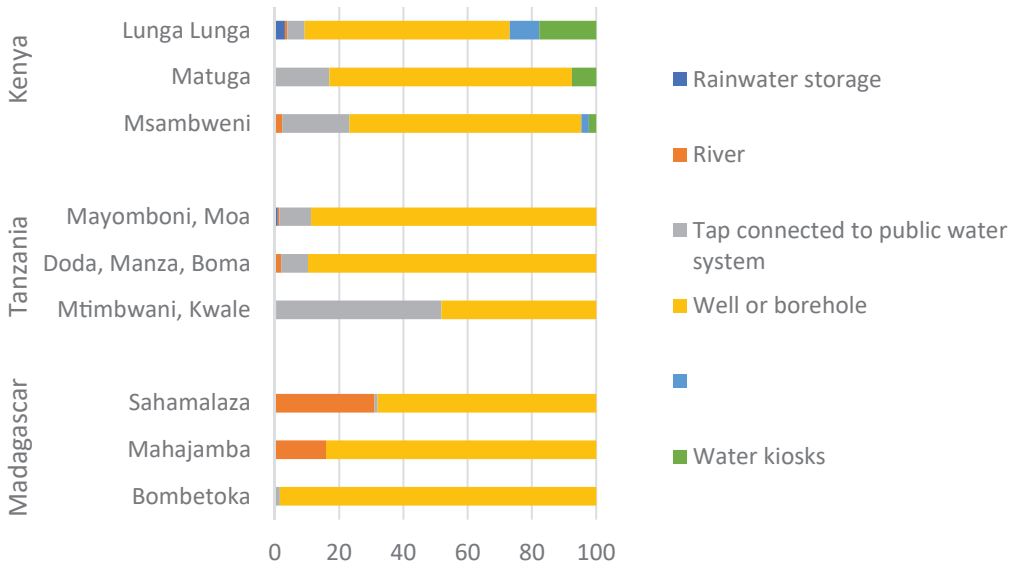


Figure 12. Main source of water across Kenya (top), Tanzania (middle), and Madagascar (bottom). © UNESCO-IOC and SwAM 2024

The material wealth index, which includes measures of household living conditions and their ownership of assets, is shown in Table 14. This was significantly positively related to total annual household income across all countries – as one would expect, richer households scored higher on the material wealth index (Table 15). However, this relation was less strong in Kenya compared to the other two case study countries. Overall, the correlation is not strong enough ($p > 0.05$) to justify using this indicator as a substitute for income.

Table 14. Material wealth index across countries

	Mean	SD	Median
Kenya	3.8	1.4	3.5
Matuga	4.0	1.4	4.7
Msambweni	3.7	1.4	3.5
Lunga Lunga	3.7	1.3	3.5
Tanzania	3.5	1.4	3.5
Mayomboni, Moa	3.6	1.5	3.5
Doda, Manza, Boma	3.3	1.4	3.5
Mtimbwani, Kwale	3.6	1.4	3.5
Madagascar	2.6	1.3	2.3
Sahamalaza	2.4	1.4	2.3
Mahajamba	2.2	1.0	2.3
Bombetoka	3.0	1.2	3.5

Table 15. Correlation between total annual household income and material wealth index across countries

	Correlation coefficient Material wealth index
Kenya	0.0828*
Tanzania	0.2488***
Madagascar	0.1599***

Opportunity and choice

Household prosperity

The non-monetary dimension of prosperity ("Opportunity and Choice") is measured by taking into account the household head's level of education, household's access to water, their main source of energy for lighting, and the distance from their house to the nearest school, clinic, and market. It also considers the overall level of government services in their local area, including the quality of public roads, and the availability of marine sector formal jobs.

Household prosperity is much lower in Madagascar (mean score 2.8) than in Kenya (mean score 4.5) and Tanzania (mean score 4.2) (Figure 13). In Kenya, Msambweni is significantly different to the other two regions (Table A1 in the Appendix). In Tanzania, the southernmost region scored the highest (Table A7 in the Appendix). Within Madagascar, the bay of Mahajamba scored significantly lower on the opportunity / choice prosperity index than the bays further north and south (Table A13 in the Appendix).

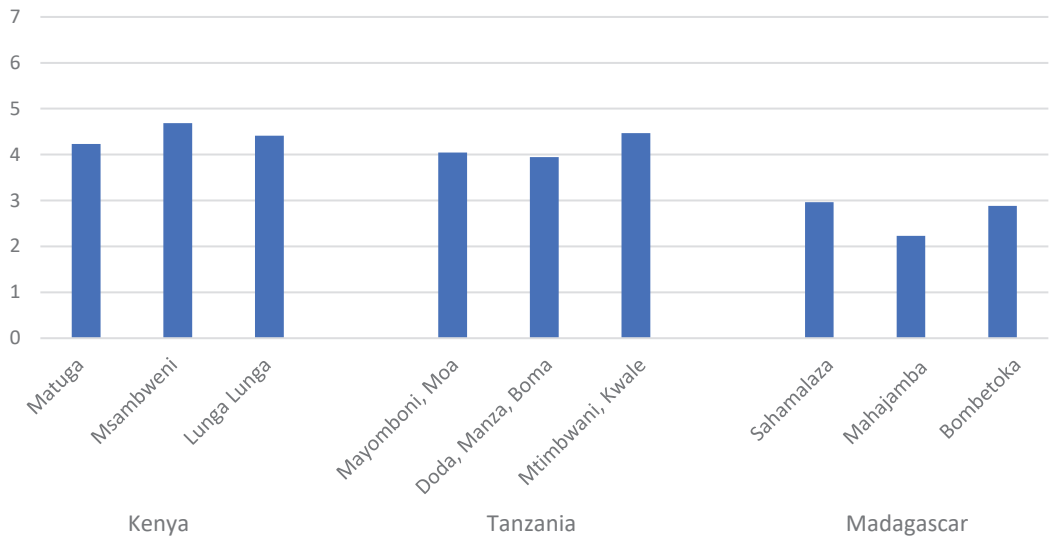


Figure 13. Opportunity / choice prosperity index across countries. © UNESCO-IOC and SwAM 2024

Gender equity

The gender equity indicator for "Opportunity and choice" uses the same metrics as the "Opportunity and choice" index for relative prosperity but in addition considers women's representation in the job market by including the ratio of the scores for general availability of marine sector formal jobs for women versus men. The gender equity score indicates that women across all three case study countries have rather low levels of opportunities and choices (Figure 14). Again, Madagascar (mean score 1.8) ranked the lowest out of the three case study countries (Kenya mean score: 2.6; Tanzania mean score: 2.4). Differences are significant across all regions within Tanzania and Madagascar (Table A8 and Table A14 in the Appendix). In Kenya, there only is a significant difference in this indicator between Matuga and Msambweni (Table A2 in the Appendix).

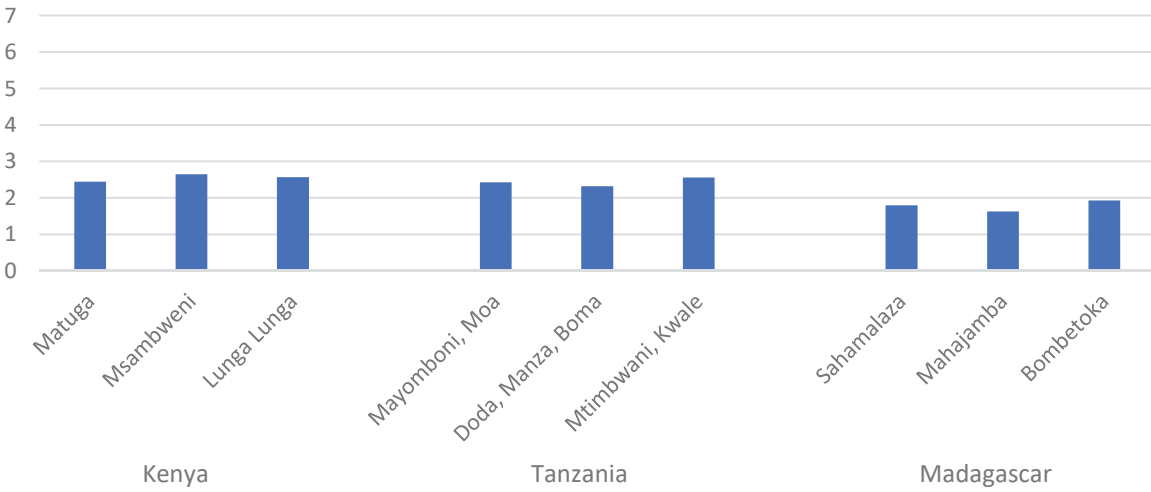


Figure 14. Opportunity / choice gender index across countries. © UNESCO-IOC and SwAM 2024

Power and voice

Relative household prosperity

The power and voice prosperity indicator considers household member's membership in organisations (both for women and men). It also takes into account households' ability to voice their concerns and to what extent they feel that their concerns about marine and coastal management are heard. Households in Tanzania rank highest on the power and voice prosperity index – they tend to agree more that they can voice their concerns about coastal and marine management and that their concerns are heard (Figure 15). However, there was no significant difference in the power and voice prosperity index across regions in Tanzania (Table A9 in the Appendix). The power and voice household prosperity index was significantly different across all regions in Kenya and Madagascar (Table A3 and Table A15 in the Appendix).

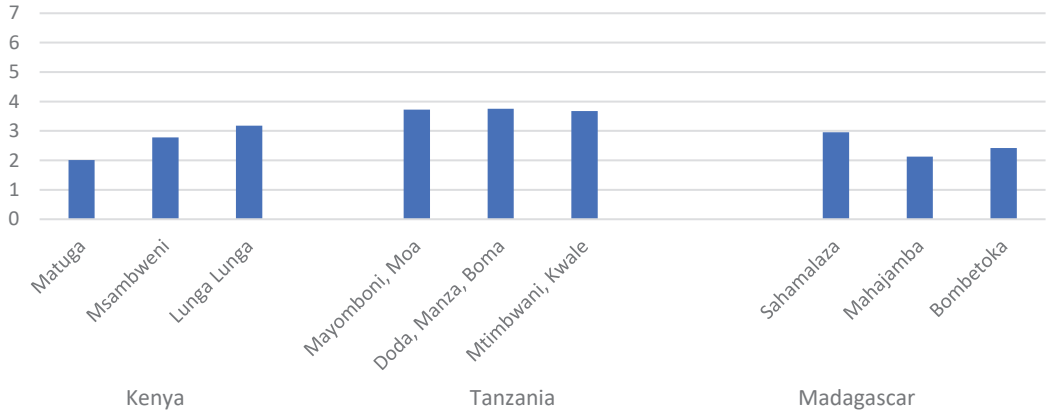


Figure 15. Power and voice prosperity index across countries. © UNESCO-IOC and SwAM 2024

Relative gender equity

The majority of the sampled households were male-headed, specifically 77% of households in Kenya, 66% in Tanzania and 82% in Madagascar. The relatively high proportion of female-headed households in Tanzania could be linked to the more common practice of polygamy in that area.

In Kenya and Tanzania, women seemed to have a relatively strong say in household decision-making (Figure 16). The majority of households indicated that women mostly or always had a say in how the household earns an income, how the household spends its money, where the household lives, the children's schooling and whether to have children or not. Very few households indicated that women did not have a say in household decisions. There were no differences across regions in Tanzania (Table A10 in the Appendix) and only a difference between Msambweni and Lunga Lunga in Kenya (Table A4 in the Appendix).

In Madagascar, however, women have less decision-making power in their households. Women were involved in deciding on how the household earned an income but tended to have less decision-making power when it came to their own occupations and activities. Men also seemed to have more decision-making power on having children and on where the children go to school. Differences were significant across all bays (Table A16 in the Appendix).

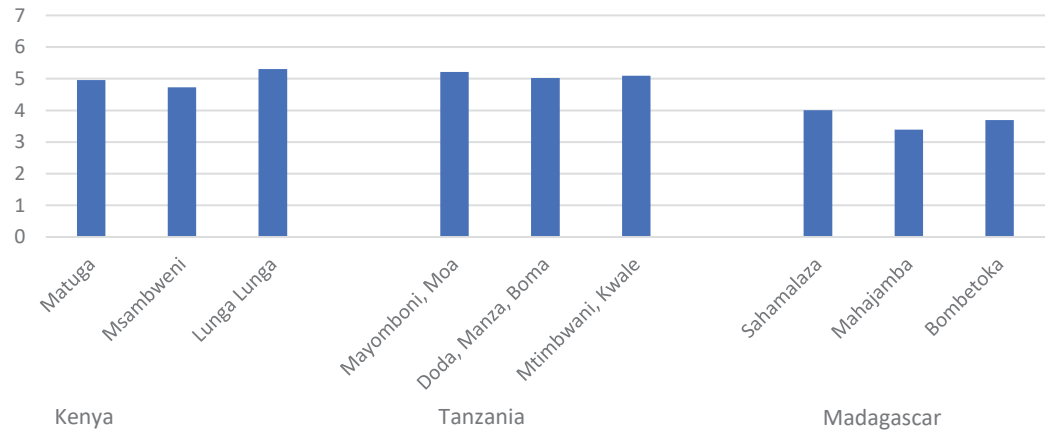


Figure 16. Power and voice gender index across countries. © UNESCO-IOC and SwAM 2024

Security

Household prosperity (community harmony)

The prosperity related security index captures the level of community harmony a household feels. Households in Tanzania feel slightly more secure than households in Kenya (Figure 17). There were no differences across Kenya but in Tanzania, there were significant differences between the Doda-Manza-Boma area and the area to the north and south (Table A11 in the Appendix). Households in the Doda-Manza-Boma area tended to agree more that there were conflicts over resources.

Madagascar ranks the lowest in terms of community harmony. In Madagascar, households had lower levels of agreement with the statements regarding the trustworthiness of local government officials. Households in Madagascar also indicated that there were generally more conflicts over access to resources in the area. The indicator was significantly different across bays in Madagascar (Table A17 in the Appendix).

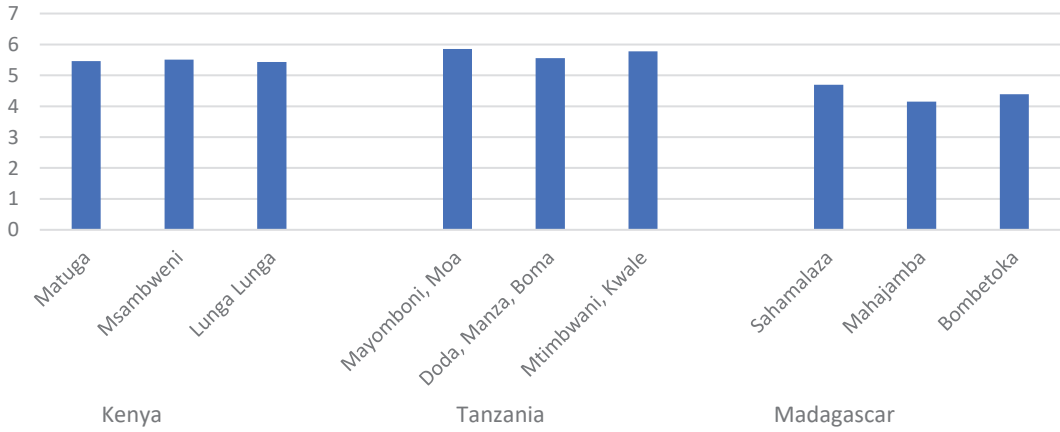


Figure 17. Security prosperity index across countries. © UNESCO-IOC and SwAM 2024

Gender equity (family harmony)

Households overall ranked very high in terms of household harmony, particularly in Kenya and Tanzania (Figure 18). There was no significant difference in Tanzania. In Kenya, households in Msambweni felt that they were significantly better off than households further to the south in Lunga Lunga. In Madagascar, households in Mahajamba were significantly less satisfied with their household harmony compared to households in Sahamalaza and Bombetoka (Table A18 in the Appendix).

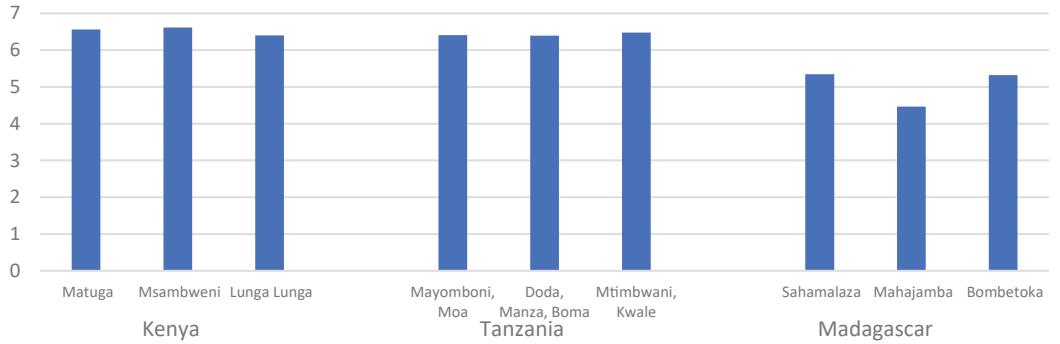


Figure 18. Security gender index across countries. © UNESCO-IOC and SwAM 2024

Summary of poverty and gender dimensions

The overall household prosperity index is computed by considering the income from formal or casual employment, and the monetary value of production of all other types of livelihood activities. It also considers the scores on the opportunity and choice index, the power and voice index, and the security index.

Table 16. Total prosperity index across countries

	Mean	SD	Median
Kenya	4.4	0.8	4.6
Matuga	4.2	0.9	4.3
Msambweni	4.4	0.9	4.5
Lunga Lunga	4.7	0.7	4.8
Tanzania	4.3	0.9	4.3
Mayomboni, Moa	4.3	0.9	4.4
Doda, Manza, Boma	4.1	0.9	4.1
Mtimbwani, Kwale	4.4	0.8	4.4
Madagascar	3.7	0.7	3.6
Sahamalaza	3.8	0.7	3.9
Mahajamba	3.3	0.6	3.3
Bombetoka	3.7	0.6	3.6

Households in Madagascar ranked highest in terms of income relative to the national poverty line (Table 13). However, combining all measures of prosperity (Table 16), clearly shows that households in Madagascar were worse off than households in Kenya and Tanzania, suggesting that purely looking at income measures would give different results than considering a multitude of prosperity measures. Considering the multiple dimensions of prosperity, households in Kenya are living in the best conditions, followed by households in Tanzania and Madagascar.

Table 17. Total gender index across countries

	Mean	SD	Median
Kenya	4.0	0.7	4.0
Matuga	3.9	0.7	3.9
Msambweni	4.0	0.8	3.9
Lunga Lunga	4.3	0.7	4.3
Tanzania	4.1	0.8	4.2
Mayomboni, Moa	4.2	0.8	4.3
Doda, Manza, Boma	4.0	0.7	4.0
Mtimbwani, Kwale	4.2	0.8	4.2
Madagascar	3.2	0.6	3.2
Sahamalaza	3.3	0.6	3.4
Mahajamba	2.8	0.5	2.8
Bombetoka	3.2	0.6	3.2

The gender equity dimension also takes into account women's share of the household income as well as their share of the job market, their representation in decision-making bodies and decision-making power within their own households. Madagascar ranks the lowest out of the three case study countries, while Kenya and Tanzania have very similar scores (Table 17).

Household perceptions and preferences regarding marine ecosystem management

As demonstrated in the previous chapter on resources and income, across all three case studies, household's livelihoods were strongly dependent on fishing activities and employment, which also revolved around jobs in the fishing and fish processing sector.

Households were asked which types of marine sector development would provide their household with the best income opportunities. Across all areas, households would like to see more developments in marine fisheries and fish processing (Figure 19). Households in Madagascar were particularly interested in marine fisheries. Households in Kenya were very interested in coastal tourism development.

Households in Kenya and Tanzania were more open to marine sector developments at the expense of small-scale fishing than households in Madagascar (Figure 20). In Madagascar, over 40% of interviewed households indicated that they would be opposed to having increased job opportunities at the expense of small-scale fishing. Households in Madagascar were even more opposed to marine sector developments at the expense of intertidal resources – close to 50% of households opposed such suggestion. However, in Kenya and Tanzania, the majority of households indicated that they would be in favour of marine sector developments at the expense of intertidal resources. The household survey responses in Madagascar clearly showed household's dependence on fishing for their livelihoods. Households in Madagascar were much more reliant on fishing for their overall income compared to the surveyed households in Kenya or Tanzania (Figure 10). Other ocean related activities (including salt making, mariculture, and tourism) were less important for local livelihoods in the coastal areas of Sofia and Boeny. Their strong dependence on offshore and inshore fishing, explains why households were generally opposed to increasing job opportunities at the expense of fishing access. Future surveys might consider including information on the contribution of fishing to household food security.

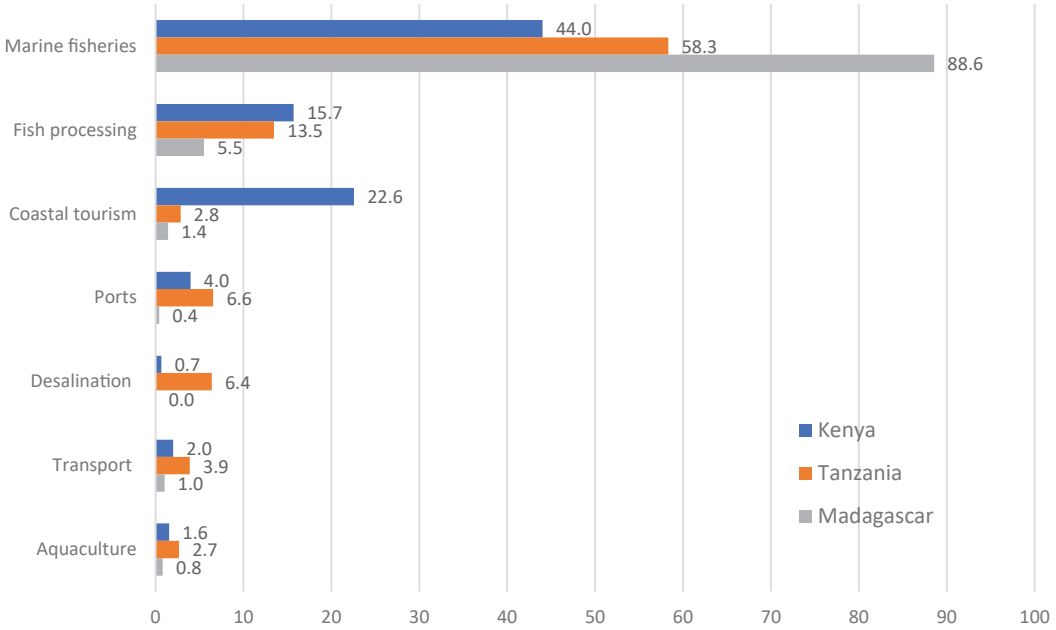


Figure 19. Preferences for marine sector developments across countries. © UNESCO-IOC and SwAM 2024

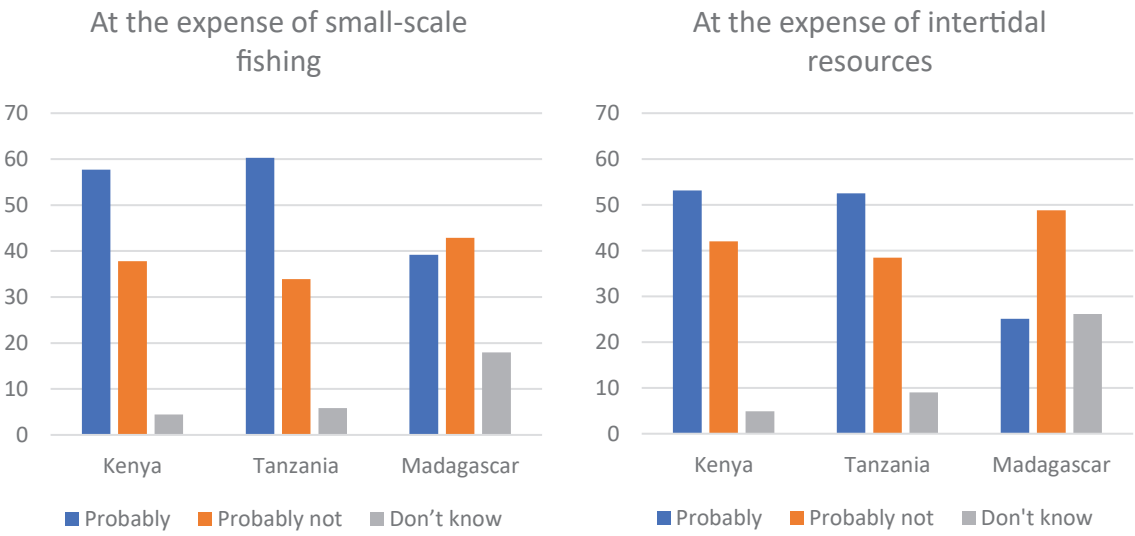


Figure 20. Preferences for marine sector developments at the expense of small-scale / intertidal fishing across countries. © UNESCO-IOC and SwAM 2024

Discussion

This study involved the development and testing of an approach to providing metrics and insights into how marine spatial planning might impact on poverty and gender equality, in order to have the tools to integrate these issues into the MSP decision-making process. The methods and metrics used in the case studies were designed to inform the baseline description of coastal communities and the analysis of scenarios in developing country contexts. They would also be relevant for the monitoring of outcomes. Some of the insights and implications of the case studies are outlined below.

Insights

This study provided some insight into the socio-economic status of coastal communities in Kenya, Tanzania and Madagascar, the extent to which they depend on coastal resources for their livelihoods and wellbeing, and the extent to which coastal planning and management might impact on poverty and gender equality. The study also provided some insights into household preferences for different types of development in their areas. More detailed information on the indicators assessed and discussions of the findings in relation to the literature are found in the accompanying reports.

Across all three case study areas, fishing was a dominant source of income – both for livelihood activities and for the households that had some type of employment. Restricting access to fishing grounds could therefore have significant impacts on household income. Households however, generally saw the need for improved management, as they were experiencing the impacts of dwindling fish stocks and were concerned that fish stocks will be completely depleted in a few years.

Madagascar ranked lowest in terms of opportunity and choice, power and voice, and domestic harmony and security while households seemed to be relatively better off in terms of income and resources compared to Kenya and Tanzania. Purely using income and access to resources relative to national poverty levels would have given different overall poverty level results for Madagascar.

However, there was very little variation for most indicators among the areas within each country study area. The most notable exception was in Madagascar, where households around the Bay of Mahajamba (which is relatively remote) scored much lower on most indices compared to their neighbouring bays in the south and north. On the whole, there was greater variation between countries than within them. This result may be an artefact of the small scale of the study areas. To some extent, the lack of variation in income is to be expected, as households will likely tend to move to where opportunities exist. In the absence of barriers to movement, one might expect rural households to redistribute themselves as long as there is any differential in income, at least over the longer term. Greater variation in contexts will be needed to be able to understand the potential short to medium-term implications of changes in marine spatial planning policies.

Asking households about their preferences for marine developments in the areas showed different results across the case study areas – while households in Madagascar were very opposed to developments at the expense of inshore or offshore fishing, households in Kenya and Tanzania were more in favour of such developments. However, results from the case studies suggested that increasing jobs in the marine sector would most likely do very little for women's empowerment in most areas. Employment was mostly held by male household members and household survey responses indicated that new employment opportunities would most likely benefit men as opposed to women.

Metrics

The study involved the development of metrics for a range of indicators aligned to multiple dimensions of poverty and gender equality, namely resources, opportunity and choice, power and voice, and security. Income was used as the measure of access to resources. This was undoubtedly the most important metric and required comprehensive data collection in order to account for income from different sectors and livelihood activities and assign income to different marine areas and genders. Whereas other studies often rely on consumption indicators as a measure of poverty, such an approach would not be conducive to the type of understanding outlined above, nor to the computation of how poverty would change under alternative MSP scenarios.

The measures of the other three dimensions of poverty required finding suitable indicators. However, some of these were more difficult to scale. For example, one of the indicators of power and voice is membership of community organisations. However, it is difficult to gauge how this indicator might be scaled, e.g. from Very Poor to Excellent. There is simply not enough range in the data. Most of the data collected for these indicators was based on questions using a Likert Scale. It is not ideal to aggregate Likert scale data, since the difference in utility implied by a shift from 2 to 3, for example, would not be the same between different questions. Since there was fairly strong agreement on the different questions, future iterations could consider simplifying some of these measures to a single question.

In this study a scale of 1 – 7 was used to express the metrics on a consistent scale. The purpose of keeping to a low number scale was to enable the scale to be converted into words (e.g. Very poor to Excellent). Alternatively, it could be converted to a more familiar base 10 scale.

Granularity of the analysis

In the Kenyan and Tanzanian study areas, households were surveyed along the entire stretch of coast and could be grouped in a number of ways to summarise the data. Ideally, groupings should be of relatively homogenous communities in terms of their ecological and economic contexts. In this study, the ecological context was gleaned from GIS data on geography, land cover, bathymetry, natural habitats such as reefs, mangroves, estuaries and lagoons, and marine protected areas (see study area maps). The economic context was also based on land cover data and inspection of Google Earth imagery which showed the location of towns, infrastructure, farming, salt and mariculture. This resulted in three areas being defined for each study area, which was coincidental. While a finer resolution description would have been possible for both Kenya and Tanzania, testing of this option did not add much value and reduced the sample size in each area. The scale of the groupings in this analysis was also likely to be more replicable and sensible for a national-scale analysis.

Potential for scaling up

Undertaking MSP in developing countries is already challenging in terms of the availability of relevant information required for planning. This is particularly true of information on vulnerable communities. Data availability also varies from country to country, as was found in this study. For example, in Madagascar, while population sizes were available at village level, detailed socio-economic data were only available at regional scale (Sofia and Boeny). In general, there will be a need to collect suitable data to undertake MSP, and particularly if the impacts on vulnerable communities and groups are to be taken into account.

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 studies varied from 50 km 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 technology 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 dropping some of the questions in the survey, 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.

There was only a weak correlation between the material wealth index and income. To properly assess the impact of changes in marine zonation on households, it is necessary to assess their dependence on marine resources, for example by looking at the percentage of household income (from paid employment and from sustenance activities) which is derived from the ocean. Simply using the material wealth index would not be sufficient.

While some indices showed significant variation across regions within a case study country, others showed very little variation which make them less useful for the marine spatial planning process. The opportunity and choice household prosperity and gender indices showed significant variation, especially in Tanzania and Madagascar, to provide baseline information for marine spatial planning scenarios.

Both the power and voice household prosperity and gender equity index did not significantly vary across regions in Tanzania. Similarly, the power and voice gender equity index showed very little variation in Kenya. However strong differences were found for both indices across the three bays in Madagascar. If future MSP surveys are time and resource constraint, the power and voice gender equity index could potentially be dropped from the questionnaire.

The security prosperity and gender indices were very similar within countries, except for Madagascar which showed significant differences across all bays in the security household prosperity (community harmony) index. The Gender equity (family harmony) security index is comprised of measures of family functionality, peacefulness of family interactions, and the degree to which family members accommodate each other. This index showed little variation within the three different case study countries and therefore provided very little information to inform spatial planning. While this indicator gives a general impression on women's status in society in each area, it is unlikely that changes in MSP would directly impact this indicator. The security gender index could be dropped from future household surveys.

Where budgets are severely constrained, there might be a case for developing a more rapid methodology. The pilot surveys each involved about 64 person-days on the household surveys themselves, and in the process generated a lot of data for analysis. A shorter survey could be tested using the same areas as this study to check the consistency of results. Reducing the amount of data that MSP decision-makers would have to collect and analyse to include poverty and gender considerations in their planning could also potentially increase the uptake of a more socially sustainable approach.

Next steps

This study has made considerable progress in developing metrics for incorporating gender and poverty dimensions into MSP, but much more work needs to be done. Further exploration of the metrics could be carried out with the datasets already developed. Studies could be scaled up to enable analysis of spatial variation and to develop 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. Spatialising the findings would also help highlighting the key marine spaces used by different coastal communities.

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Appendix

Pairwise comparisons of index means (Tukey post hoc test following one-way ANOVA)

Kenya

Table A1: Pairwise comparisons of opportunity and choice household prosperity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Matuga vs Lunga Lunga	-.1829774	.1296451	-1.41	0.336	-.4878393	.1218846
Msambweni vs Lunga Lunga	.2704518	.1099675	2.46	0.038	.011862	.5290415
Msambweni vs Matuga	.4534292	.1174824	3.86	0.000	.1771679	.7296904

Table A2: Pairwise comparisons of opportunity and choice gender equity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Matuga vs Lunga Lunga	-.1268118	.0692533	-1.83	0.161	-.2896617	.0360381
Msambweni vs Lunga Lunga	.0768073	.058742	1.31	0.392	-.0613251	.2149396
Msambweni vs Matuga	.203619	.0627563	3.24	0.004	.056047	.3511911

Table A3: Pairwise comparisons of power and voice household prosperity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Matuga vs Lunga Lunga	-1.413836	.1655281	-8.54	0.000	-1.803078	-1.024595
Msambweni vs Lunga Lunga	-.4330247	.1404041	-3.08	0.006	-.7631865	-.1028628
Msambweni vs Matuga	.9808118	.1499991	6.54	0.000	.6280874	1.333536

Table A4: Pairwise comparisons of power and voice gender equity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Matuga vs Lunga Lunga	-.3491188	.1919716	-1.82	0.165	-.800542	.1023044
Msambweni vs Lunga Lunga	-.5711538	.162834	-3.51	0.001	-.9540597	-.188248
Msambweni vs Matuga	-.222035	.1739617	-1.28	0.409	-.6311079	.1870378

Table A5: Pairwise comparisons of security household prosperity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Matuga vs Lunga Lunga	.0295718	.1403854	0.21	0.976	-.300546	.3596897
Msambweni vs Lunga Lunga	.0742521	.1190776	0.62	0.807	-.2057602	.3542645
Msambweni vs Matuga	.0446803	.1272151	0.35	0.934	-.2544675	.3438281

Table A6: Pairwise comparisons of security gender equity index means with equal variances (Tukey post hoctest following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Matuga vs Lunga Lunga	.1597484	.1105921	1.44	0.319	-.1003101	.4198069
Msambweni vs Lunga Lunga	.2157407	.0938063	2.30	0.057	-.0048459	.4363273
Msambweni vs Matuga	.0559923	.1002169	0.56	0.842	-.1796687	.2916533

Tanzania

The regions were abbreviated in the following way:

First: Mayomboni, Moa
Second: Doda, Manza, Boma
Third: Mtimbwani, Kwale

Table A7: Pairwise comparisons of opportunity and choice household prosperity index means with equalvariances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Second vs First	-.0942554	.0853123	-1.10	0.511	-.2947348	.106224
Third vs First	.4249506	.0819548	5.19	0.000	.232361	.6175402
Third vs Second	.519206	.0882884	5.88	0.000	.3117328	.7266792

Table A8: Pairwise comparisons of opportunity and choice gender equity index means with equal variances(Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Second vs First	-.1064349	.0458024	-2.32	0.053	-.2140681	.0011982
Third vs First	.1362757	.0439998	3.10	0.006	.0328784	.239673
Third vs Second	.2427106	.0474002	5.12	0.000	.1313226	.3540986

Table A9: Pairwise comparisons of power and voice household prosperity index means with equal variances(Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Second vs First	.0255126	.1192606	0.21	0.975	-.2547436	.3057688
Third vs First	-.047107	.1145671	-0.41	0.911	-.3163339	.2221198
Third vs Second	-.0726196	.123421	-0.59	0.826	-.3626527	.2174134

Table A10: Pairwise comparisons of power and voice gender equity index means with equal variances (Tukeypost hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Second vs First	-.1880242	.1406702	-1.34	0.375	-.5185917	.1425434
Third vs First	-.1205837	.1351341	-0.89	0.645	-.4381419	.1969745
Third vs Second	.0674404	.1455775	0.46	0.888	-.2746591	.4095399

Table A11: Pairwise comparisons of security household prosperity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Second vs First	-.2923763	.0804872	-3.63	0.001	-.481517	-.1032355
Third vs First	-.0758449	.0773197	-0.98	0.589	-.257542	.1058523
Third vs Second	.2165314	.083295	2.60	0.026	.0207924	.4122704

Table A12: Pairwise comparisons of security gender equity index means with equal variances (Tukey post hoctest following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Second vs First	-.0209043	.0757031	-0.28	0.959	-.1988025	.1569939
Third vs First	.0647721	.0727238	0.89	0.646	-.106125	.2356693
Third vs Second	.0856764	.078344	1.09	0.518	-.0984278	.2697807

Madagascar

Table A13: Pairwise comparisons of opportunity and choice household prosperity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Mahajamba vs Bombetoka	-.6557869	.1132633	-5.79	0.000	-.9220575	-.3895162
Sahamalaza vs Bombetoka	.0788396	.090534	0.87	0.659	-.1339967	.291676
Sahamalaza vs Mahajamba	.7346265	.1123459	6.54	0.000	.4705126	.9987403

Table A14: Pairwise comparisons of opportunity and choice gender equity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Mahajamba vs Bombetoka	-.3042264	.0711444	-4.28	0.000	-.4714797	-.1369731
Sahamalaza vs Bombetoka	-.1328826	.0568674	-2.34	0.052	-.2665721	.0008069
Sahamalaza vs Mahajamba	.1713438	.0705681	2.43	0.041	.0054452	.3372423

Table A15: Pairwise comparisons of power and voice household prosperity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Mahajamba vs Bombetoka	-.3284827	.0955871	-3.44	0.002	-.5531984	-.103767
Sahamalaza vs Bombetoka	.5181092	.076405	6.78	0.000	.3384887	.6977297
Sahamalaza vs Mahajamba	.8465919	.0948128	8.93	0.000	.6236964	1.069487

Table A16: Pairwise comparisons of power and voice gender equity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Mahajamba vs Bombetoka	-.3043845	.1246933	-2.44	0.040	-.5975258	-.0112431
Sahamalaza vs Bombetoka	.3027022	.0996703	3.04	0.007	.0683875	.537017
Sahamalaza vs Mahajamba	.6070867	.1236833	4.91	0.000	.3163198	.8978536

Table A17: Pairwise comparisons of security household prosperity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Mahajamba vs Bombetoka	-.2423244	.1014541	-2.39	0.045	-.4808329	-.003816
Sahamalaza vs Bombetoka	.3096748	.0810947	3.82	0.000	.1190294	.5003202
Sahamalaza vs Mahajamba	.5519993	.1006323	5.49	0.000	.3154227	.7885758

Table A18: Pairwise comparisons of security gender equity index means with equal variances (Tukey post hoc test following one-way ANOVA)

	Contrast	Std.Err.	t	P>t	[95%_Conf	Interval]
Mahajamba vs Bombetoka	-.8602506	.1040339	-8.27	0.000	-1.104824	-.6156773
Sahamalaza vs Bombetoka	.0252261	.0831568	0.30	0.951	-.1702671	.2207193
Sahamalaza vs Mahajamba	.8854767	.1031913	8.58	0.000	.6428844	1.128069

Household questionnaire

Disclaimer: this questionnaire was used in the pilot studies, but some changes will need to be made in future studies based on the lessons learned.

A: Introduction and informed consent

Greetings. My name is *[please tell the respondent your name]*. We are doing a survey on behalf of the government to inform the future management of marine and coastal resources in this area through a process called Marine Spatial Planning. We would like to ask you about how your household derives its income and the way in which you benefit from coastal activities, and we would like your opinion on how future developments might affect your household. Our questions relate to the whole household, so we need to talk to at least one senior decision maker in the household, but it will be even better if we could jointly interview both a man and a woman of the household.

This research has been approved by the University of Cape Town's Commerce Faculty Ethics in Research Committee. Your participation in this research is voluntary. You can choose to withdraw from the research at any time. The questionnaire will take approximately 45 minutes to complete. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. If personal data are collected, published data will be anonymised. Due to the nature of the study, you will need to provide the researchers with some form of identifiable information however, all responses will be confidential and used for the purposes of this research only. Do you consent to being interviewed?

Consent given Yes = [ ] No = [ ] *(If No, terminate the interview)*

B: Demographic and socio-economic background

1. Please could you give the following details about the household head?:
   a. Gender (tick one): o Male o Female o Other o Don't know / Prefer not to say
   b. Age (years) _____
   c. Marital status:

      o Never married o Married o Previously married o Other o Don't know

   d. Level of education completed:

      o None o Some schooling but no level completed o Primary o Secondary o Higher education o Don't know

2. How many members are there in this household in the following age groups?

   Adults 60+ ____ Adults 18-59 ____ Youth 13-17 _____ Children 0-12 _____

3. To which religious group does this household belong?

   o None/Atheist or Agnostic o Roman Catholic Christianity o Islam o Zionist o Protestant Christianity o Traditional o Other o Don't know

4. How long have you been resident in this village / area (in years) _____

5. [if < 4 years] Where did you move here from?
   a. o Another village in this county
   b. o Another county/region
   c. o Another country

C: Residence and neighbourhood characteristics

6. What are the main house's walls made of? o Mud o Thatch/leaf/reed/palm/ bamboo o Cement blocks o Mud bricks – local/homemade o Commercial bricks o Other o Don't know

7. What is the roof made of? o Thatch/leaf/reed/palm/ bamboo o Corrugated iron o Mud o Asbestos o Cement/concrete o Other o Don't know

8. What is the household's main source of energy for cooking and lighting? o Firewood o Batteries o Solar panel o Public electricity grid o Oil/Paraffin/kerosene o Candles o Other o Don't kow

9. What is the household's main source of water? o River o Well or borehole o Tap connected to public water system o Rainwater storage o Other o Don't know

10. Does this household own any of the following? o Bicycle o Motorbike o Car o Phone o Radio o TV o Fridge o Mobile phone o Canoe or rowing boat o Dhow/sailing boat o Motor-boat o Tuktuk o Minibus o Truck o House o Farmland o Don't know

11. About how long would it take to get from your home to the nearest school if you walked? o 10 minutes or less o 11-20 minutes o 21-30 minutes o More than 30 minutes o Don't know

12. About how long would it take to get from your home to the nearest market if you walked? o 10 minutes or less o 11-20 minutes o 21-30 minutes o More than 30 minutes o Don't know

13. About how long would it take to get from your home to the nearest clinic by motorized transport? o 10 minutes or less o 11-20 minutes o 21-30 minutes o More than 30 minutes o Don't know

D. Employment and income

14. Has anyone in this household earned income from formal or casual employment here in this area in the last 3 years? o Yes o No o Don't know

15. Please give details of employment <u>for any household members who are employed</u> (this can be over more than one line if a person had two jobs):

a. Gender: o male o female

b. Type of occupation: o Self-employed/ informal trade o Formally registered business o Employed in community o Employed outside of community

c. Economic sector related to occupation: o None o Farming livestock o Farming crops o Aquaculture o Fishing o Fish processing o Forest extraction o Oil / gas o Salt o Mineral extraction o Construction o Manufacturing o Transport o Tourism o Buying/selling goods o Service industry o Health and education o Other

16. When was their last month of paid employment? (mm/yyyy) (Don't know 999)

17. What is or was their monthly income (before tax)? (Don't know 999)

18. Please divide these 20 beans to show how much the following contribute to your household's monetary income in a typical month (Don't know 999)

- Employment
- Own fishing or other livelihood activities involving coastal and marine resources or coastal tourists
- Own farming or livelihood activities involving upland resources
- Pensions and welfare
- Remittances

E: Livelihood activities and income

Fishing by boat

19. I am going to ask separately about fishing by boat and fishing on the shore. Let's start with boat-based fishing. How many men in this household have regularly gone fishing out to sea (by motorised boat, dhow or canoe) in the last 12 months? (Don't know 999)

20. And how many women? (Don't know 999)

21. (If >0). Where off the coast did most of this fishing take place?

- Offshore from around here
- Further to the north of here
- Further to the south of here
- Don't know

22. Where do you/they do most of this fishing?
o Offshore islands o Offshore reefs o Open sea o Don't know

23. What type of boat is used for this?

- Dhow
- Motorised boat
- Canoe
- Other
- Don't know

24. Does this household own the boat?

- Yes
- No
- Shared ownership
- Don't know

25. What are the main types of species caught (up to 3)? (list given)

26. Was this fishing mainly for household consumption or for sale?

- Household consumption
- Sale
- Don't know

27. Approximately what percentage of the catch was sold? (Don't know 999)

28. Approximately how much income was earned from offshore fishing in the last month? (Don't know 999)

29. Approximately how much income was earned from offshore fishing in the last 12 months? (Don't know 999)

30. How do you rate the abundance of these fishery stocks relative to their historical levels?

o Almost gone o Severely reduced o Somewhat reduced o About the same o More abundant o Don't know

Men inshore fishing

31. How many men in the household have regularly gone fishing from the shore (in tidal or shallow areas) in the last 12 months? (Don't know 999) If number > 0:

a. What were the 3 main types of species caught or collected at the shore, in order of importance? (list given)

b. Where do you do most of this fishing? o River or estuary o Reef o Mangrove creeks o Seagrass areas o Sand or mudflat areas o Off the beach o Don't know

c. How do you rate the abundance of these fishery stocks relative to their historical levels? Almost gone o Severely reduced o Somewhat reduced o About the same o More abundant o Don't know

d. Approximately what percentage of these catches were sold? (Don't know 999)

e. Approximately how much income did this earn in the last month? (Don't know 999)

f. Approximately how much income did this earn in the last 12 months? (Don't know 999)

Women inshore fishing

32. How many women in the household have regularly gone fishing at the shore in the last 12 months? (Don't know 999) If number > 0:

a. What were the 3 main types of species caught or collected at the shore, in order of importance? (list given)

b. Where do you do most of this fishing? o River or estuary o Reef o Mangrove creeks o Seagrass areas o Sand or mudflat areas o Off the beach o Don't know

c. How do you rate the abundance of these fishery stocks relative to their historical levels? Almost gone o Severely reduced o Somewhat reduced o About the same o More abundant o Don't know

d. Approximately what percentage of these catches were sold? (Don't know 999)

e. Approximately how much income did this earn in the last month? (Don't know 999)

f. Approximately how much income did this earn in the last 12 months? (Don't know 999)

Fish processing and trading

33. Have any members of the household been regularly involved in buying fish or other sealife from fishers to process and sell, or just to sell? Yes / No / Don't know; If yes:

a. How much of this work was by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know

b. Approximately how much income did this earn in the last month? (Don't know 999)

c. Approximately how much income did this earn in the last 12 months? (Don't know 999)

Salt

34. Has anyone in this household been regularly involved in salt making in the past 12 months? Yes / No / Don't know; If yes:
    a. How much of this work was by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    b. How much income did your household earn from this in the last month? (Don't know 999)
    c. And approximately how much income was earned in the last year? (Don't know 999)

Mariculture

35. Does this household undertake any mariculture (farming fish, prawns or seaweed) as a business? Yes / No / Don't know; If yes:
    a. (If yes) What type of mariculture (in acres)?
        i. Fish
        ii. Prawns
        iii. Seaweed
        iv. Don't know
    b. What size area do you have for mariculture? (Don't know 999)
    c. How much of the mariculture work is done by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    d. How much income did your household earn from this in the last month? (Don't know 999)
    e. And approximately how much was earned in the last year? (Don't know 999)

Tourism

36. Has anyone in this household have regularly provided guiding or other services to tourists in the last 3 years? Yes / No / Don't know; If yes:
    a. How much income was earned from this in the last month? (Don't know 999)
    b. And in the last 12 months? (Don't know 999)
    c. How much of this was earned by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    d. How much would have been earned in a year before the pandemic? (Don't know 999)

Timber and poles

37. Has anyone in this household have regularly cut timber or poles from mangroves or other forests in the last year? Yes / No / Don't know; If yes:
    a. Approximately how many logs were cut for timber in the last two months? (Don't know 999)
    b. How much income was earned from timber in the last two months? (Don't know 999)
    c. And approximately how much in the last year? (Don't know 999)
    d. Approximately how many scores of poles were harvested in the last two months? (Don't know 999)
    e. How much income was earned from poles in the last two months? (Don't know 999)
    f. And approximately how much in the last year? (Don't know 999)

Charcoal

38. Has anyone in this household regularly made charcoal from mangroves or other forests in the last year? Yes / No / Don't know; If yes:
    a. Approximately how many bags of charcoal were produced in the last two months? (Don't know 999)
    b. How much income was earned from selling charcoal in the last two months? (Don't know 999)
    c. And approximately how much in the last year? (Don't know 999)

Firewood

39. Does this household regularly collect firewood? Yes / No / Don't know; If yes:
    a. How much of the firewood collecting is done by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    b. How many headloads were collected in the last month? (Don't know 999)
    c. How much of the firewood collected comes from mangroves? o Most or all o More than half o Less than half o Little or none o Don't know
    d. What percentage of firewood collected is sold? (Don't know 999)

Wild food and medicines

40. Has anyone in the household regularly collected wild vegetables, fruits or medicines in the past year? Yes / No / Don't know; If yes:
    a. How much of this work was done by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    b. What proportion of the food collected was sold? o Most or all o More than half o Less than half o Little or none o Don't know
    c. How much was earned from this in the last month? (Don't know 999)
    d. Approximately how much was earned from this in the last year? (Don't know 999)

Hunting

41. Has anyone in the household regularly hunted for bush meat or wild honey in the past year? Yes / No / Don't know; If yes:
    a. Which of these do they hunt for the most? (top 3)
        i. Mangrove honey
        ii. Forest honey
        iii. Forest animals and birds
        iv. Coastal and mangrove birds
        v. Don't know
    b. What proportion of this was sold? o Most or all o More than half o Less than half o Little or none o Don't know
    c. How much was earned from this in the last month? (Don't know 999)
    d. Approximately how much was earned from this in the last year? (Don't know 999)

Plant raw materials

42. Has anyone in the household harvested reeds, sedges, grasses or palm leaves in the last year? Yes / No / Don't know; If yes:
    a. How much of this work was done by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    b. What proportion of the amount collected was sold? o Most or all o More than half o Less than half o Little or none o Don't know
    c. How much was earned from this in the last month? (Don't know 999)
    d. Approximately how much was earned in the last year? (Don't know 999)

Mining

43. Has anyone in the household regularly mined for sand or minerals in the last year? Yes / No / Don't know; If yes:
    a. How much of this work was done by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    b. What proportion of the amount collected was sold? o Most or all o More than half o Less than half o Little or none o Don't know
    c. How much was earned from this in the last month? (Don't know 999)
    d. Approximately how much was earned in the last year? (Don't know 999)

Making products for sale

44. Has anyone in the household regularly prepared food, drinks or handicrafts for sale in the past 12 months? Yes / No / Don't know; If yes:
    a. Approximately how much was earned from this in the last month? (Don't know 999)
    b. Approximately how much was earned in the last year? (Don't know 999)
    c. How much of this income was generated by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    d. Approximately what proportion of this income was from sales to tourists? o Most or all o More than half o Less than half o Little or none o Don't know

Crops

45. Does this household engage in growing crops, fruits, nuts or coconuts? Yes / No / Don't know; If yes:
    a. How many banana plants do you have? (Don't know 999)
    b. How many coconut palms? (Don't know 999)
    c. How many fruit and nut trees? (Don't know 999)
    d. What area of land do you cultivate (acres)? (Don't know 999)
    e. What are the main crops grown? (list given)
    f. Approximately what proportion of this work was done by female members of the household? o Most or all o More than half o Less than half o Little or none o Don't know
    g. What proportion of your production was sold? o Most or all o More than half o Less than half o Little or none o Don't know
    h. How much income was generated in the last year? (Don't know 999)

Livestock

46. Do you keep poultry? Yes / No / Don't know

47. Does this household have any other livestock? Yes / No / Don't know

    a. (If yes) How many pigs do you have?

    b. How many goats or sheep do you have?

    c. How many cattle do you have?

    d. How many horses or donkeys do you have?

    e. How many chicken or other birds do you have?

48. How much income was generated from poultry and livestock in the last month? (Don't know 999)

49. And in the last year? (Don't know 999)

F: Security and voice

50. Please rate the following on a scale from 1 = strongly disagree to 7 = strongly agree:

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

51. Please rate the following on a scale from 1 = strongly disagree to 7 = strongly agree:

    - Our community is harmonious.
    - Life in this area is very peaceful.
    - There is conflict over access to resources in this area.
    - Local government officials are trustworthy.
    - Households are able to voice their concerns about the use and management of our coastal and marine areas through organisational structures.
    - I feel that our concerns about marine and coastal management are heard.

52. Are any men in the household part of any community organisations? Please select:

    - Church, mosque or other local religious group
    - Fishing association or co-operative
    - Farming association or co-operative
    - Business association or cooperative
    - Political organisation
    - Neighbourhood security group
    - Environmental or conservation association
    - Educational, developmental or social welfare association
    - Don't know

53. Are any women in the household part of any community organisations? Please select:
    - Church, mosque or other local religious group
    - Fishing association or co-operative
    - Farming association or co-operative
    - Business association or cooperative
    - Political organisation
    - Neighbourhood security group
    - Environmental or conservation association
    - Educational, developmental or social welfare association
    - Don't know

54. To what extent are women involved in decision-making in the house, on: (Seldom or not at all, Sometimes, Often, Mostly or always)?
    - How the household earns an income
    - How the household spends its money
    - Household's fishing activities
    - Where the household lives
    - Children's schooling
    - Having children
    - Women's occupations and activities

G: Household perspectives on local conditions and development

55. Please say how much you agree with the following, based on a scale from 1 = strongly disagree to 7 = strongly agree:
    - The coastal and marine life around here is healthy, diverse and productive.
    - It is important to ensure that inshore fishing areas are not impacted by other developments.
    - There are too many restrictions on fishing in this area, like closed areas, closed seasons or permits.
    - Fishing regulations in this area are well enforced.
    - Anyone should be able to fish or harvest resources in this area.
    - Ecotourism is an important source of income in this area.
    - Small-scale fishing is threatening the marine life in the area.
    - An increase in industrial activities along this cost will increase the risk to our marine life.
    - Our household supports marine wildlife conservation.
    - There is a good balance between protection and use of marine resources in this area.
    - If the government gets more taxes from big business, it will deliver better services in our area.

56. How do you rate the overall level of government services in your local area, including the quality of public roads and recreational spaces? o Very poor o Poor o Below average o

56. How do you rate the overall level of government services in your local area, including the quality of public roads and recreational spaces? o Very poor o Poor o Below average o Average o Good o Very good o Excellent o Don't know

57. Which of these marine sectors is key source of formal employment in your community?

    o Coastal tourism o Oil and gas o Fish processing o Shipbuilding o Marine fisheries o Ports o Aquaculture o Transport o Marine Renewables o Desalination o Coastal protection o Marine biotechnology

58. How would you rate the general availability of marine sector formal jobs for men, women and youth in your community? (on a scale of 1 (not available) to 7 (abundant))

    i. For men

    ii. For women

    iii. For youth

59. Which types of marine sector development in this area would provide this household with the best opportunities for income? (top 3)

    o Coastal tourism o Oil and gas o Fish processing o Shipbuilding o Marine fisheries o Ports o Aquaculture o Transport o Marine Renewables o Desalination o Coastal protection o Marine biotechnology

60. Would you say that your community is fairly represented in blue sector formal jobs in this area? Yes / No / Don't know

61. Would you vote for a situation where job opportunities are increased if it meant loss of access to small scale fishing? o Probably o Probably not o Don't know

62. And if it only meant loss of access to the marine resources that are collected from the shore at low tide? o Probably o Probably not o Don't know

That is the end of the interview. Thank you for your time.

H: Interview details

Note: Date, start and end time will be automatically recorded by the programme

Take the GPS location at the house then fill in the details away from the house.

Enumerator:	Supervisor:
County:	Subcounty:
Village:	GPS location

Who was present (tick one or both)

- Adult male
- Adult female

Was the female able to express herself freely?

- No
- Somewhat
- Yes

Overall quality of the interview (reliability of information given)

- Poor
- OK
- Good

Understanding of the choice question

- Poor
- Good

Any other comments, observations or information to take note of? _____

END

Guiding checklists for focus groups/key informant interviews

Disclaimer: These guidelines were used in pilot studies but some changes will need to be made in future studies based on the lessons learned.

Resource-harvesting and farming activities

Broad description of the resource and related activities

- Describe these resources and how you would divide the livelihood activities relating to these resources into subcategories.
- gear used
- main species used
- locations

Rules of access

- Are the resources well managed? Explain
- Are there any closed areas / closed seasons?
- Are there any restrictions to harvesting methods / type of species / amount of catch?
- Are these restrictions imposed by the government or by the local communities?
- How well are these restrictions enforced?
- Tells us about harvesting rights in this area.
- Do you know of any plans of the government to change access to resources in the area?
- Are there any proposed developments along this coast? And what would be the implications for other users?
- What changes are the people in this community afraid of?
- What development changes does the community want to see in the area to enhance availability of the resource?

Equipment

- For the equipment described above, what are the costs, how long do they last
- Do households share equipment?

Seasonality

- For the main resources, please describe seasonality in resource availability and harvesting activity?
- Are there any seasons when people don't engage in the activity?

Returns to effort

- How much do people in this community usually harvest in a day / week / during different times of the year?

Change in availability

- Have people in this community noticed any changes in the stocks of the resource?
- What alternative livelihood source(s) would people in this community adopt if the resource is depleted?
- At the current rate of extraction, do people in this community think this resource will be available in the next 20 years?
- What do people in this community think can be done to ensure sustainable use?

Prices and inputs

- What is the selling price of each type of resource that people in this community harvest?
- What has been the price trend of the resources people in this community extract over the past 5 years? And why do people think they have seen this trend?
- Which are the main markets of the resource people in this community extract?
- Is there any form of taxation for this resource from county or national government?
- Are there any local extraction fees enforced at the community level?

Who is involved? (Opportunities and choices)

- What is the role of men, women, and children in this livelihood activity?
- Would people in this community say that women are equally represented in access and utilisation of the resources?
- Would people in this community say that women have the same opportunities in the community as men?
- What livelihoods opportunities are available for men only in your community?
- Which ones are considered to be for women only?
- Which ones can be done by both by men and women?
- What would prevent men, women, and youth from choosing any livelihood activity they would want to undertake in this community?

Local women

Economic opportunities

- Tell us a little bit about women's lives in this community.
- What are the main economic activities that women in this community engage in?
- Would you say that women have the same opportunities in the community as men?
- What livelihoods opportunities are available for men only in your community?
- Which ones are considered to be for women only?
- Which ones can be done by both men and women?
- What would prevent men, women, and youth from choosing any livelihood activity they would want to undertake in this community?

Decision-making power and voice in the community

- Are women well represented in local associations? And in your community in general?
- Are women's views taken seriously in the decisions of these associations?
- Could you please describe to what extent women are involved in decision-making in the house, on:
    - How the household earns an income
    - How the household spends its money
    - Where the household lives
    - Children's schooling
    - Having children
    - Women's occupations and activities

Tourism

- Describe the tourism in this area (What are tourists coming here for? Where do they commonly stay? What type of accommodation do they stay in? Do they come with tour busses or in smaller groups? etc.)
- Is tourism / ecotourism an important source of income in this area?
- Where are the areas that are important for tourism? (draw this on a map)
- What kind of tourism services do local people usually provide?
- Are jobs in the tourism industry usually done by men or women? Would you say that women have the same opportunities in the tourism sector?
- What kind of opportunities exist for women in the tourism industry?
- How much do people working in the tourism sector typically earn per month / per year?
- Is tourism strongly dependent on seasons? What time of the year is tourism season?
- How much did the COVID-19 pandemic affect tourism in this area?
- What would a person in the tourism typically earn per month before the pandemic?
- Are there any proposed developments along this coast (such as oil and gas extractions or port development)? And what would be the implications for tourism in this area?
- What changes are people in this community afraid of?

Marine conservation

- Where are the marine protected areas in this area? (please draw them on a map)
- Are there any restrictions in marine protected areas?
- How well are these restrictions enforced?
- Who decides about the marine protected areas – the government or do local communities decide where they are and what restrictions apply?
- Are there any conflicts about access rights to marine resources in this area?

Local economy

- Please describe the economy in this area.
- How has the local economy changed over the last few years?
- How has the COVID-19 pandemic impacted the local economy?
- What economic sectors are most important for the local economy?
- Is industry (oil, gas, offshore energy, shipping) an important source of income in this region?
- Does the industry provide jobs for the local communities?
- Where are the industrial areas? (draw them on a map)
- Are there any proposed developments along this coast (such as oil and gas extractions or port development)? And what would be the implications for this region?
- What changes are people in this community afraid of?
- Are jobs in the industry usually done by men or women? Would you say that women have the same opportunities in this sector?
- How much do people working in the industry sector typically earn per month / per year?

Publications in this series

Publications in this series of joint works on poverty and gender in marine spatial planning:

Framework: Poverty and gender considerations in marine spatial planning – Conceptual and analytical framework (Swedish Agency for Marine and Water Management, 2022)

Case study Madagascar: Incorporating poverty and gender considerations in Marine Spatial Planning: Pilot baseline study of the Sofia and Boeny Regions, Madagascar (Turpie et al., 2022a)

Case study Tanzania: Incorporating poverty and gender considerations in Marine Spatial Planning: Case study of the Tanga region in Tanzania (Turpie et al., 2022b)

Case study Kenya: Poverty and Gender Perspectives in Marine Spatial Planning: Lessons from Kwale County in Coastal Kenya (UNESCO-IOC and SwAM, 2024)

Synthesis: Developing metrics of poverty and gender considerations in Marine Spatial Planning – A synthesis of case studies in Kenya, Madagascar and Tanzania (UNESCO-IOC and SwAM, 2024)

Marine Spatial Planning (MSP) is a process to systematically and sustainably allocate marine areas based on the understanding of the interactions among and between resource user groups and the marine environment. MSP is most effective when everyone, including vulnerable social groups that largely depend on marine resources for their food security and livelihoods - such as youth and elderly adults, small-scale fishers, Indigenous Peoples, and women - are involved in governance decisions from the planning stages.

This synthesis report is part of a series of publications developed by the Swedish Agency for Marine and Water Management and the Intergovernmental Oceanographic Commission of UNESCO about a conceptual and analytical framework for incorporating poverty and gender considerations into MSP. It provides an overview of three pilot cases in Kenya, Tanzania and Madagascar on baseline data collection to better understand local communities' dependence on marine resources and other livelihood activities, with emphasis on understanding the role that MSP can play to alleviates, or at least does not worsen poverty and gender inequality. It also indicates that gender is a critical organizing category for coastal activities and is of significant relevance and legitimacy to the MSP process.