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Linking poverty alleviation and nature-based solutions across small-scale fisheries, aquaculture and critical marine habitat interventions

Evidence Review for the Climate and Ocean Adaptation and Sustainable Transition (COAST) programme

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A note to the reader:

This evidence review should be read alongside the evidence review approach note which provides a detailed overview of the methodological process. The evidence review approach is available in the annexes section of the COAST monitoring, evaluation and learning strategy.

Introduction

This is the first evidence review delivered by the COAST MEL services team. The evidence reviews aim to provide robust and relevant evidence related to the COAST programme. They will facilitate informed judgement and evidence-based decision making in the implementation and adaptation of the COAST ToC, and in turn the programme, by providing a critical appraisal of evidence (and/or lack thereof). Identification of gaps in the available evidence will guide future research.

This evidence review addresses the question "What are the links between poverty alleviation and nature-based solutions, including sustainable aquaculture, small scale fisheries and marine habitat protection, sustainable management and restoration?", and seeks to address, across the three interventions areas, the sub questions:

- What is the evidence on the links between sustainable aquaculture/ small-scale fisheries/ marine habitat protection, sustainable management and restoration and poverty alleviation? How is poverty alleviated through such nature-based solutions?
- What is the evidence on the factors and strategies that contribute to simultaneously promoting sustainable aquaculture/ small-scale fisheries/ marine habitat marine habitat protection, sustainable management and restoration, gender equality and social inclusion, and poverty alleviation?
- What is the evidence for how a participatory, innovation-based process of designing, testing and adapting novel and/or alternative technologies for sustainable aquaculture/ small-scale fisheries/ marine habitat protection, sustainable management and restoration can help to achieve poverty alleviation?

Critical marine habitat protection, sustainable management and restoration

Critical marine habitats, such as mangroves, seagrass bed and coral reefs provide a range of ecosystem services and associated economic benefits to coastal communities across the world (Brooks *et al.* 2020) with estimates of over 700 million people being highly dependent on marine ecosystems (Selig *et al.* 2019).[1]

- *What is the evidence on the links between marine habitat protection, sustainable management and restoration and poverty alleviation? How is poverty alleviated through such nature-based solutions?*

There is evidence of positive links between marine habitat restoration and poverty alleviation although this is varied for different habitats. Detailed cost effectiveness measurements have not been taken to analyse the impact of nature-based solution interventions (JNCC 2021). Instead, some evidence suggests the generally positive impacts of marine habitat restoration and conservation on economies, with benefit:cost ratios of mangrove habitat conservation and restoration reaching 88:1 and 2:1 respectively (in monetary value in USD) (Konar & Ding 2020). Likewise, restoration of coastal ecosystems (mangroves, coral reefs, oyster beds and

[1] This study calculated a global dependency index based on magnitude of the benefit of the ecosystem service, the susceptibility of the human population to a loss of that benefit, and the level of substitutability of that benefit to quantify the global population that were depending on marine ecosystems through nutritional, economic and cultural factors. The majority of countries in Southeast Asia were regarded as having 'high' dependency.

saltmarshes) has demonstratable cost effectiveness in a coastal flood protection context (Seddon *et al.* 2020). In Mozambique, mangrove habitats provided flood and storm protection to local communities, as well as direct economic benefits through provision of marketable food, timber and charcoal (Machava-António *et al.* 2020).

However, the benefits seen in conservation and restoration efforts can vary depending on environmental factors such as the habitat type and country specific socio-economic nuances: restoration of seagrass meadows and coral reef habitats are typically much more costly than of mangroves (due to the greater costs associated with underwater activities), while such initiatives in developing countries are up to 30 times cheaper than in developed nations (Bayraktorov *et al.* 2016). In Indonesia, evidence suggested that costly marine spatial planning processes, developed in order to enhance marine habitat management, fail to address socio-economic factors of all stakeholders, in particular small-scale fishers, who often are not involved in management processes (Tietze *et al.* 2016; Stanford *et al.* 2013). Marine habitat restoration interventions must consider the increased impact of co-restoration (multi-species and multi-habitat seascapes) versus single element interventions in delivering socio-ecological benefits ((McAfee *et al.* 2022).

The ecosystem services of critical marine habitats are well described, but there is typically a lack of evidence of case studies that show linkages with poverty alleviation beyond food security. The evidence base suggests that poverty is alleviated through services that can include the provision of nature-based solutions to coastal protection, carbon capture and biodiversity enhancement, as well as direct provisioning services in the form of food and materials.[2]

Coastal marine habitats contribute substantially to food security both directly through the production of edible resources, and indirectly by enhancing productivity of small-scale fisheries (typically as nurseries/protective refuges for fishable biomass) and aquaculture (providing space and natural infrastructure on which to develop aquaculture operations, as well as producing feed resources for fed-aquaculture (Hutchison *et al.* 2014)). In coastal regions of Indonesia and the Philippines, mangrove forests and coral reefs provided significant contributions to food security for coastal communities (Ickowitz *et al.* 2023; Cabral & Geronimo 2018).

Evidence shows that conservation and restoration initiatives have been the focus of major interventions across the globe which have attempted to assess impacts on local communities and level of contribution to poverty alleviation of these interventions (Abelson *et al.* 2020). For example, effectively designed and implemented Marine Protected Areas (MPAs) have shown positive impacts on poverty reduction in coastal communities (Fox *et al.* 2012), but importance is placed on the nature of what constitutes effective design and management.

- *What is the evidence on the factors and strategies that contribute to simultaneously promoting marine habitat protection, sustainable management and restoration , gender equality and social inclusion, and poverty alleviation?*

There is some evidence that an integrated approach to marine habitat conservation and restoration, where stakeholder socioeconomics are balanced with environmental aspects, results in more efficient engagement with conservation and habitat protection interventions, for example in marine protected areas (Gurney 2014; O'Connor *et al.* 2024). Typically, marginalised and poor communities put the lowest burden on the environment but gain the least from the ecosystem services (Plagerson 2020). An inclusive approach, which empowers local

[2] See the Common International Classification of Ecosystem Services for further details on how ecosystem services are formally classified and described (https://cices.eu/)

stakeholders to manage and monitor (often described as community-based management), can ensure greater understanding and compliance within communities, contributing positively to habitat protection. This intervention has demonstrated success in improving local fish biodiversity, while at the same time improving local economies by producing a higher fishable biomass in the Philippines (Marriot *et al*. 2021).

The carbon sequestration capacities of mangrove habitats offer one such example of a payment for ecosystem services (PES) initiative, where **blue credits/carbon credits have been highlighted as a potential source income for local communities and poverty alleviation strategy** (Hejnowicz *et al.* 2015). Successful carbon credit schemes have been implemented in Kenyan mangrove habitats, with local communities increasing their annual revenues as a result of credit sales, and subsequent impacts on community health, sanitation and education (Kairo *et al*. 2018). Such initiatives highlight how communities can be empowered, and ecosystem services monetised to improve local economies and reduce poverty. However, this is one of few examples of successfully implemented blue carbon credit schemes, which are typically limited by a lack of accurate cost effectiveness assessments (Williamson & Gattuso 2022), and thus determining contributions to poverty alleviation remain to be comprehensively validated.

- *What is the evidence for how a participatory, innovation-based process of designing, testing and adapting novel and/or alternative technologies for marine habitat protection, sustainable management and restoration can help to achieve poverty alleviation?*

Marine habitat restoration can help alleviate poverty through different aspects, notably through capacity and knowledge building, providing purpose and/or autonomy, direct ecosystem services provision (food, coastal protection) and increasingly, alternative livelihoods (eco-tourism) (Seddon 2022, Woroniecki *et al.* 2023). **There is considerable evidence on the roles these ecosystems play in ecosystem service provision that benefit society, especially in the context of climate change (coastal protection), biodiversity (ecosystem health) and food security (fisheries).**[3] With regard to restoration, currently most studies focus on local communities planting mangrove and/or seagrass and coral fragments, with restoration contributing to both ecological enhancement as well as social benefits from awareness to long-term indirect economic values (Hein *et al.* 2021, Shaver *et al.* 2021). Increasingly, innovative solutions to scale-up restoration efforts have emerged, for example the use of robots for planting seagrass[4] (Shahria, 2019; Nguyen 2024); and ex-situ grow-out of coral larvae for transplanting into reef systems[5]. **New mangrove restoration initiatives have demonstrated the ability to provide new sources of income and livelihoods** (Debrot *et al.* 2020).

Connections between marine habitat restoration, sustainable management and conservation and socio-economic impacts for local people exist but vary in context (Plagerson, 2020). Interventions in critical marine habitats, like aquaculture and agriculture, requires enabling ecosystem conditions and technical knowledge, and as such, interventions and policy development must take into account biophysical as well as socio-economic considerations (Verma & Neghandi 2022). With the acceleration of approaches that are focused on social values and benefits, there is increasing focus on inclusion and equity with regard to knowledge exchange and co-production in the planning, design, delivery and continuity of marine

[3] See www.mangrove alliance.org, www.coralbreakthrough.org, www.dugongseagrass.org
[4] See www.futurescot.com/robot
[5] See www.coralvita.co

conservation, sustainable management and restoration projects (O'Conner *et al.* 2024, Ortega-Alvarez *et al.* 2022, Claudet, 2024, Ardoin *et al.* 2023).

Interventions in critical marine habitats generally also take time, and the benefits can also be difficult to elaborate (Xu & Liu 2022), meaning that economic benefits are not always immediate or direct. Participation by local stakeholders in restoration projects in the Philippines for example was largely driven by short term financial incentives, but long-term engagement was attributed to greater livelihood sustainability, effective governance and improved social capital (Grigorio *et al.* 2020). This **long-term engagement and participatory approach to restoration has demonstrated impacts simultaneously on poverty and habitat improvement** (Valenzuela *et al.* 2020), which has been shown to be possible through greater subnational government representation at a governance level and through improved monitoring and evaluation of interventions (Sasmito *et al.* 2023). Efforts to reduce poverty can remove management barriers faced by local stakeholders, thus increasing empowerment and local representation (Gardner *et al.* 2020).

Sustainable aquaculture

- *What is the evidence on the links between sustainable aquaculture and poverty alleviation? How is poverty alleviated through such nature-based solutions?*

Evidence shows that although relationships between **poverty alleviation and sustainable aquaculture[6] are generally positive, the relationship can be complex and dependent on several variables.** Income generation and economic opportunities (employment, value chain and local economy development) can be enhanced through sustainable aquaculture, most notably through scaling, commercialization and technological development.

While small scale aquaculture plays an important role in contributions to economic opportunities, **advanced technology, commercialisation and increased scale are generally regarded as more impactful in terms of poverty alleviation.** Typically, commercially oriented aquaculture has been shown to generate much larger employment networks (longer supply chains and diversity of roles) than subsistence aquaculture (Little *et al.* 2012)[7]. Interventions in aquaculture across pilot case studies (notably including Vietnam) demonstrated how aquaculture productivity can be increased through technological development, establishment of aquaculture extension services and increasing seed availability. Additionally, improved microfinancing and diversification of aquaculture activities proved to enhance farmer incomes (Upare, 2017).

In Nigeria and Vietnam, commercial aquaculture was shown to generate significant increases in domestic and export revenue respectively and contributing to GDP (although the level of analysis contributed to variability in these findings) (Béné *et al.* 2016). In Bangladesh, intensification and commercialization of finfish aquaculture resulted in rapid increases in production over a 10-year period, and a corresponding increase in employment opportunities (Bunting *et al.* 2023). Adoption of new technology was identified as an important aspect of aquaculture development: Amankwah *et al.* (2018) demonstrated that, after controlling for all

[6] Sustainable aquaculture relates to the production of aquatic foods and other useful products in a manner that balances economic feasibility with socio-environmental considerations, aligning with the UN Nations Brundtland Commission definition. Aquaculture typically enhances food production rates and food security, as it allows for improved control and consistency of production rates and removal of variables such as seasonality which can impact production levels.

[7] However, any benefits of the increased supply chain length need to be balanced with reduction in value to the first producers – this clearly would impact the distribution of poverty alleviation but has not been well elaborated.

variables, use of improved fish feeds in aquaculture operations had direct income increasing and poverty reduction effects on households in Kenya.

Evidence also suggests that sustainable aquaculture can contribute to poverty alleviation through the provision of an affordable and secure supply of nutritious food, providing more affordable fish particularly for people in moderate to extreme poverty (Béné *et al.* 2016; Bunting *et al.* 2023). Typically, its consistency and reliability stems from the greater control over external factors afforded to aquaculture operations, and thus offer a viable option for food security under changing climatic conditions (Gaines *et al.* 2019). Additionally, aquaculture can offer an alternative to offset against losses in capture fisheries, as has been demonstrated in some studies in Bangladesh (Toufique & Belton 2014). Konar & Ding (2020) demonstrated that, as part of wider initiatives to increase sustainable ocean sourced protein, increases in maricultured foods produced benefits up to 10 times the associated costs. Interventions need, of course, to consider the potential negative impacts of scaling and developing aquaculture and maintain balance in the environmental-economic-social sustainability nexus, but evidence suggests that aquaculture is not a zero-sum game (in relation to environmental, ecological and social trade-offs) (Garlock *et al.* 2024) and can and is conducted in ways that are synergistic with nature (le Gouvello *et al.* 2022).

- *What is the evidence on the factors and strategies that contribute to simultaneously promoting sustainable aquaculture, gender equality and social inclusion, and poverty alleviation?*

Aquaculture has historically empowered typically marginalised communities where technologies often developed through the adoption by indigenous peoples, helping to meet demands for fish whenever supply from natural ecosystems waned (Costa-Pierce, 2022). While aquaculture has developed rapidly throughout the world, Little *et al.* (2012) reported that due to aquaculture's typically 'technocentric focus', development has typically favoured those with the initial investment capacities. Similarly, it was shown that although development of aquaculture was positively correlated with poverty alleviation in Vietnam (Nguyen *et al.* 2016),[8] these findings indicate a minimum poverty threshold level, below which the positive impacts of developing aquaculture are not relevant. Furthermore, in countries where aquaculture has not been well developed (where it is still perceived as a 'novel' technology), barriers remain in its ability to alleviate poverty due to a lack of economic equity – in Kenya, farmers have difficulty in accessing credit loans from banks due to perceived risks in aquaculture (Aloo *et al.* 2017).

Aquaculture's contribution to gender equity and diversity inclusion and the link with poverty alleviation has not been well elaborated. For example, in seaweed supply chains, despite reports that women often make up the majority of the labour force (especially in the direct cultivation and harvesting sectors), there are little to no reliable figures on female labour force participation, making the development of gender-informed policies an ongoing challenge (UNCTAD 2024). Considering the significant contributions of women to the aquaculture labour force (estimates of up to 42% and 80% in Indonesia and Vietnam respectively (Tietze *et al.* 2016) for example), equitable development remains highly important – improved education, greater economic and governance level empowerment, increased financing and improved community cohesion through the establishment of farming cooperatives have been shown to enhance

[8] The correlations were non-significant for those people who were living below the $1.00 per day poverty line, suggesting that at least some level of non-poverty is required before finfish aquaculture can begin to alleviate poverty; this paper utilised the World Bank poverty line figure available at the time of publication.

female opportunities in seaweed supply chains (UNCTAD 2024). However, establishing **links between GESI and sustainable aquaculture and poverty alleviation impacts vary significantly based on a number of variables including the diversity and type of aquaculture production method, the location, the species farmed and the multidimensional nature of poverty** (Bunting *et al.* 2023; Béné *et al.* 2016; Little *et al.* 2012; Nguyen *et al.* 2016). A clear data gap exists in terms of the understanding of disability in the aquaculture sector, particularly in terms of the COAST target countries, and the link with poverty alleviation: results from Scotland indicate that stakeholders generally were not aware of any aquaculture specific frameworks targeted at people with disabilities (Kelling & Lawan, 2023).

- *What is the evidence for how a participatory, innovation-based process of designing, testing and adapting novel and/or alternative technologies for sustainable aquaculture can help to achieve poverty alleviation?*

Innovation based approaches have been seen in non-fish aquaculture, such as seaweed farming, which offers potential contributions to food security, typically offering a low-cost source of nutrients when consumed directly and through by-product extraction (Sultana *et al.* 2023). These approaches offer future opportunities for aquaculture development and may promote further prosperity, particularly in coastal communities. In Indonesia and the Philippines, the world's 2nd and 4th largest seaweed producers (by volume) (FAO 2022), seaweed production has proven to be an alternative, sustainable source of income for coastal communities (Sultana *et al.* 2023). With seaweed farming projected to grow rapidly as demand increases, low cost and low technology production methods may allow small scale producers continued access to lucrative markets (Sultana *et al.* 2023). **Details around participatory approaches have not been well elaborated.**

Small scale fisheries

- *What is the evidence on the links between small-scale fisheries and poverty alleviation? How is poverty alleviated through such nature-based solutions?*

Across the world, it is estimated that over 60 million people are directly engaged in small scale fishing (FAO 2022). However, similar to aquaculture, **the links between small scale fisheries and poverty alleviation are also complex.** One layer of complexity is the definition of small-scale fisheries (often reported as artisanal fishing), which typically involves households and small communities engaging in relatively low catch volumes, with few advanced technological inputs, typically for local consumption (Tietze *et al.* 2016), but this definition can vary across countries. In Myanmar's *hilsa* fisheries, a typical example of artisanal fishing, fishers are often economically poor, lack formal education and come from large households with many dependents (Porras *et al.* 2017). Béné *et al.* (2016) notes further complexity in linking poverty alleviation and small-scale fisheries due to a lack of clarity on impacts at the household level, which Martuscelli (2022) looked to elucidate, finding that, with improved food security and nutrition indicators, fishing households in some countries have a lower probability of being below the poverty line than non-fishing communities.[9]

Evidence shows a link between small scale fisheries and alleviation of poverty through improved income generation and economic opportunities (employment, value chain and local economy

[9] These findings were dependent on the geographical context: in Vietnam for example, no significant linkage was found.

development). Small scale fishing is often one source of income for households who cannot rely on a singular source of income, and the target stocks often suffer directly from negative impacts associated with environmental changes and overfishing. To alleviate these impacts, models of economically optimal harvest rates (where the catch rates are managed from the point of view of ensuring long term sustainability, i.e. maximising economic returns while maintaining stocks at sustainable levels) showed positive correlations with increased landings and profits across several regions (including Vietnam, Thailand and the Philippines) (Costello *et al.* 2016). Reducing the 'race to fish' supported better quality produce and improved marketing which can enhance incomes. The former also highlights the importance of entire value chains considerations, as post-harvest fish loss and waste greatly impacts income rates (Kruijsen 2020). The 'race to fish' needs also to be considered from an ethical and socio-economic point of view (as both impact poverty), with reports of labour abuses in the seafood sector adding further to the socio-economic effects of fisheries (Clark & Longo, 2022; Tickler *et al.* 2018).

Small scale fisheries contribute to alleviation of poverty by providing a source of nutrient rich food, without which many people would face consequences of ill health and disease (FAO, Duke University & WorldFish (2023)). In the Philippines, food and water security were closely linked with poverty levels in fishing households – these communities were typically not economically self-sufficient, and when their financial capacities were limited, their market trading abilities waned, resulting in decreased food security (Fabinyi 2017).

- *What is the evidence on the factors and strategies that contribute to simultaneously promoting small-scale fisheries, gender equality and social inclusion, and poverty alleviation?*

Small scale fisheries play an important role in supporting social capital by contributing to well-being within communities through reciprocal arrangements and collective action (Béné *et al.* 2016). Similarly, inclusion of multiple stakeholders in the decision-making process (through fisheries co-management), greatly enhances positive social and economic outcomes from small scale fisheries (d'Armengol *et al.* 2018). From a gender equity perspective, small scale fisheries intervention projects have highlighted the particularly important role of women, and that sufficient quantification and recognition of their roles had profound implications on the degree of success in fisheries management, poverty alleviation and development (Tietze *et al.* 2016). Harper *et al.* (2020) evaluated that while women made up around 11% of participants in global small-scale fisheries, data collection methodologies were often gender-blind and sparse in relation to the exact role of women. The sparsity also comes from the fact that many of the roles women take up in the fisheries value chain (typically post-harvest processing and sales) are unpaid, informal, part-time and/or considered a part of their traditional household roles, and thus precise contributions remain unknown. Accurate sex-disaggregated data can enhance our understanding of value chain dynamics, for example in cases of post-harvest loss, which is known, to some extent, to impact stakeholders disproportionately (Kruijsen 2020).

Many small-scale fisheries operate in regions where infrastructure is limited and government accountability and regulations are weak (Cohen *et al.* 2019), meaning that the potential impact of improvements in small-scale fishing and related supply chains on poverty alleviation are threatened (FAO *et al.* 2023). Furthermore, evidence suggests that while policy and development initiatives are often centred on increasing production rates and volumes, **nutrition sensitive approaches are equally important due to the nutrition-health-poverty nexus** (Thilsted *et al.* 2016). While information is limited, there is a clear need to ensure social protection frameworks

for small scale fisheries stakeholders with health vulnerabilities such as disabilities which can compound often existing socio-economic vulnerabilities (Béné *et al.* 2015). Disability can not only directly impact the ability of fishers to meet the physical demands of their livelihoods but has knock on impacts on poverty and quality of life (Müller *et al.* 2017).

- *What is the evidence for how a participatory, innovation-based process of designing, testing and adapting novel and/or alternative technologies for small-scale fisheries can help to achieve poverty alleviation?*

Adaptive co-management and community engagement have been shown to be imperative to successful achievement of project interventions, for example in Indonesia (Stacey *et al.* 2021). While in some cases fishers have perceived co-management initiatives as being more equitable than not (Ruano-Chamorro *et al.* 2023), unequitable distribution of support mechanisms (fisheries subsidies) between large scale, commercial and artisanal fisheries (Schuhbauer *et al.* 2017) exemplifies further the challenges that small-scale fisheries face. Similarly, uneven distribution of benefits from policy interventions across communities in South Africa further highlights the need for multi-stakeholder considerations to maximise poverty alleviation in small scale fishing communities (Sowman 2014). Small-scale/artisanal fisheries communities, with typically high levels of fishing dependency, stand to be the most heavily impacted by changing environments as result of high rates of stock decline and decreased fishing revenues (Gaines *et al.* 2019; Lam *et al.* 2016). As such, the importance of equitable, adaptive management of fisheries is shown.

Results and conclusions

Lessons from this evidence review

Overall, the evidence reviewed indicates strong links between poverty alleviation and interventions across sustainable aquaculture, small scale fisheries and critical marine habitats respectively.[10] However, the overall body of evidence received a medium score as most of the literature reviewed was from a more global level, or from outside the target countries. As such, the nuances of each target region would need to be considered with the addition of more contextual evidence in order to draw specific, target country-level conclusions. Despite this, key lessons emerge from the review, including:

- The need to **carefully consider how the benefits associated with an intervention are equitably distributed among stakeholders** – as demonstrated by Farmery *et al.* (2021), simply increasing production rates does not automatically equate to poverty alleviation: access to, affordability, distribution and utilization of resources, and the associated benefits, are equally important considerations. Sowman (2014) showed how uneven distribution of benefits negatively impacted stakeholder engagement with policies that had been aimed to alleviate poverty. In seaweed supply chains, the issue of unequitable distribution of benefits, particularly between men and women, persists (Sultana *et al.* 2023; UNCTD 2024). A clear lack of data related to disability inclusion in small scale fisheries, aquaculture and coastal habitat restoration and conservation greatly limits our understanding.

[10] See Annex 1 for the strength of evidence assessment breakdown.

- The **importance of an engaging, multistakeholder approach to interventions, and consideration of the 'seascape connectivity'**[11] (the connectiveness of different socio-economic and environmental elements across the land-sea interface) (Barbier 2017) when deciding on effective interventions, and that **inclusionary approaches should incorporate interests of multiple stakeholders, and the potential impacts an intervention would have on poverty alleviation**. Adaptive co-management and multistakeholder approaches were highlighted in Stacey *et al.* (2021) and d'Armengol *et al.* (2018), supporting the use of technical intervention strategies such as the Sustainable Livelihood Approach (Ferrol-Schulte *et al.* 2013) and the need to implicate wider socio-economic considerations in the field of seascape ecology (Pittman *et al.* 2021).

Further considerations

While links can be drawn between poverty alleviation and critical marine habitat interventions, aquaculture and small-scale fisheries, several variables cloud our full understanding of these connections. An important consideration is whether developments are part of an imminent system (emerging due to demand) or an interventionist approach (where external agencies support a particular initiative) (Béné *et al.* 2016). Spatio-temporal timeframe is also an important consideration - in Bangladesh for example, initial economic benefits experienced by local communities waned 10 years post establishment of an MPA related intervention (Gurney *et al.* 2014). Moreover, given the drive to develop 'nature-based solutions' to many of today's climate and food security problems, the immediate costs associated with implementing 'alternative' practices potentially outweigh the benefits when operationalised (see for example Burcham *et al.* 2020). A detailed argument on semantics was beyond the scope of this review, but the evidence highlights how clear definitions (for example in defining 'poverty', or in categorising 'aquaculture' and its many potential types) can influence the outcome of intervention assessments.

[11] See https://www.oxfordseascapeecologylab.com

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Annex 1 – Strength of evidence table

Thematic Area	Principle of quality score (average)	Number of articles	Justification	Body of evidence score	Justification	Consistency of the evidence	Justification	Context	Justification	Overall Strength of Evidence	Justification
Sustainable aquaculture	10.9	17	The reviewed evidence, on average, scored high in terms of its overall quality	High	Scored between 9-14 on average	Consistent	Generally, the evidence pointed towards similar outcomes across the studies	Global	Majority (15/17) of reviewed evidence is not specific to the target locations	Medium	While evidence quality and consistency are high, a larger body of evidence, specific to the target regions, is required
Small scale fisheries	10.4	19	The reviewed evidence, on average, scored high in terms of its overall quality	High	Scored between 9-14 on average	Consistent	Generally, the evidence pointed towards similar outcomes across the studies need	Global	Majority (16/19) of reviewed evidence is not specific to the target locations	Medium	While evidence quality and consistency are high, a larger body of evidence, specific to the target regions, is required
Critical marine habitats – restoration, conservation and sustainable management	10.0	21	The reviewed evidence, on average, scored high in terms of its overall quality	High	Scored between 9-14 on average	Consistent	Generally, the evidence pointed towards similar outcomes across the studies	Global	Majority (15/21) of reviewed evidence is not specific to the target locations	Medium	While evidence quality and consistency are high, a larger body of evidence, specific to the target regions, is required

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