



# Marine biodiversity and livelihoods. Minimising barriers and enabling benefits

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## Questions

*What are the barriers to, and enablers for, ensuring benefits from biodiversity to livelihoods are captured and dis-benefits minimised?*

## Contents

1. Summary
2. Marine biodiversity and livelihoods - barriers and enablers
3. Spatial and socio-economic planning
4. Stakeholder participation
5. Environmental governance
6. Tenure and property rights
7. Access to markets
8. Access to technology
9. Fiscal and financial instruments
10. References

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# 1. Summary

Typical enablers of the benefits of biodiversity are spatial planning, stakeholder participation, access to markets and access to technology. Some enablers can also act as barriers, for example access to technology. In terms of ways of minimising dis-benefits and achieving benefits, they typically involve concerted actions at international, national and local levels, intensive commitment to stakeholder partnerships and scientific and technical expertise.

Barriers and enablers of marine and coastal livelihoods are often closely related. For example technology may create a barrier or act as an enabler for sustainable livelihoods. This report is structured according to factors which can act as enablers or barriers in relation to realising livelihood outcomes. For each theme, barriers and enablers are briefly outlined (see also the Rapid Review 'Marine biodiversity and poverty'), together with evidence from the literature on best practice in terms of how to minimise disbenefits and optimise benefits.

**Spatial and socio-economic planning.** Neglect of social dimensions of marine and coastal planning can have a negative impact on resource-dependent livelihoods whereas an understanding of trade-offs between biophysical and socioeconomic impacts can support the conservation of both ecosystems and livelihoods that depend on marine resources. A commitment to achieving livelihood improvements can be facilitated by comprehensive stakeholder mapping (with a focus on gender and other vulnerable groups that could be affected). Cost-benefit methods which account for distributional impacts can be used in planning.

**Stakeholder participation.** The cost, challenges and time required in the process of stakeholder engagement can act as a barrier. Established processes to manage conflict between stakeholders support sustainable development initiatives. Effective stakeholder participation at every stage of the conservation process as well as significant capacity-building activities can help to optimise benefits to livelihoods of resource users.

**Environmental governance.** Piecemeal approaches to conservation can be a major barrier to meeting policy objectives. As the scope and scale of marine interventions increases, multi-stakeholder systems involve governments, civil society (NGOs, resource user groups, community members), academic and scientific institutions, and the private sector. Smaller management groups should operate within the scales of jurisdictional decision-making where specific issues or concerns exist. Cross-border and multi-jurisdictional governance can address transboundary issues such as illegal fishing.

**Tenure and property rights.** The introduction of new environmental protection regulations may exclude coastal and marine resource users from the resources they depend on. Property and access rights are extremely complex to manage in ways that do not threaten livelihoods. Clarity around property rights and effective processes of stakeholder engagement are key to mediating the reallocation of property rights incurred by conservation programmes.

**Access to markets.** Limited financial and geographical access to markets means that prices can be dictated by intermediary buyers and that fishers are often forced to sell their catch below the market price. Sustainable supply chain approaches can facilitate the introduction of artisanal fisheries to international buyers and helped them gain insights on product requirements and quality standards requested by international buyers and connections with sustainable seafood markets.

**Access to technology.** Both access and lack of access can act as constraints or enablers of informal coastal activities (such as fishing). Case studies highlight that technology development/transfer which accrues benefits for resource-poor users is gradual, context-specific

and embedded within relational networks. Technology diffusion should be carried out through tailoring and adaptation rather than wholesale transfer, taking into consideration recipient circumstances to ensure compatibility.

**Fiscal and financial instruments.** Seasonal variation, climate-related disruptions and transitions to sustainable practices can contribute to livelihood insecurity. There is some emerging evidence that social protection measures can be used to provide assistance to compensate for lost revenues for artisanal fishing livelihoods. These may be community-driven, project-managed or developed as part of national social assistance frameworks.

## The evidence base

The evidence base on how to integrate social and environmental aims of marine biodiversity initiatives, while optimising the trade-offs, is growing rapidly, but varies in terms of quality of evidence. Academic literature contains a small number of systematic reviews of the factors which influence whether and how marine interventions generate livelihood benefits. Multi-lateral and non-governmental institutional reports tend to document innovative and/or large-scale approaches.

The review highlights some of the major and recurring findings in the literature, with a focus on findings derived from best practice. Geographically, the review is focused on coastal livelihoods in developing countries. Guidelines for best practice globally are primarily developed in the context of Marine Protection Area evaluations and across Large Marine Ecosystem project reviews. Other programmes are mentioned where data is available (e.g. certification programmes). Fishing-related livelihoods are the most frequently addressed in the literature.

## 2. Marine biodiversity and livelihoods – barriers and enablers

The same issues recur in the literature as both barriers and enablers to marine and coastal livelihoods (e.g. technology transfer can be an enabler or a barrier). In a systematic review of the socioeconomic factors that influence how marine protected areas impact on ecosystems and livelihoods, Mizrahi et al. (2019) found that many factors had both positive and negative impacts for livelihoods.

This report is therefore structured according to overarching themes. Under each one, barriers and enablers are outlined (drawing on the Rapid Review 'Marine biodiversity and poverty'), together with evidence from the literature on best practice in terms of how to minimise disbenefits and optimise benefits.

## 3. Spatial and socio-economic planning

The social dimensions of marine and coastal areas are a crucial component of marine conservation spatial planning. This section outlines some of the key barriers and enablers in relation to the potential for spatial, socio-economic and stakeholder mapping to comprehensively take into account the needs of coastal communities who rely on marine resources for their livelihoods and food security (Mizrahi et al., 2019).

## 3.1 Barriers

**In Marine Protected Area (MPA) planning processes, socio-economic dimensions are often neglected** or considered in a less systematic way than biophysical dimensions. This may be because of the complex nature of socioeconomic factors and the lack of standardised guidelines that incorporate these factors (Mizrahi et al., 2019). Spatial planning which prioritises marine conservation and gives residual attention to socio-economic dimensions of marine biodiversity can subsequently have a negative impact on resource-dependent livelihoods, potentially resulting in a destructive negative feedback loop through the establishment of illegal or destructive fishing practices (Mizrahi et al., 2019). Most seafood certification programs, which have gained recognition and increasingly engage in developing regions, also tend to remain focused on environmental sustainability, rather than social sustainability, equity or fairness (Cisneros-Montemayor et al., 2019).

**Political motivations for MPA placement may dominate over both livelihood and ecosystem-based considerations.** Protected areas can tend to be placed in residual areas where they least interfere with extractive activities, limiting the potential for both conservation and livelihood development. The current increase in large scale MPAs reinforces global patterns for residual placements, focusing on increasing percentage coverage rather than maximizing impact. Poorly placed MPAs may also preclude the establishment of additional MPAs in areas where conservation and livelihood threats could be addressed, if the required limits of protected area extent have been reached (Mizrahi et al., 2019).

**Over-simplistic and undifferentiated approaches to socio-economic and stakeholder mapping may lead to conflict over resources and poor targeting of results.** Narrow and static frameworks for evaluating socio-economic outcomes will fail to predict broader impacts, for example beyond MPA sites (Smallhorn-West et al., 2020).

**Planning may fail to take into account that in the short term, people involved in small-scale fisheries can incur negative and disproportionate impacts** from implementing MPAs since their initial implementation can harm fishers through decreased food insecurity and loss of revenue by limiting or ending access to marine resources (Kockel et al., 2020, Westlund et al., 2017, Mizrahi et al., 2019).

## 3.2 Enablers

**Establishing MPAs is often advocated as an effective management tool to mitigate fishing pressures** and to sustain fisheries' resources, which in addition to conserving biodiversity MPAs can support the recovery of overharvested populations and enhance fisheries productivity through the spillover effect (Kockel et al., 2020). Over time, placing MPAs in areas with important fisheries can be beneficial to livelihoods, as there is potential to increase important fisheries abundance and the proportion of individuals of commercial size (Mizrahi et al., 2019).

**An understanding of trade-offs between biophysical and socioeconomic impacts can support the conservation of both ecosystems and livelihoods that depend on marine resources** (Mizrahi et al., 2019). With careful assessment of pre-existing social contexts, practitioners and stakeholders can design interventions that seek to increase positive synergies within marginalized and vulnerable groups or create trade-offs that reduce power inequalities between groups (Gill et al., 2019).

### 3.3 Ensuring benefits and minimising disbenefits

**Understanding the socio-political context and planning for positive socioeconomic outcomes need to inform the spatial MPA design process** (Mizrahi et al., 2019). This is also dependent on the scale of an MPA and where it falls on the governance spectrum (managed locally, nationally or regionally)(Mizrahi et al., 2019).

**Stakeholder mapping is a crucial component of interventions intended to enhance livelihoods.** This requires deep understanding and identification of the relevant stakeholder groups in the planning stage. Stakeholder analysis is a process of systematically listing and analysing information to determine which groups have an interest in a project, which groups are typically included or excluded, whether the groups support or oppose the project, and whether the groups would benefit or be harmed by it. The analysis also includes the demographic characteristics of different groups; the human, social, natural, financial, physical and political assets to which different coastal and marine dwellers have access; and the strategies they adopt to achieve more or less viable and sustainable livelihoods for themselves and their households (GEF, 2018, Townsley, 2011).

**Gender-sensitive and inclusive planning requires careful attention to the distribution of impacts across age, gender, and ethnic groups,** especially when biodiversity programmes may lead to significant changes in their resource rights. A comprehensive gender-sensitive assessment of the fisheries and aquaculture sector, for example, takes into account the post-harvest importance of women's contribution to production, trade, food security and livelihoods, in order to promote the role of women in fisheries and aquaculture and pragmatically move towards gender equality in the sector. Towards this end, gender disaggregated data is needed that reflects women's role and responsibilities, their access and control over resources, assets, credits, information, training and technology, nor the power they have (or do not have), their decision-making, and nor their access to leadership (FAO, 2020).

**Applying a vulnerability framework during planning can help to identify the poorest groups,** such as older people, those suffering from disabilities, widows or marginal ethnic or migrant groups, who have limited adaptive capacity, so that decision makers can focus efforts on improving (or not compromising) the wellbeing and resilience of these potentially marginalized groups, especially that might otherwise be excluded from the decision-making process (Gill et al., 2019). The many factors which characterise them as vulnerable to ecosystem services changes include: limited access to natural resources and reliance on open-access resources; lack of economic capital and facilities; lack of social cohesiveness and opportunities like safety nets; inadequate health and education services; gender-based exclusion; limited capacity and skills; and lack of ecological security in terms of protection from adverse events (Brown et al., 2008). Increased attention has been given to mainstream a gender lens into marine spatial planning (see previous paragraph). However, there has been little attention paid to issues related to disability in natural resource and environmental management (Bockstael, 2017).

**Cost-benefit valuations.** Making decisions between alternative investments, projects or policies that affect the provision of ecosystem services often involves weighing up and comparing multiple costs and benefits that are measured in different metrics and are incurred at different locations and points in time. For example, the establishment of a new marine protected area might involve costs in terms of the purchase of coastal land, investment in local communities, and on-going maintenance and enforcement costs; and benefits in terms of biodiversity conservation, recreational use and enhanced fish stocks. Calls have been emerging departing from merely economic valuation approaches, to better integrating considerations of social justice,

economic efficiency and ecological sustainability in policy and decision-making processes (Chaigneau et al., 2019). Toolkits have been developed to assist decision makers to structure the information and factors that are relevant to a decision and to select between alternative investments, projects or policies (such as the GEF Toolkit for Marine Spatial Planning) (GEF LME: LEARN, 2018, World Bank and United Nations Department of Economic and Social Affairs, 2017).

**Distributional equity issues need to be an important part of costs and benefits analyses to support livelihoods**, for example to take into account the negative impacts from spatial restrictions which may affect fishers and communities disproportionately (Kockel et al., 2020). Understanding who gains and who loses from each policy option can provide important insights into the incentives that different groups have to support or oppose each project. It also helps to ensure that conservation interventions do not harm vulnerable groups within society. Information on the distribution of the impacts of alternative options may be included directly in a Multi-Criteria Analysis as an additional criterion in the analysis, which then contributes to the overall weighted standardised score of each option. This is important, although it is technically more challenging to include distributional considerations directly in a cost benefit analysis (GEF LME: LEARN, 2018).

## 4. Stakeholder participation

Stakeholder participation is frequently cited as a cause of failure or success of a marine conservation project, and is key to ensuring the achievement of positive socioeconomic outcomes (Mizrahi et al., 2019, Kockel et al., 2020). The degree of participation in environmental management can vary widely depending on the power and role of each stakeholder relative to the environmental issue at hand. On one end of the spectrum, users are fully in control of natural resources and decision-making, while on the other end, an agency with authority controls the resources and informs stakeholders of their decisions. Wealth, social status, customary norms, seniority, age, and gender are some of the factors that influence the relative power of different stakeholders in negotiations during the environmental management process (GEF, 2018).

### 4.1 Barriers

**The process of stakeholder engagement is lengthy and challenging, which implies additional costs for programme management.** Conservation programmes may be perceived as exploitative, in cases where they simply draw on the knowledge and hospitality of stakeholders in resource management and research, without adequately protecting sensitive information or returning research results to these groups (GEF, 2018).

**A failure to address equity concerns of MPAs may lead to conflict**, reduced local support towards MPAs, and non-compliance of rules; all of which can result in suboptimal conservation outcomes (Kockel et al., 2020).

**Several factors can limit poor stakeholders' ability to fully participate.** These include high levels of food insecurity, low levels of literacy and limited financial resources or the seasonal nature of livelihoods (Diz et al., 2018). The low status of resource users in many coastal areas affects their access to channels of political influence and decision-making (Townesley, 2011).

**Without skilful stakeholder engagement, benefits generated by increasing the value of biodiversity-based resources through conservation efforts may be captured** by non-poor

groups with financial and relational influence, which could leave the poor worse-off than prior to an intervention (Gill et al., 2019).

**An assumption of superiority of knowledge** can characterise the introduction of environmental programmes. Particularly in the case where marine conservation affects indigenous people (as in the case of some MPAs in Brazil) the right of local residents' to assert control and to govern may be called into question (Bockstael, 2017).

## 4.2 Enablers

**Effective stakeholder participation is key to achieving both environmental and social aims.** In a review of factors which determined livelihood impacts, the most highly cited factor was stakeholder engagement. Environmental policy and management only succeed if key stakeholders feel engaged and have bought into the design of the actions concerned (Mizrahi et al., 2019).

**Managing conflicts between stakeholders is an inherent and necessary component** to ensure effective environmental management. Conflict is at the heart of most environmental issues, as it is often the case that the activities of one group may negatively affect the economic and/or human well-being of another group (GEF, 2018).

**Stakeholder involvement and co-management regimes can help manage multiple interests** through helping to engage those who depend most on marine resources in sustainable management (Tedsen et al., 2014). If a process is deemed fair and legitimate by key stakeholders, the benefits of improved relationships between stakeholders often lead to agreements that are respected, implemented, and monitored, which far outweighs the financial and time costs associated with stakeholder participation (GEF, 2018).

## 4.3 Ensuring benefits and minimising disbenefits

**A process rather than project approach to stakeholder engagement.** Most stakeholders interact with natural resources prior to, during, and after the proposed interventions, and as a result their stakes in the issues go far beyond the implications of one single project or initiative. Pre-existing relationships and conflicts between various actors engaged in natural resource management need to be carefully recognized and acknowledged prior to proposing a new course of action. Thus, the process of engaging stakeholders in environmental management is iterative and cyclical (GEF, 2018).

**Proactive stakeholder engagement.** Broad stakeholder participation is often reserved for intricate situations with wide-ranging implications for multiple groups of people. Participatory decision-making processes work best when proactive engagement may avert future problems. It is also helpful for all stakeholders to understand the principles of conflict resolution and negotiation (GEF, 2018). Some representatives of stakeholder groups may have to spend significant time away from their livelihoods in order to participate. The coordinators of planning processes may opt to provide appropriate stipends or other support to remove barriers to participation and make sure that all invited stakeholders are able to participate in the process on a more equal footing.

**Well-facilitated stakeholder engagement.** Skilled negotiators can be very useful when different parties agree to discuss options for overcoming issues. The varying interests at play may conflict through the process, delaying decision-making or making consensus practically impossible. These complexities call for skilled stakeholder participation facilitators with a wide range of

experiences, from conflict resolution, to meeting facilitation, to collaborative decision making. Importantly, negotiation conveners must recognize and compensate for the power imbalances that are often at play when different stakeholders are involved in a decision-making process, to ensure fair and just outcomes for all (GEF, 2018).

**Stakeholder participation at every stage of conservation process.** It is important to start the stakeholder engagement planning process as early as possible in the project cycle (GEF, 2018):

- (i) At the inception stage, collaborative target-setting is helpful for the effective management of large marine areas, but requires careful negotiation between options and the reconciling of potentially competing interests.
- (ii) Developing management plans and strategies to effectively manage large areas of human-natural interaction, is important and requires that stakeholder groups should be approached as keepers of highly valuable and sensitive knowledge. Informed consent agreements, Intellectual Property Agreements, Data Sharing Agreements, and Information Management Agreements are important tools that can help to protect stakeholder knowledge and input in management planning processes.
- (iii) Involving Stakeholders in Implementation may require coordination mechanisms at national and/or local level (see Section 6 on Environmental Governance). Even where adequate resources (financial, political and organizational) are available to support implementation, periodic monitoring and review are essential to assess whether implementation is achieving the group's goals, and to respond to new information and circumstances.
- (iv) Working with Stakeholders on Monitoring and Evaluations. Participatory M&E emphasizes the role of stakeholders in identifying local solutions to local challenges. For example, giving fishers' associations or local women's cooperatives a prominent role in problem-solving helps the community to implement but also take ownership over the project (Chen et al., 2020).

**Capacity-building activities may be necessary to enable the involvement of community members** in stakeholder engagement processes as well as formal marine management. Capacity-building activities may range from literacy and numeracy skills, to legal, technical and legal training (Morgera and Ntona, 2018). Developing and supporting inclusive institutions and small-scale fisheries organizations, including those representing the rights of indigenous communities, women and marginalized sectors of societies, is also an important step towards enabling local communities to participate in resource planning, development and governance and to secure access to resources and markets (Cisneros-Montemayor et al., 2019, Diz et al., 2018).

**Tangible impacts are closely connected to stakeholder engagement.** It is essential for communities to witness the visible benefits of project implementation. Consistent broadcasting of project developments, both in terms of achievements or setbacks, and the use of social media are tools which have proven effective. In several projects reviewed by Chen et al. (2020), stakeholders who were directly earning a living from the local ecosystem services, such as fishers, were more engaged when they could see tangible benefits and practical results from conservation actions, such as enhanced biodiversity and more aquatic species, or an increase of high-value fish stocks. In a Chinese case study, the financial benefits of both sea cucumber cultivation and tourism-related activities boosted fishers' enthusiasm for seagrass-bed restoration and protection.



**An effective communication strategy undergirds successful stakeholder involvement for project development, implementation, and sustainability.** Introducing new ideas or new approaches to managing natural resources and ecosystem services is generally challenging as it requires people to deviate from long-formed attitudes and customs. Setting up a comprehensive communication strategy is important to increase awareness about project motivation and goals, and to build trust. Regular communication with stakeholders through periodic meetings, workshops, trainings or other activities create fora through which feedback from community members on project progress can be gathered. To enhance transparency, messages should be conveyed in an accessible way and new rules and regulations should be formulated so that they are easy to implement or follow (Chen et al., 2020).

**The benefits of involving strong local leaders are context-specific.** Engaging specific members of the community such as community elders, village leaders, local champions, non-partisan members of communities can be helpful to bring more people on board. When strong leaders are apparent, policy makers should work closely with them during the development process, particularly when gaining support during the early stages of MPA planning, and be alert to the potential for elite capture. Alternatively, if strong leaders are not present, it is possible to work with others in non-leadership roles, as strong leadership might not be essential to achieve positive impact (Mizrahi et al., 2019).

## 5. Environmental governance

As the scope and scale of marine interventions increases, environmental governance refers to the policies, regulations and institutions, both formal and informal, which manage the delivery of environmental goods at a local, regional, and national level. Governance involves governments, civil society (NGOs, resource user groups, community members), academic and scientific institutions, and the private sector (GEF, 2018, Mohammed et al., 2018).

### 5.1 Barriers

**Piecemeal approaches can be a major barrier to meeting policy objectives** (Tedsen et al., 2014, World Bank and United Nations Department of Economic and Social Affairs, 2017). One of the main challenges in environmental governance is achieving trust between and among the large number of players often involved in natural resource management (GEF, 2018). Lack of common vision and coordination between different administrative entities and government bodies responsible for various aspects of coastal zone management can lead to duplications, overlaps, gaps and possibly conflicting actions by different actors (UN, 2015).

**Scaling up of successful programmes requires complex new governance platforms.** To realise their potential for positive impact, standalone projects and programmes are often able to result in more sustainable oceans management at the local and community levels, but need to be scaled up to the national and regional level (UN, 2015).

**Many issues affecting marine livelihoods are transboundary in nature and require cooperative action.** For example illegal, unreported and unregulated fishing is a major concern which requires much greater regional cooperation and coordinating efforts to ensure compliance (Tedsen et al., 2014). Another example that requires cross-institutional governance and regulation is the emerging bioprospecting sector, which may run the risk of commodifying biodiversity and taking advantage of traditional and indigenous knowledge (often with no further benefits to original knowledge holders) (Cisneros-Montemayor et al., 2019).

**There is currently a problematic lack of data across all sectors of ocean governance.** In a report on the fisheries sector, the World Wildlife Fund (WWF) reported a lack of transparency in the way that EU and other governments, and vessel operators fall short of reporting obligations both at the negotiation and implementation levels. This perpetuates the exclusion of marine stakeholders from management evaluations and negotiations, and amplifies tensions with developing state partners, many of whom have argued that traditional access rights to their fisheries are being violated by foreign fishing fleet activities (WWF, 2020).

## 5.2 Enablers

**There are a growing number of international agreements and technical guidelines** to support the sustainable and equitable use of marine resources, such as the Sustainable Development Goals (SDGs) and the United Nation's Food and Agriculture Association (FAO) Code of Conduct for Responsible Fisheries. There are international organisations such as the FAO devoted to providing legal, policy and technical advisory services to governments as well as non-governmental entities such as the World Wildlife Fund committed to advocacy at an environmental governance level (FAO, 2020).

**Regional multi-stakeholder collaborative working groups can reach and implement** environmental agreements at various levels of decision-making. These coordinating mechanisms have in recent years demonstrated their capacity to successfully harmonise policies and actions (GEF, 2018). Examples include the Benguela Current Large Marine Ecosystem which stretches from South Africa to northern Angola and sustains important artisanal and commercial fisheries. Implementing the multi-stakeholder governance structure involves three countries, multiple jurisdictions and agencies, numerous fish stocks, large-scale commercial fleets, small-scale fleets, artisanal fishers, and international private sector buyers (GEF, 2018).

**At a national level, several countries have created coordinating mechanisms** aimed at organizing their marine affairs. For example, Indonesia created the Ministry of Maritime Affairs and Fisheries and Mexico established the Intersecretarial Commission for the Sustainable Management of Seas and Coasts. These efforts bring together many government agencies under one single management authority with specific mandates, competencies, and dedicated budgets (GEF, 2018).

## 5.3 Ensuring benefits and minimising disbenefits

**Marine policy can seek to embed interventions in relevant international agreements** and aligns them with national priorities outlined in development plans on poverty reduction, social inclusion and environmental management. It is also important to ensure that there are the coordination mechanisms across government ministries to achieve this across offshore, coastal, inland and aquaculture fishery jurisdictions. This joined up approach will ensure decisions are taken at the landscape level, cover labour movement and private investment across different jurisdictions and ensure there are no gaps or negative externalities between one marine domain and another (Mohammed et al., 2018). Influencing existing and emerging policy frameworks (for example, the Convention on Biological Diversity's post-2020 global biodiversity framework) is one route to mainstreaming livelihoods as a primary concern for environmental agencies (FAO, 2020).

**To overcome the challenges of managing the large number of actors** in large multi-stakeholder systems involved in natural resource management, it is often more effective to organize smaller management groups which operate within the scales of jurisdictional decision-

making where specific issues or concerns exist. Thus, nested governance groups only handle a few tasks specific to their level of management. For example, localized issues such as agricultural run-off and marine pollution can be managed within the local ecological and jurisdictionally boundaries of the issue. At the national level, governance focuses on regulatory frameworks and enforcement of laws. Benefits such as fisheries, which are highly migratory, are governed by regional bodies, as is the case with Regional Fisheries Management Organizations.

**Strengthening regional and international initiatives is crucial to ensure effective cross-border and multi-jurisdictional governance.** In response to global concerns around illegal, unreported and unregulated fishing (IUU) the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSMA) entered into force in 2016 and needs to be implemented in ways that promote and protect artisanal fishing livelihoods (Tedsen et al., 2014, FAO, 2020). To address the risks of private sector interests in biodiversity, as is the case of marine bioprospecting, a strong focus on transparency and support for the inclusion of least-developed countries in international regulatory frameworks is crucial for achieving a more equitable distribution of benefits among private firms, coastal states, and the public at large. These benefits include revenues from pharmaceutical and industrial products, but also much broader technological knowledge and capacity, and the products themselves (e.g., medicines) (Cisneros-Montemayor et al., 2019).

**Robust and publically accessible reporting and monitoring mechanisms of fishing activities** and of the ecological and economic effects of adopted management measures are being encouraged, particularly in developed countries (FAO, 2020, WWF, 2020). National and international data collection and management systems need to include disaggregated data to account for nutrition, well-being, gender, labour standards and other dimensions beyond economic and catch-related indicators (FAO, 2020).

**Partnerships are particularly important for scaling up of local projects.** Crucial elements are collaboration and alignment between various international and regional organizations, national governments and local authorities, project implementers or community-based organizations and members of the community. Involvement of the private sector can support the replication of sustainable aquaculture and ecotourism practices. In the case of the Global Environment Facility (GEF) Small Grants Programme projects, the role of the funding organisation in institutionalising relationships between partners through regular meetings was recognised as essential in building a platform for scaling up (Chen et al., 2020).

## 6. Tenure and property rights

Access to marine and coastal ecosystem services is determined by a range of property rights, mediated by formal and informal institutions. Across intervention types, conservation regimes alter human access to and control over natural resources, and the consequences of these alterations affect wellbeing through a variety of positive and negative mechanisms (Gill et al., 2019, FAO, 2020, Townsley, 2011).

### 6.1 Barriers

**When natural resources are open access or guided by customary rights, a key problem is that resource-poor users operating in the informal economy may be unable to exclude others** from using these resources and thus have no guarantees to the benefits of any increase in ecosystem services flow (Brown et al., 2008, Mohammed et al., 2018)

**The introduction of new environmental protection regulations may exclude coastal and marine resource users** from the resources they depend on, with negative impacts on their livelihoods. Where alternatives are not easily accessible, they often continue to pursue their livelihood strategies even though they have been outlawed, rendering resource protection measures ineffective and adding increased vulnerability to their livelihoods (Townsend, 2011).

**Competition over resources within the fisheries and aquaculture sector can arise** where tenure systems are not clearly defined or not properly enforced. This is, for example, the case where large-scale and small-scale fisheries target the same fish stocks, or in areas where sectors such as tourism, urban development, port infrastructure, energy and transport are expanding. Often, fisheries and aquaculture activities are not considered and are not stakeholders consulted, despite the fact that international norms call for their inclusion in decision-making about who is granted tenure and user rights to land, water and aquatic resources, and how (FAO, 2020) (Mohammed et al., 2018).

## 6.2 Enablers

**There are several international agreements which seek to safeguard legitimate tenure rights** against transactions that could threaten the livelihoods, food security and nutrition of coastal communities. These include the Committee on Food Security's Principles for Responsible Investment in Agriculture and Food Systems, the Committee on Food Security's Voluntary Guidelines for Responsible Governance of Land, Fisheries and Forests in the Context of National Food Security and in the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (FAO, 2020).

**Weakly defined natural resources have in the past enabled the poor to gain entry** to areas or to access resources without formal rights or at relatively low cost. As aquatic resources are gaining attention in national policies for economic development and conservation of natural resources, tenure and user rights systems are being developed which can secure the activity of historical users and dependent communities, establish exclusive access to the resource and create the conditions to help avoid overfishing (FAO, 2020).

## 6.3 Ensuring benefits and minimising disbenefits

**Case studies testify to the complexity of managing resource rights equitably.** Clarity around property rights and effective processes of stakeholder engagement are key to mediating the reallocation of property rights incurred by conservation programmes. From a livelihoods perspective, Mizrahi et al. (2019) identified studies showing that placing an MPA in an area of existing tenure could generate a greater likelihood for compliance and support for the MPA. In addition, traditional tenure systems that are used as a basis for periodic closures have been shown to increase fisheries catch and avoid displacement of harvesting communities. A review of the socioeconomic benefits of MPA schemes identified cases where increased management rights led to greater income from fishing and/or tourism, but also to increased conflict with groups with restricted access. Users of the traditionally managed areas in the Diani-Kinondo area in Kenya reported that the community-managed areas supported their cultural fishing practices as well as good catch rates. However, the perpetuation of the traditional management systems also contributed to conflict between the elders who practice traditional spiritual practices and younger Muslim fishers (Gill et al., 2019)(see Section 4.3).

**Permits/Licenses may act as barriers or enablers.** In theory they can be used to protect access to resources for the poor (e.g. 'subsistence permits' for poor fishers in South Africa),

however many attempts to regulate access to ecosystem services through permits or licences may have built-in biases against the poor. These regulations may be expensive for poor people, or may be restricted to certain types of equipment or technology, and may require legal or bureaucratic procedures which entail high transaction costs or assumed knowledge of regulatory frameworks. National workshops held in Kenya identified a lack of confidence in the fairness and legitimacy of permits and licences (Brown et al., 2008).

## 7. Access to markets

Coastal and marine resources support local and intercontinental market economies. As coastal areas have progressively become more closely connected with urban and international markets, this market orientation has become stronger and patterns of exploitation are increasingly closely linked with patterns of market demand (Townsend, 2011).

### 7.1 Barriers

**Limited access to markets means that prices can be dictated by intermediary buyers** and that fishers are often forced to sell their catch below the market price. Middlemen provide access to markets and may provide security for fishers exploiting fluctuating fisheries, however they may also bond fishers to them through credit arrangements (Brown et al., 2008). These ties of dependency have often facilitated the development of exploitative relationships between market intermediaries and producers but they are deeply ingrained in many coastal and marine communities and have proved difficult to change (Townsend, 2011).

**High transport costs are a barrier for small island developing states.** This hinders trade opportunities, for many of the world's most remote islands and least developed countries (WWF, 2020). Similarly in rural coastlands, lack of means to transport fish from the landing sites situated further away from the main road where intermediaries come to buy the fish is another factor limiting the economic benefits generated by fishing resources (Brown et al., 2008).

### 7.2 Enablers

**SDG Target 14.b recognizes the importance of addressing the challenges facing small-scale fisheries** (FAO, 2020). It commits to 'provide access for small-scale artisanal fishers to marine resources and markets'. Growing awareness among consumer groups, retailers and industry is forcing change towards higher standards, for example through certification and labelling.

**Better opportunities for small-scale fishers and their products to access markets do exist.** Approaches and tools are available to overcome issues such as compliance with food safety regulations, the lack of appropriate technology, such as improved processing, information and communication technology, and low levels of organizational capacity, to ensure small-scale fisheries actors benefit fully from access to lucrative markets (FAO, 2020).

### 7.3 Ensuring benefits and minimising disbenefits

**Key tools to help provide access for small-scale fishers to marine resources** and markets include: capacity development of fishing-related workers, including for women engaged in post-harvest activities; technical assistance; and information dissemination regarding market access requirements and markets (FAO, 2020).

**Examples of supply chain approaches have been documented by the Sustainable Supply Chains for Marine Commodities (GMC) Project** (Orellana and Seager, 2020). The GMC Project contributes to the transformation of international seafood markets by mainstreaming sustainability in seafood supply chains originating in developing countries. The project uses emerging market-based tools such as seafood ecolabelling programs, international retailer corporate purchasing policies, Sustainable Marine Commodity Platforms, and Fishery Improvement Projects to integrate sustainability in fishery management and supply chain operations. The GMC programme has facilitated the introduction of artisanal fisheries to international buyers and helped them gain insights on product requirements and quality standards requested by international buyers and connections with sustainable seafood markets.

## 8. Access to technology

Finding new solutions to sustainable development involves new information, science and technologies, ranging from baseline information collection, management interventions, and design of alternative livelihoods (Chen et al., 2020). Technology constitutes an important constraint or enabler for securing livelihoods by the poor (Brown et al., 2008).

### 8.1 Barriers

**Lack of access to technology can be a barrier which disadvantages the poor.** For example, lack of access to larger, more efficient boats and fishing gear and to processing, storage, and transport facilities limits resource-poor fishers from accessing certain species and fisheries (e.g. distant or deep-sea), and from being able to conserve fish or generate more income from fishing (Brown et al., 2008).

**Conversely access to technology can create new constraints.** A case study in Kenya found that the while boat owners and those with improved gear have better access to ecosystem services, they may not be better-off as this equipment is expensive to acquire and maintain.

**The implementation of international obligations on cooperation in marine scientific research and marine technology transfer continues to lag behind,** particularly towards developing states, where small-scale fisheries feature very prominently (Morgera and Ntona, 2018).

**The transfer of fishing technologies has often led to the emergence of a dualistic structure of developing states' fisheries sectors.** Technologies which originate in the developed world characterized by greater urbanisation, centralisation, and capital intensity, support a newly-established large-scale sector (with higher catch rates) which exists in direct competition with large numbers of small-scale producers use simple technologies (Cisneros-Montemayor et al., 2019). In addition, technology transfer has brought about a shift in values, as it has often led traditional technologies and institutions to be regarded as primitive and as irrelevant for the purposes of participating in the rapidly expanding global markets for certain varieties of fish (Morgera and Ntona, 2018).

### 8.2 Enablers

**Scientific knowledge and technology perform several important functions in sustainable ocean management,** including (FAO, 2020, Gill et al., 2019):

- Spatial mapping tools

- Supporting the implementation of strategies for the sustainable management of marine resources and enhancing the productivity of fishery resources
- Improving forecasting of the location of marine species and fish stocks based on physical conditions such as current circulation, temperature and salinity. In turn, data on the probable location of fish stocks leads to improved catches and profits.
- Information and communication technologies (ICTs) are increasingly being used across the fisheries sector, from resource assessment, capture or culture to processing and commercialization. Some of these technologies are specific to fisheries (e.g. sonar for locating fish), while others are general purpose applications (e.g. Global Positioning Systems (GPS) used for navigation and location finding, mobile phones for trading, information exchange and emergencies, radio programming with fishing communities, Web-based information and networking resources)
- The replanting and restoration of damaged habitats such as mangroves and coral reefs.

### 8.3 Ensuring benefits and minimising disbenefits

**Case studies highlight that technology development/transfer which accrues benefits for resource-poor users is gradual, context-specific and embedded within relational networks** (Chen et al., 2020) (see Section 6 in the Rapid Review on ‘Marine Biodiversity and Poverty’).

**Technology diffusion should be carried out through tailoring and adaptation rather than wholesale transfer, taking into consideration recipient circumstances to ensure compatibility.** ‘Technology blending’ introduces the positive aspects of modern technologies into indigenous technologies, producing hybrids that are energy-efficient as well as economically and ecologically sustainable. This can avoid the disruptive impacts that imported technologies can have in the recipient country's small-scale fisheries sector: for instance, after the introduction of nylon nets in Brazil, fishermen could no longer afford to purchase their own equipment (bought instead by urban businessmen), which ultimately resulted in the loss of control over traditional fishing grounds (Morgera and Ntona, 2018).

**Technological appropriateness should be evaluated in accordance with a focus not only on volumes of output and income, but also on the way that those are distributed among the population.** In Sri Lanka, the newly-motorised fleet displaced traditional technologies that had developed over time to cater to different ecological niches, while contributing to unemployment and increased inequality in the distribution of wealth (Morgera and Ntona, 2018).

**Transferred technology should be appropriable by the user and not deskill its operators.** ICTs are a good example of such technologies, as they can be adapted and introduced in all but the most remote communities, with positive impacts on fishery management. For example, smartphone applications can facilitate the collection of catch data, thus promoting the sustainable setting of catch limits (Morgera and Ntona, 2018) .

## 9. Fiscal and financial instruments

Marine biodiversity interventions require extensive funds, significant investments and a variety of disbursement channels. Fiscal and financial instruments can be a barrier or an enabler of coastal livelihoods.

## 9.1 Barriers

**High levels of global fishing subsidies (estimated at US\$30–34 billion annually) have enabled many fishing fleets to exploit fisheries beyond their territorial waters.** Harmful impacts particularly in low income countries include the rapid depletion of many fish species, threats to many fishery-related jobs and decreased profit from fishing-related activities (Mohammed et al., 2018).

**Seasonal variation and climate-related disruptions contribute to livelihood insecurity.** Particularly in the short-term, reserve closures may accentuate this insecurity. However, small scale fishers often lack access to financial services.

**Blue Carbon initiatives have been criticized for limited consideration of social equity** concerns at local, national, and international scales. Blue Carbon approaches which confer payments for the maintenance of seagrass meadows, mangrove forests, and tidal salt marshes habitats equivalent to their carbon storage are being integrated into marine planning by a growing number of countries, such as Bangladesh, Senegal and the Philippines. These include lack of access to funds across countries, limited participation of local community members in project planning, implementation, and benefit sharing, and the exclusion of traditional users (Cisneros-Montemayor et al., 2019)

## 9.2 Enablers

**Fiscal reform** by local and national governments (through taxes, subsidies, ecological fiscal transfers and social protection) can be directed towards the achievement of integrated ecological, economic and social outcomes (Mohammed et al., 2018).

**There is some emerging evidence that social protection measures can be used to provide assistance to compensate for lost revenues for artisanal fishing livelihoods.** These may be community-driven, project-managed or developed as part of national social assistance frameworks (see examples in following section) (Mohammed et al., 2018, Chen et al., 2020, FAO, 2020).

## 9.3 Ensuring benefits and minimising disbenefits

**International frameworks that tackle the wide use of subsidies need to be strengthened.** At national level, governments should have clear targets to curb harmful subsidies and eventually eliminate them. The SDGs provide a strong mandate, calling on countries “by 2020, (to) prohibit certain forms of fisheries subsidies which contribute to overcapacity and over-fishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies”. Harmful subsidies can be replaced with subsidies that promote fishery resource conservation and management (FAO, 2020).

**The use of taxation reform and of ecological financial transfers (EFTs) have been proposed** as cost-effective fiscal instruments delivering both social and ecological objectives. The aim of taxation is to generate revenue to national governments from fishery industries while limiting extractive effort, by imposing additional cost to operating costs. In practice, the experience of taxation in the fisheries sector is mixed, and unattractive to many small-scale fisheries without tangible benefits. EFTs target local administrators to provide incentives for the promotion of sustainable management of marine fisheries. In order to compensate decentralized jurisdictions for the costs of providing ecological goods and services which generate spill over benefits beyond their boundaries, an environmental performance indicator is incorporated into



fiscal transfers from central governments to local or sub-national levels of the administrative hierarchy (Mohammed et al., 2018).

**Financial services can support the transition to more sustainable and responsible fishing** (FAO, 2020). The fisheries sector requires access to financial services (e.g. savings, credit and insurance) and investments to support the transition to more sustainable and responsible fishing, as well as to address climate change adaptation and mitigation. The FAO has partnered with the Asia-Pacific Rural and Agricultural Credit Association to build capacity among rural finance institutions on doing business with the fisheries sector and to increase access for small-scale fishers to microfinance, credit and insurance services. Capacity-building programmes and pilot projects are being conducted in several countries in Asia.

**Government-led social assistance as a response to marine degradation.** In Bangladesh, Mohammed et al. (2018) describe an example of a government-led dual environmental/social intervention: on one hand the government declared five sites as 'hilsa' (a type of fish whose stocks had rapidly decreased due to overfishing) sanctuaries, to prevent fishing during the reproductive season and allow fish stocks to regenerate. On the other hand, to compensate for lost earnings, the Ministry of Finance provided regular in-kind support with steady increasing amounts over an extended time period (WWF, 2020). Caveats may apply to monetary approaches, such as financial incentives, when wellbeing is also linked to non-tradable, non-material benefits from ecosystem services (Chaigneau et al., 2019).

**Co-management models can support communities to develop local financial instruments.** In an MPA in Vietnam, the local community established a revolving fund that provides financial support to the community for fishing, trading, aquaculture, ecotourism and agricultural activities. The model of a revolving fund has offered non-interest loans in the first phase, and priority is given to the persons in difficulty that have clear and potential plans with a high possibility of loan return. After the first round, low interest rates will be applied to reach more members. It should be noted that experiences of developing and managing revolving funds are still evolving and should be further explored (Chen et al., 2020).

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