

Strategies, technologies, and social solutions to manage bycatch in a tropical Large Marine Ecosystem Fishery (4LME)

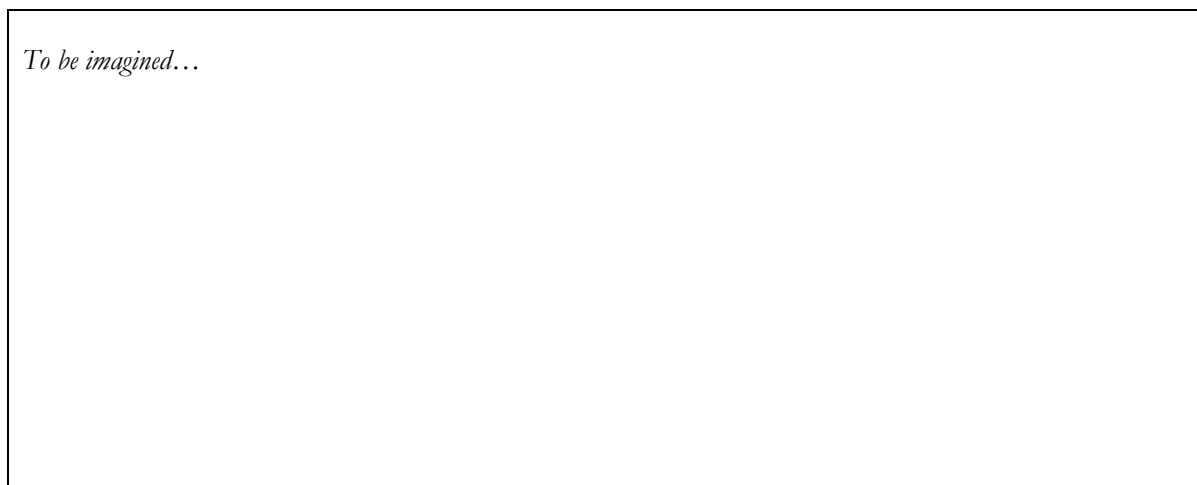
[This is an illustrative international waters PIF prepared for fisheries in an imaginary marine region loosely based on parts of the Caribbean, in order to illustrate the types of information and detail that is expected in a convincing GEF-8 PIF. It should NOT be used as a simple template for other projects, nor is it all necessarily fully internally consistent. (It is also NOT a reliable source of real data for the region!)]

PROJECT SUMMARY

Provide a summary description of the project, including (i) what is the problem and issues to be addressed. (ii) what are the project objectives, and if the project is intended to be transformative, how will this be achieved? (iii) how this will be achieved (approach to deliver on objectives), and (iv) what are the GEBs and/or adaptation benefits and other key expected results. The purpose of the summary is to provide a short, coherent summary for readers. The explanation and justification of the project should be in section B "project description". (max. 250 words, approximately 1/2 page)

The 4-country Large Marine Ecosystem (4LME) region supports an important fishing industry as well as unique marine biodiversity, which, along with tourism, supports coastal population livelihoods on these Small Island states. Unsustainable fishing practices are rapidly reducing the productivity of the 4LME fishery, and disrupting the marine ecosystems, yet the region faces the need to handle rising demand for fish products as well as the uncertain impacts of climate change. High levels of bycatch result in low fishing efficiency as well as damage to the resilience of the marine ecosystems, including their ability to cope with climate change impacts. This project will reduce bycatch and discards by at least 50% in four key countries by introducing and promoting the adoption of new technologies and methods, through improved policies and governance, planning, data, monitoring, enforcement, capacity, knowledge, and incentives for enduring adoption by key stakeholders. The project will also promote development of alternative livelihoods, including for women involved in the fishing value chain, so that the outcomes are robust in the face of climate change impacts on fisheries. Target outcomes are conservation of marine biodiversity, more fisheries under sustainable practices, and socio-economic benefits for local communities. The project aligns with GEF's International Waters objectives, aiming to deliver >0.5m ha of marine habitat under improved management across 2 shared international water basins, reduce fisheries overexploitation by 37,000 tons, and benefit around 9,300 people (a third female).

Figure 1: A map of the 4LME region



A concise summary for public use...

...with a brief list of the main target benefits

Clearly shows the proposed project site within the context of the larger area (country or region)

PROJECT RATIONALE

Briefly describe the current situation: the global environmental problems and/or climate vulnerabilities that the project will address, the key elements of the system, and underlying drivers of environmental change in the project context, such as population growth, economic development, climate change, sociocultural and political factors, including conflicts, or technological changes. Describe the objective of the project, and the justification for it. (Approximately 3-5 pages).

Global environmental significance of the 4LME

The Large Marine Ecosystem region based around these 4 countries (4LME) covers 4.4 million km², bordered by 26 Sovereign States and 18 Overseas Territories. The 4LME region is one of the most geopolitically diverse and complex LMEs in the world and supports exceptionally high levels of unique marine biodiversity including Endangered, Threatened and Protected (ETP) species, e.g., sharks, rays, turtles, marine mammals, and seabirds, as well as globally important ecological processes. It contains ~10% of the world's coral reefs, 20% of the remaining mangrove forests and up to half the world's seagrass beds.¹ Mangrove forests, seagrass beds and salt marshes provide nursery grounds for regionally and globally important fish stocks and globally contribute almost 50% of the total organic carbon buried in ocean sediments, known as 'blue carbon.'² The continental shelf and pelagic ecosystems are also recognized to be vital for continued fisheries and for marine biodiversity of significance at a global scale.³

Social-ecological systems description: the fisheries sector in the 4LME region

The 4LME region supports industrial, small-scale, and recreational fisheries, which, with tourism, are the main source of livelihoods for coastal populations. Fisheries are a key economic driver for the region and provide food security and nutrition, livelihoods, and income. Capture fisheries employ >900,000 people, with another 3 million jobs in ancillary activities such as processing, net-making, and boat building⁴. This regional fishing industry is generally regarded as male-dominated; however, a more gender-balanced picture emerges if postharvest (e.g., fish processing and trade) and ancillary activities (e.g., supplying fishing inputs and credits) are included, though sex-disaggregated data are limited.⁵

The economic and social importance of fisheries, and the need for sustainable fisheries, is recognized in many regional and national policies and plans and highlighted in the 10-year Strategic Action Programme (2015-2025) for the 4LME region.⁶ The region reported total fishery catches of 890,500 tonnes of fish in 2014 worth approximately US\$ 2 billion annually;⁷ however, these figures underestimate the true importance of significant, but under-reported, small-scale artisanal fisheries (SSF) in the 4LME countries, and subsistence consumption. SIDS are known to be highly dependent on fish for food, with annual individual per capita consumption rates twice the world average.⁸ The fisheries of greatest importance are offshore pelagics, reef fishes, lobster, conch, shrimps, continental shelf demersal fishes, deep slope, and bank fishes and coastal pelagics.⁹ Demersal fish and shrimp are the main fishery resources in coastal waters and on the continental shelf. Coastal shrimp and groundfish fisheries are particularly important for livelihoods and food security¹⁰ and can be an important source of foreign exchange for many tropical and sub-tropical developing countries.

Livelihoods dependent upon tropical fisheries are increasingly threatened by multiple factors: overfishing, habitat degradation, pollution, sedimentation, invasive species, as well as various physical and biogeochemical responses to climate change, including warming, sea-level rise, deoxygenation, acidification and altered nutrient concentrations.¹¹ Some 55 percent of the commercially harvested fisheries stocks in the region are already overexploited or depleted and some 40 percent of the stocks are fully exploited.¹²

A variety of fishing techniques are typically used in small-scale operations to catch a range of species including barriers or corrals, longlines, and gillnets, whereas industrial fisheries use lines and large traps to harvest lutjanids and carangids and trawling to harvest shrimp on the continental shelf,¹³ all of which can result in significant bycatch. In general, fishing methods and gears are not 100% efficient and bycatch is a

What is the global and regional significance of this system for people and nature? Give sources briefly

What is the general problem to address? Show it is in GEF's mandate

pervasive problem globally that results in significant losses in biomass and biodiversity.¹⁴ Fishers discard catch in response to numerous and continuously changing factors, including market conditions (low or no economic value), regulations (e.g., quota or size restrictions) and the quality of the catch.¹⁵ Globally, discards have declined in recent years due to (i) the use of more selective fishing gear and methods that avoid the capture of unwanted species and sizes; (ii) increased retention of catches that had previously been discarded due to changes in market demand (e.g., species now used as feed by the aquaculture sector), and due to discard bans where effective; (iii) reduced effort by fisheries with relatively high discard rates; and (iv) reduced abundance of species that are discarded;¹⁶ however, discards remain a significant problem in the 4LME.

Key System Drivers

Several trends will continue to exacerbate the pressure on fisheries, the natural ecosystem, and local livelihoods in the 4LME region for the foreseeable future. Demand for fish and fish products (for human consumption and for animal feed and aquaculture sectors, as well as for non-food uses such as pharmaceuticals) continues to grow globally, regionally, and locally, creating an increasing demand for a limited resource; demand is also fueled by government policies and incentives that encourage investment in too many boats. Reduced fish stock often leads to an increased fishing effort and decreasing catches. This, compounded by increasing costs of fishing operations, threatens the long-term viability of these fisheries and the social and economic conditions of coastal fishery dependent communities. Technological developments, such as improved engines, haulers, more efficient fishing gears, fish location equipment, combined with increasing costs of fishing operations, also encourage short-term gains at the cost of long-term losses. Capture fisheries production in the Caribbean has been growing by as much as 9% per year, and already a third of fish is imported. Demand could rise by anything from 5-50% in the coming decade.

In addition, as the 4LME region rebounds from the COVID-19 epidemic, coastal tourism and development is expected to increase, with further impacts on fisheries and biodiversity: habitat destruction can destroy or degrade important fish habitats, and coastal development often results in increased land-based sources of marine pollution such as sewage and agricultural runoff which can harm fish populations and other marine life. Tourism, at 32 million visits in the Caribbean in 2019 (and 14% regional GDP) and a major (potentially premium) consumer of local fish, is projected to grow by 5.5% annually to 2032, resulting in >900,000 new jobs, with consequent coastal development, coastal conflict with fishers, as well as demand for fish. Critically, climate change is also expected to negatively impact fisheries, biodiversity, and local livelihoods in the 4LME region through inevitable ocean warming, acidification, sea level rise and increased extreme weather events such as hurricanes.¹⁷ Given global projections of between 1.5-3°C warming, climate change is expected to cause 0.3-1 m of sea level rise in the Caribbean by 2050, a 2-6x increase in the likelihood of extreme hurricane rainfall (though no clear change in mean number of hurricanes overall), a drying trend in rainfall, and return times for marine heat wave events have already declined from 377 to 199 days in the past 30 years, and may halve again by 2040.

Baseline understanding and projects

The 4 countries were selected for this project through discussions with national stakeholders, due to their inadequate conservation measures to protect from illegal, unreported, and unregulated (IUU) fishing activities and bycatch of protected marine life,¹⁸ along with commonalities in fishing methods and target species, and their incorporation in a widely agreed Strategic Action Plan (4LME SAP) for the region.

Each country has participated in relevant national and regional-level GEF and non-GEF funded projects and initiatives aimed at promoting sustainable fisheries, including those supported by the Western Central Atlantic Fishery Commission (WECAFC) and the Caribbean Regional Fisheries Mechanism (CRFM). They also have participated in several prior FAO initiatives and other GEF-funded projects: *Sustainable*

Identify
key
system
drivers
and their
potential
future
trends

Management of Bycatch in Latin America and Caribbean Trawl Fisheries, the FAO *Blue Growth Programme for Sustainable Fisheries and Aquaculture*, the UNEP PROCARIBE+ project and the CAF-FAO-GEF blue economy project. Despite the incremental successes of past projects, terminal evaluations have identified several outstanding needs, for:

- 1) technology transfer between countries and fisheries to be extended across gear types and scaled up across the region;
- 2) addressing other trawl impacts apart from bycatch (e.g., impact on benthic habitats) as well as ghost fishing, and fundamental differences between small-scale and large-scale trawl fisheries in the design of bycatch reduction strategies and other management measures;
- 3) additional efforts to spur behavioral change and innovation; and
- 4) a greater focus on gender, livelihoods, private sector engagement/co-management, incentives, and fishery certification that is appropriate for national and regional contexts.

Previous projects also lacked specific linkages with biodiversity goals; and, although they provided models of how to successfully strengthen fisherfolk organizations to effectively participate in decision-making and management processes, these fishing communities, including their postharvest workers, need connecting across countries and regions.


At the national level, each participating country differs with regards to the adoption of bycatch management, discard mitigation and ‘Abandoned, Lost, Discarded Fishing Gear’ (ALDFG) measures and the degree of governance and institutional development necessary for the successful management of bycatch in their fisheries.

In terms of research and testing of bycatch, discard and ALDFG measures, **Country1** has conducted studies to quantify and characterize bycatch in various fish and shrimp trawling fleets, reduce bycatch through the development of Turtle Excluding Devices (TEDs) and Bycatch Reduction Devices (BRDs) and has participated in experiments related to the utilization of bycatch. **Country2** has successfully tested the use of square mesh paneling to facilitate the release of unwanted bycatch, including juveniles, on the double-rigged non-artisanal trawlers, and there are plans to incorporate the mandatory use of BRD in all non-artisanal trawlers in existing regulations. Discussions were held between **Country2**, NOAA, ASU and Ecolibrium Inc. to develop leatherback bycatch reduction solutions that will also benefit fisherfolk.


In terms of ALDFG, measures to date in the 4LME are largely focused on prohibiting certain gears, such as the use of monofilament nets in most fisheries since these are notorious for causing ghost fishing when lost in the environment. **Country2** has a draft Fisheries Management Plan including a proposal to ban monofilament bottom-set gillnets in hard-substrates, and its Fisheries Management Bill 2020 allows regulations to be drafted to address registration, identification, use and management of fishing gear, including retrieval of lost fishing gear. A more detailed baseline study on the extent to which bycatch management, discard reduction and measures to mitigate ALDFG have been addressed in the four participating target countries will be undertaken during the PPG phase and will consider lessons learned from the NORAD-funded FAO GLoLitter Partnerships (GLP) program.

With regards to monitoring, control, and surveillance (MCS) and enforcement measures, including for bycatch management, efforts are generally weak in all 4LME countries of the and require additional expertise for inspections (at sea and in port) on industrial vessels (inspection of trawl gear, longlines, engine capacity, etc.). **Country1** has developed a National Strategy and Road Map to implement provisions of PSMA and other complementary international instruments and mechanisms to combat IUU fishing but lacks sufficient resources to effectively implement it.

Currently, few incentives exist to encourage adoption of bycatch mitigation measures in any of the target countries and certification of sustainable fisheries is uncommon. However, the trawl fishery for Atlantic



Lessons learned from past projects, and challenges remaining



Country baseline information

seabob shrimp has been MSC certified in **Country1** since 2011 and recently a Fishery Improvement Programme (FIP) was launched for the gillnet and trawl fishery on groundfish. Other approaches include the exemption of Value Added Tax on TEDs, which are mandatory in the non-artisanal trawl fishery, in **Country2** and this has been expanded to other BRDs, such as circle hooks and other devices proven to minimize bycatch. In **Country3**, there has been less private sector engagement in the fisheries sector; however, there is a commitment to move towards MSC certification for the seabob trawl industry. Finally, an assessment was conducted by FAO in **Country4** regarding the engagement of the private sector in developing the Pelagic fishery to ensure greater economic social and environmental benefits.

Baseline futures

Under a ‘business as usual’ scenario, unsustainable levels of bycatch and discards will continue to occur in those fisheries which have not adequately addressed mitigation, with continued loss and degradation of marine biodiversity and habitats, contributing to the overall decline of 4LME fisheries with negative consequences for people and nature, and low resilience in the face of climate change. Investments by national governments in fisheries will continue to be directed towards maintaining core functions with *ad hoc*, non-strategic projects used to fill urgent gaps, but will not be sufficient to address the overarching and long-term needs of the fisheries and the people who depend on this sector for their livelihoods. Private sector investment will continue to be limited due to high perceived costs and low benefits of new fishing techniques. Without full understanding of and access to technologies and practices to minimize bycatch and discards as well as economic incentives to adopt them, fisherfolk organizations and institutions will continue existing practices, contributing to a precipitous decline in fisheries as a source of income and protein.

The rate and nature of deterioration will be affected by the systems drivers identified earlier – more rapid increases in demand due to population increase or government policies will speed this up; policy coherence to avoid over-subsidizing increase in demand could slow it down. Poor coastal planning coupled with rising population and more tourism could weaken ecosystem conditions, further damaging fish stocks, whilst better management of these issues could improve underlying marine resilience. Climate change is almost certain to increase the frequency of extreme events in the region, but improved marine resilience will enable reefs to recover more rapidly from the impacts of hurricanes and heat-induced coral mortality, whereas its absence will hasten the collapse of fisheries. Reducing bycatch and discards can help improve resilience, but total demand must still be limited. Hence any intervention that, for example, encourages diversification within or away from fishing therefore needs to ensure alternatives are likely to continue to provide livelihoods whatever the rates of change that are experienced, noting also the potential for livelihood synergies with tourist demand for fish and fishing, and the need expressed by women and youth for opportunities in these livelihoods.

Objective and barriers to achieving it

With targeted GEF support for four countries in the 4LME region working in concert with other, ongoing initiatives in the region in support of the 4LME SAP, the overall **objective** here is that technologies and practices designed to reduce bycatch and discards will be widely implemented, allowing fisheries to rebound; ultimately resulting in healthy, resilient 4LME marine ecosystems, with their biodiversity protected. These objectives are likely to be robust to the uncertain futures related to climate change and fishery demand, since they contribute to marine ecosystem resilience and hence ability to cope with climate change; however, parallel efforts to explore diversified livelihoods are also required, which may take advantage of increasing tourism, so that these alternative jobs reduce fishing effort, provide options for women and youth, and to harness the potential tourism demand for premium, sustainably-sourced fish that could increase the value of a smaller catch.

What will occur in the absence of this project?

Use the driver trends identified earlier to sketch aspects of how the future might unfold that the design must allow for

Hence, the project objective and why this response is robust given future uncertainty

The following barriers have been identified that prevent meaningful reductions in bycatch and discards:

- (1) limited effectiveness, availability and awareness of selective fishing approaches and technologies to address bycatch and other damage to the marine environment;
- (2) insufficient governance and management addressing bycatch with limited control, compliance and enforcement of current rules governing bycatch and discards;
- (3) lack of incentives and sufficient opportunities to encourage adoption of bycatch and ALDFG management measures, including alternative livelihoods where these measures are onerous; and
- (4) lack of knowledge and availability of information on threats posed by bycatch and to promote adoption of feasible solutions to manage bycatch, reduce discards and address ALDFG.

Ongoing efforts are addressing the other cross-cutting and interlinked priority transboundary threats that were identified by the region's Transboundary Diagnostic Analysis (TDA) including habitat degradation and modification of the community structure of ecosystems, and pollution.¹⁹

Key stakeholders were consulted at the national and regional levels during the initial project development phase, including the national fisheries agencies of each country, notably officials at the decision-making level (Permanent Secretaries/Ministries and GEF OFP, and Chief Fisheries Officers), FAO (sub-regional office as well as FAO Country Offices in the other countries), and the Western Central Atlantic Fishery Commission Secretariat. In addition, the project has had exchanges with the design teams of the various other GEF-funded and proposed projects in the 4LME region to discuss collaboration and synergies. Project development has also been informed by other regional GEF projects, including the FAO-GEF CC4Fish project.

Identify key barriers to achieving the stated objective, which must then be addressed in the ToC.

Who needs to be involved for this to work?

How have stakeholders been empowered throughout the design process? (more below also)

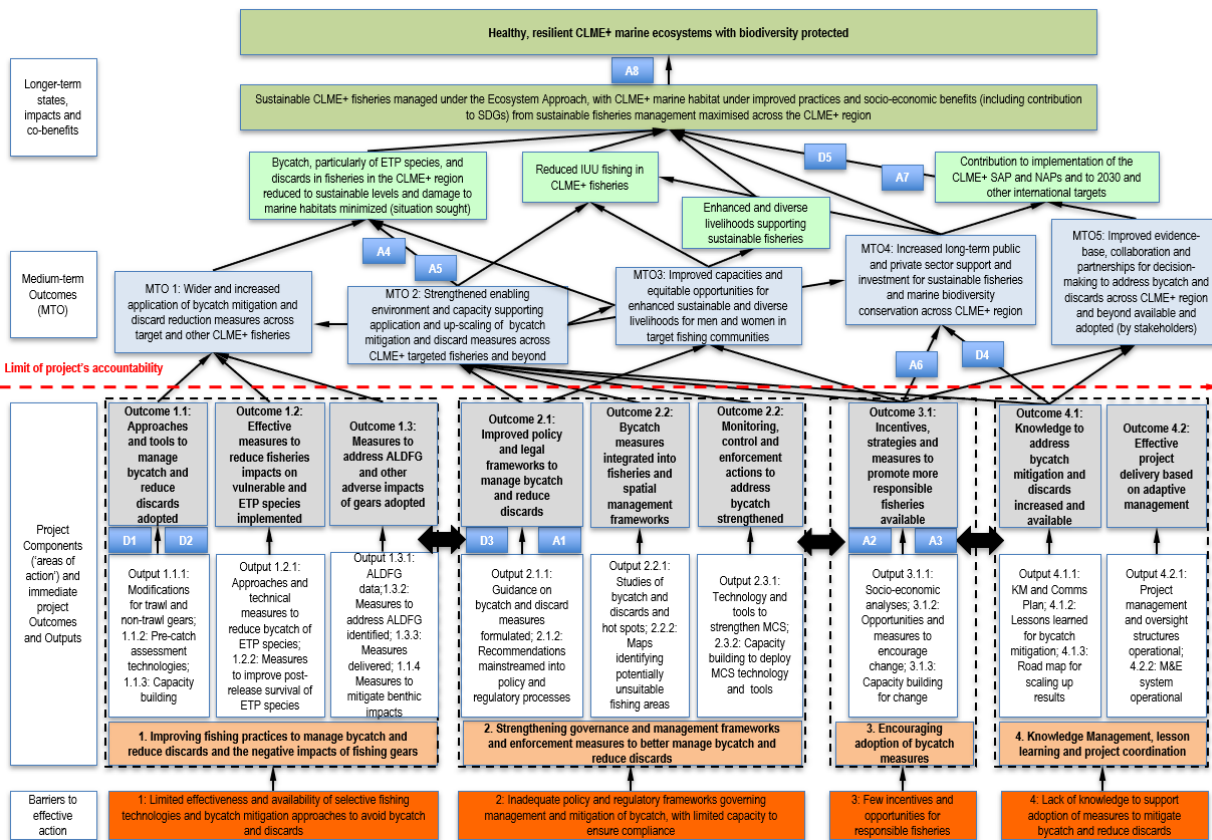
PROJECT DESCRIPTION

This section asks for a theory of change as part of a joined-up description of the project as a whole. The project description is expected to cover the key elements of good project design in an integrated way. It is also expected to meet the GEF's policy requirements on gender, stakeholders, private sector, and knowledge management and learning (see section D). This section should be a narrative that reads like a joined-up story and not independent elements that answer the guiding questions contained in the PIF guidance document. (Approximately 3-5 pages)

The Theory of Change (ToC) for this project overall is depicted in Figure 2; this will be elaborated to suit the specific context of individual countries during further development. The four interlinked pathways each address a specific barrier to achieving the project objective and define a project Component comprising sets of project activities and outputs that will deliver immediate project outcomes. The project will also contribute to wider development objectives and socio-economic and cultural co-benefits such as supporting diversified and resilient livelihoods, greater empowerment and access to marine resources by fishing communities (particularly for women), reduced vulnerability to economic and environmental shocks, and improved food and income security for fisherfolk communities (with a focus on women), enhancing resilience to climate change as well as contributing to the achievement of Sustainable Development Goal targets for each country, in particular for SDG Goal 14 Life Below Water, which calls for specific actions in fisheries including ending overfishing, illegal, unreported and unregulated fishing and destructive fishing practices.

Use the ToC as a clear logical structure on which to hang the project justification and description

Figure 2: Preliminary Theory of Change (ToC) for the proposed 4LME project¹



ToC diagram (but ToC narrative equally important)

¹ NB: this is a real ToC diagram for the GEF7 REBYC-III CLME+ project, so does not precisely match this abstracted PIF

Component 1 will address barrier (1) by delivering more effective approaches and technologies to reduce bycatch and discards and other negative impacts in target 4LME fisheries. It will achieve this through identifying and developing smart-gear modifications for trawl and non-trawl gears in collaboration with fishery stakeholders, including cutting edge pre-catch assessment technologies, with a focus on measures to reduce bycatch of ETP species, including measures to improve post-release survival of ETP species. In addition, it will develop innovative approaches to address ALDFG, which to date has received relatively little attention in the 4LME region. Expected outcomes of this pathway include: (1.1) approaches and tools to manage bycatch and reduce discards are widely adopted in target trawl and non-trawl 4LME fisheries; (1.2) effective mitigation measures to reduce adverse fisheries impacts on vulnerable, and Endangered, Threatened and Protected (ETP) species are implemented in 4LME target fisheries; and (1.3) specific measures and technologies to address ALDFG and other adverse impacts of fishing gears on marine benthic habitats are adopted in the region.

Component 2 will address barrier (2) by strengthening governance and management frameworks and compliance to reduce bycatch and discards in target 4LME fisheries in collaboration with national stakeholders. Specific guidance/advocacy materials on appropriate effective bycatch management and discard reduction measures will be formulated to inform decision-makers, to mainstream these issues into updated fisheries and marine conservation policy, regulatory and management processes. As part of this, the project will develop a system to identify bycatch and discard hot spots, and develop maps identifying potentially unsuitable fishing areas that can be integrated into existing (and planned) Marine Spatial Planning and Fisheries Management Planning processes. To support the enforcement of strengthened bycatch management and discard reduction measures, the project will help build targeted capacity for monitoring, control, and surveillance (MCS) measures including improving and standardizing data collection frameworks. Expected outcomes of this pathway include: (2.1) improved policy and legal frameworks to manage bycatch and reduce discards and address ALDFG are adopted in target countries; (2.2) widespread integration of bycatch mitigation measures in marine fisheries management frameworks and Marine Spatial Planning in participating countries; and (2.3) monitoring, control, compliance and enforcement frameworks governing bycatch management and discards reduction in fishing fleets within 4LME fisheries is strengthened.

Component 3 will address barrier (3) to encourage behavioral change for adoption of effective bycatch mitigation and discard measures and wider uptake of more responsible fisheries practices in target 4LME fisheries, including changes in livelihoods where these practices cannot be achieved for all. This will be achieved through a range of project activities built on initial assessments with community stakeholders to better understand the use of bycatch and discards and their importance to fisher communities (for livelihoods, income, food security and nutrition, and how they vary between men and women and SSF and industrial fisheries), as well as the costs and benefits (including financial) of the adoption and use of bycatch mitigation and discard measures. This component is expected to include a range of project activities such as support for new value chains for landed discards (particularly targeted at women) and co-management as well as exploration of financial and other incentives to encourage behavioral change. The expected outcome of this pathway is (3.1): incentives, strategies, and measures to support behavioral change of stakeholders towards more responsible fishing practices (focused on bycatch mitigation) that are developed and widely available in target 4LME fisheries. In recognition of the dependence of target coastal communities on fisheries and bycatch for local livelihoods and food security, and the potential adverse impacts of reductions in the quantity of bycatch on these communities, the project seeks to minimize these impacts through incorporating the principles of EAF and the SSF Guidelines while at the same time addressing food security and poverty eradication through livelihoods enhancement and diversification. Livelihood diversification will focus on options likely to be robust in the face of different levels of climate change

ToC narrative description that explains the main logic pathways and related outcomes and outputs.

(Here assumptions are handled separately below; but they can be woven in here)

impacts on the region, including interactions with the tourism industry, both as a client for high value fish and fishing, and as a direct source of alternative jobs.

Component 4 will address barrier (4) by improving knowledge and knowledge management to enable more informed decisions on bycatch management and discard reduction, drawing upon key project results and lessons learned from components 1-3 as well as other parallel initiatives. Component 4 will include a road map for scaling up project results. It also includes project management activities related to adaptive management, based on monitoring, evaluation, learning and project oversight. Component 4 has two immediate project outcomes: (4.1) knowledge of measures, options, and incentives for addressing bycatch mitigation and discards to improve sustainability of fisheries is increased among key stakeholder groups (individual fishers, fishing industry and fish-buying public); and (4.2) effective project implementation occurs based on adaptive management.

These pathways and outcomes are interlinked and work together or are dependent on the progress and results of others (main linkages indicated by two-way arrows in ToC Figure 2). For instance, identification of potential incentives under Outcome 3.1 will inform the development of policy guidance on bycatch measures under Outcome 2.1, and the uptake of bycatch measures under Outcomes 1.1 – 1.2 will be facilitated by successful delivery of project measures to integrate bycatch mitigation recommendations into policy and legal frameworks (Outcome 2.1) and specific incentives (such as tax incentives) identified under Outcome 3.1.

These proposed components are *necessary*, but not *sufficient*, to fully address the problem of declining fisheries and the impact of harmful fishing practices on ecosystems and livelihoods. They are *necessary* because existing harmful fishing practices such as longlining are contributing to declining fish populations and declining ecosystems and lost livelihoods. They are not *sufficient*, however, unless targeted efforts to mitigate bycatch and discards are done in concert with other efforts in the region to also address pollution, climate change, habitat destruction and invasive species. For this reason, close coordination is critical among the various projects and stakeholders in the 4LME region. Recognizing this, the project will draw together a large and diverse group of gender and age-balanced stakeholders who play important roles in fisheries in the 4LME region, including fisheries management and regulatory authorities, fisherfolk communities, academic and private sector groups involved in developing and testing bycatch mitigation technologies, those involved in financing fisheries, and stakeholders involved along target fisheries value chains. It will also build on existing collaborations and regional initiatives and will prioritize working with institutions and projects (GEF and non-GEF) that are working with local communities to adapt to the negative impacts of climate change to ensure that critical scientific and socio-economic information is mainstreamed into the project components, such that proposed activities are effectively designed to endure under changing conditions and continue to support sustainable fisheries and related livelihoods.

Explain how the ToC pathways are *necessary & sufficient*, with implications for coordination with others to fill in aspects NOT covered in the project (or GEF) scope.

Assumptions and impact drivers

The achievement of the project outcomes and progress towards the project objective and longer-term impacts also depends on several wider assumptions ('A's in ToC Figure 2). Assumptions that directly relate to achievement of the project's immediate outcomes are that:

- A1 – Government fisheries agencies, fishing communities and private sector fishery groups are willing to engage in co-management of fisheries and marine resources
- A2 – Social and cultural barriers do not prevent women from effectively participating in the sustainable management of fisheries
- A3 – The private sector is willing (or can be encouraged) to invest in activities to address bycatch and discards and continues to have a supporting enabling environment

In addition, it is assumed that fishing communities will be receptive to opportunities offered by sustainable co-management and are willing to invest the required time and energy (exact opportunities to be defined during the PPG phase) to adopt bycatch and discards measures (these will be encouraged through activities under Component 3).

There are also several impact drivers² ('D's in ToC Figure 2) that facilitate progress along the causal chain:

- D1 – The fishing industry (particularly the industrial fisheries subsector) is keen to reduce operational (ultimately financial) costs and losses owing to unwanted and incidental bycatch and discards
- D2 – Obligations under international/regional policy and legal frameworks (e.g. the Landing Obligations under the EU Common Fisheries Policy (CFP) and the US Marine Mammal Protection Act – Fish and Fish Product Import Provisions) encourage more responsible fishing practices to maintain fish exports
- D3 – There is increased awareness among government decision and policy makers about the value and role of marine ecosystems in climate change mitigation and sustainable development, the opportunities offered by the blue economy and need to manage coastal and marine resources sustainably, together with increased promotion of the value of marine ecosystems by number of global level initiatives such as the High-Level Panel on Sustainable Ocean Economy.

If the project outcome-level assumptions and impact drivers (A1-3 and D1-3) are met, then delivery of the four project Components will result in further gains along the causal pathways to achieving improved management of bycatch and a reduction in discards contributing to more responsible fisheries. Hence the project will monitor progress against the assumptions and drivers, and adapt activities if they are not being realized.

The four Components and their 9 Outcomes combine to drive several medium-term outcomes (MTOs in Figure 2). Components 2 and 3 combine to strengthen the enabling environment to support application and scaling of bycatch mitigation and discard measures across 4LME fisheries and beyond (MTO2). With Component 1, this should lead to wider and increased application of bycatch mitigation and discard reduction measures across these fisheries (MTO1). The strengthened enabling environment (MTO2) with improved value chains and incentives delivered from Component 3 should help improve capacities and equitable opportunities for enhanced sustainable and diverse livelihoods for men and women in target fishing communities (MTO3) and increase long-term public and private sector support and investment for sustainable fisheries and marine biodiversity conservation across the region (MTO4). These MTOs supported by aligned interventions and resources outside this project will gradually lead to levels of bycatch, particularly of ETP species, and discards in the region to sustainable levels, resulting in less damage to marine habitats, while also contributing to reducing IUU fishing (especially through Component 2 related activities), and to enhanced and diverse livelihoods supporting sustainable fisheries in an enduring way. Apart from gains in specific countries and fisheries, the delivery of project outcomes will also improve the evidence base for more effective decision-making, collaboration, and partnerships for addressing bycatch and discards across 4LME region and beyond (MTO5), contributing to implementation of the 4LME SAP and NAPs and to the 2030 and other international targets (represented by the separate right-hand causal pathway in Figure 2). Achievement of these longer-term enduring outcomes, which is beyond the immediate accountability of the project (shown as dotted line in ToC Figure 2), is subject to further assumptions (A4-A8) and two additional drivers (D4-D5):

Brief summary of key assumptions, etc.

These are critical for internal monitoring of progress for adaptive management.

Address longer-term outcomes and what will ensure that these are enduring

²*Impact drivers* are defined as significant external factors that can positively influence the direction of change along the project's causal pathways from outputs to outcomes to impacts, and over which the project, or its stakeholders/partners has some degree of control or influence, e.g., public pressure on decision-makers through KM and advocacy activities.

- A4. There is sufficient and continued commitment (political support, staff, resources, etc.) by national government institutions responsible for fisheries policy, legislation and management for actions to implement EAF, including the desire to better manage bycatch and reduce discards and other associated damage through ALDFG
- A5. Perverse subsidies can be eliminated and do not continue to reward unsustainable fishing and encourage overcapacity of fishing fleets
- A6. Domestic and international markets for bycatch and discard value chain products can be sufficiently developed and maintained to provide long-term secure sources of income for local fishing communities, particularly for the benefit of women (so low likelihood of an economic crash)
- A7. Countries continue to see the value of, and commit resources for, regional cooperation and collaboration to address bycatch and discards and promote EAF
- A8. Future climate change impacts do not irreversibly affect the structure and function of the CLME+ marine and coastal ecosystems and habitats
- D4. Global demand increases for premium certified sustainable fish products or those meeting national standards of import countries for bycatch (especially ETP species such as marine mammals)
- D5. Regional initiatives and forums occur that promote regional visions, build capacity, and facilitate increased investment for sustainable management of marine resources, in line with international legal obligations (e.g. to SDGs, UNFCCC, and CBD).

Innovation and scaling towards wider transformation

This project incorporates innovative technologies associated with new, smart-gear modifications and innovations for non-trawl gears to allow for more size and species selective fishing practices. Various solutions that have already been shown to reduce incidental bycatch in other areas (e.g. those supported through WWF's International [Smart Gear](#) Competition) will be tested under Component 1 of this project. These may include use of low-strength ropes that break under strain from marine mammals, magnets attached to longlines to repel sharks, passive pingers that retain effectiveness even when the gear is lost, as well as fishing gear-marking technologies, lost gear tracking and reporting systems (preventative measures) and smart-gear technologies to minimize the potential of ghost fishing and ways to better manage gear in the water (mitigating measures). Recycling schemes for recovered plastic fishing gear will also be considered. The project will also develop (through pilots and case studies) and promote the adoption of new and cost-effective technology and tools for control, monitoring, tracking/ surveillance (remote, real-time) and reporting of compliance on bycatch mitigation, tailored according to country needs and circumstances. For example, this may include innovative smart forms for improved monitoring and reporting of bycatch and discards. In addition to technological innovation, there is potential for innovation related to de-risking investments from microloans to fisherfolk.


Capacity building is embedded across all four project components to employ bycatch mitigation and address discards, including strengthening national fisheries authorities to undertake MCS to ensure compliance with bycatch regulations. By the end of the project, the key fisheries-related institutions, organizations and stakeholders should have sufficient capacity to ensure continuity of the project results. A 'training of the trainer' approach and learning-by-doing methodologies, combined with an effective Knowledge Management program (Component 4) promoting wide sharing of project-generated information (with project data base/knowledge repository), lessons learned and good practice including linkage with well-established knowledge platforms and the websites of project partners, will ensure that capacity and knowledge generated by the project will be sustained over the longer-term.

Project successes (and lessons learned from failures) will be translated to other non-participating countries (both coastal and island states) in the 4LME region as well as other tropical and sub-tropical LMEs. Project results, lessons and good practices will be disseminated and scaled up through both national, regional, and global level partners and initiatives; conversely the project will continually seek to benefit from lessons

What is innovative about this project?

(Here mostly extant tech applied in a new region)

learned from other, related projects. At the regional level, potential opportunities for scaling up and wider dissemination of results include measures to implement the 4LME SAP and its National Action Plans, and project linkage through non-participating member countries of WECAFC, CRFM, and CARICOM, and other GEF-financed projects including the UNDP-GEF project in the region and the proposed FAO-GEF EAF4SG project, all of which support measures for sustainable use of natural resources in the 4LME region. The existence of several closely connected GEF-funded projects also provides an unprecedented opportunity for scaling up through linkages and networking and potential leverage to achieve greater economies of scale.



How will this project be transformative, including scaling (out, up, deep) impacts?

RISKS TO PROJECT PREPARATION AND IMPLEMENTATION

[Warning – these are generally sensible examples, but are not necessarily rooted in an actual example]

Risk Categories	Rating	Comments
Climate	Medium	<p>Risks: Climate change is considered as a key driver in the project description, but climate impacts may also occur during the implementation of the project, either from direct events like hurricanes, or indirectly due to responses to such events. For example, government priorities may shift after a significant climate event, such as a hurricane, which can lead to fewer resources for fisheries management (and hence project co-financing), as well as direct damage to government fisheries management structures, infrastructure, and equipment.</p> <p>Mitigation measures: The project will draw on the experience gained from several other ongoing initiatives in the region that are addressing climate vulnerability and resilience in fisheries, including FAO-GEF <i>CCAFish and Climate Change Adaptation in the Eastern Caribbean Fisheries Sector</i>. This project will also be informed by the <i>Protocol on Climate Change Adaptation and Disaster Risk Management in Fisheries and Aquaculture in the Caribbean</i>²⁰ developed by FAO and CRFM. An assessment of the existing impacts of climate change on the target fishing communities and key stakeholder groups in the participating countries will also be undertaken during the PPG stage.</p>
Environment and Social	Medium	<p>Risks: Limited participation by women due to lack of confidence that the project will benefit them and will also take time and effort that they cannot spare due to child rearing and other responsibilities.</p> <p>Mitigation measures: The project will engage women in further elaborating the problems and responses in each country, implementing a gender tailored action plan ensuring women's access to productive resources; it will draw on experience gained from relevant regional projects including the recently completed <i>Mainstreaming Gender Equality in Fisheries in the Caribbean</i> project.</p>
Political and Governance	Low	<p>Risks: Target countries may be reluctant to engage in the project if there is a change of government leading to low support for the existing 4LME SAP and other regional agreements.</p> <p>Mitigation measures: Political buy-in will also be maintained through strategic and periodic awareness-raising and communication to key decision-makers including parliamentarians, and through carefully crafted messages to targeted audiences at the national level.</p>
Macro-economic	Medium	<p>Risks: Heavy focus on tourism and commodities in 4LME countries leads to heavy reliance on external demand and therefore higher risk from external factors such as a global epidemic (as witnessed by COVID-19) or extreme weather events.</p> <p>Mitigation measures: In its engagement with local communities, the project will actively seek out opportunities foster economic diversification and connect with other regional projects focusing on enhancing resilience as part of efforts to adapt to climate change.</p>
Strategies and Policies	Low	<p>Risks: Low commitment and engagement in the project (poor political support, staffing, co-financing, and/or changed priorities due to adverse economic conditions) from key partners and government institutions responsible for fisheries management</p> <p>Mitigation measures: The project has been designed to respond to, and directly supports, the priorities of WECAFC, CRFM and CARICOM and their member states participating in the project. The project will leverage existing coordinating and cross-cutting intergovernmental and transboundary mechanisms that govern these institutions to ensue participation remains strong.</p>
Technical design of project or program	Low	<p>Risks: Required expertise for design and implementation of the project is not secured (or is delayed)</p> <p>Mitigation measures: The identification and engagement of expertise for the project has already begun and there is already ample expertise given the history of related GEF projects in the 4LME and/or related to fisheries management.</p>
Institutional capacity for implementation and sustainability	Low	<p>Risks: Project partners do not sustain the project activities including co-financing commitments</p> <p>Mitigation measures: The monitoring, knowledge curation and dissemination, replication, and scaling pathway of the project is specifically designed to address the sustainability and durability</p>

Risk Categories	Rating	Comments
		of project outcomes. Further, effective stakeholder engagement from the onset will ensure adequate buy-in.
Fiduciary: Financial Management and Procurement	Low	Risks: (1) Project funds are not adequately managed (2) delay in the mobilization of co-finance. Mitigation measures: GEF fiduciary guidelines, as well as that of the agency, will be followed in fund management. This will also be part of the frequent monitoring and evaluation activity of the project.
Stakeholder Engagement	Low	Risks: Low and/or short-lived participation – particularly the private sector. Mitigation measures: The risk of stakeholder disengagement will be prevented through effective frequent communication with all identified stakeholders and developing and agreeing on a stakeholder engagement plan. Private sector groups will be engaged directly from early in project design and the project will aim to highlight the benefits of bycatch mitigation and opportunities from addressing excessive discards to both large- and small-scale fisheries. Financial institutions providing funding for the fisheries sector will be engaged by the project to encourage their financing of sustainable fisheries and the risks from not doing so highlighted.
Others		Not applicable
Financial Risks for NGI projects		Not applicable
Overall Risk Rating	Moderate	The overarching risk to this project is low-moderate. Close monitoring of the identified risks and effective implementation of mitigation measures will ensure that the risks do not adversely impact the success and durability of the project.

CORE INDICATORS

This should be inserted as in past PIFs, but is not included in this model example

ALIGNMENT WITH GEF-8 PROGRAMMING STRATEGIES AND COUNTRY/REGIONAL PRIORITIES

Describe how the proposed interventions are aligned with GEF- 8 programming strategies and country and regional priorities, including how these country strategies and plans relate to the multilateral environmental agreements. Confirm if any country policies that might contradict with intended outcomes of the project have been identified, and how the project will address this. (max. 500 words, approximately 1 page)

Not completed in this model example: notably, conflicting policies should be identified and dealt with in the project description.

¹ UNEP-WCMC, W.C., WRI, TNC, 2021. Global distribution of warm-water coral reefs, compiled from multiple sources including the Millennium Coral Reef Mapping Project. Version 4.1. Includes contributions from IMaRS-USF and IRD (2005), IMaRS-USF (2005) and Spalding et al. (2001). Cambridge (UK): UN Environment World Conservation Monitoring Centre. Data DOI: <https://doi.org/10.34892/t2wk-5t34>.

² Holmyard, N., (2014). Climate Change: Implications for Fisheries & Aquaculture. Key Findings from the Intergovernmental Panel on Climate Change Fifth Assessment Report, 16 pp.

³ Cite evidence, e.g. Miloslavich, P. et al., 2010. Marine Biodiversity in the Caribbean: Regional Estimates and Distribution Patterns. *PLoS One* 5(8), e11916.

⁴ Cite evidence, e.g. Villasante, S., Österblom, H. (2015). The role of cooperation for improved stewardship of marine social-ecological systems in Latin America. *Ecol. Soc.* 20(1), 8.

⁵ Cite evidence, similar to: McConney, P., Nicholls, V., and B. Simmons. (2019). Gender in Caribbean Fisheries: It's the Women's Turn – Commentary. *Journal of Eastern Caribbean Studies* 44(2): 202 – 224.

⁶ Cite evidence in government strategies

⁷ Oxenford, H.A., Monnereau, I., (2018). Chapter 9: Climate change impacts, vulnerabilities and adaptations: Western Central Atlantic marine fisheries. In: M. Barange, T. Bahri, M.C.M. Beveridge, K.L. Cochrane, S. Funge-Smith, F. Poulain (Eds.), Impacts of climate change on fisheries and aquaculture: synthesis of current knowledge, adaptation and mitigation options, FAO, Rome, FAO Fisheries and Aquaculture Technical Paper No. 627, 147-168 pp.

⁸ Barange, M., Bahri, T., Beveridge, M.C.M., Cochrane, K.L., Funge-Smith, S., Poulain, F., (2018). Impacts of climate change on fisheries and aquaculture: synthesis of current knowledge, adaptation and mitigation options. FAO Fisheries and Aquaculture Technical Paper No. 627, FAO, Rome.

⁹ Cite evidence, similar to: Debels, P. et al., (2017). The CLME+ Strategic Action Programme: An ecosystems approach for assessing and managing the Caribbean Sea and North Brazil Shelf Large Marine Ecosystems. *Environmental Development* 22:191-205. The CLME+ Strategic Action Programme:

An ecosystems approach for assessing and managing the Caribbean Sea and North Brazil Shelf Large Marine Ecosystems. *Environmental Development* 22: 191-205.

¹⁰ FAO (2018). The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals. Food and Agriculture Organization of the United Nations License: CC BY-NC-SA 3.0 IGO, 211.

¹¹ Lam, V.W.Y. et al., (2020). Climate change, tropical fisheries and prospects for sustainable development. *Nature Reviews Earth & Environment* 1: 440–454.

¹² *Cite evidence, similar to:* FAO (2016). Review of the state of fisheries in the WECAFC region. Western Central Atlantic Fishery Commission (WECAFC). Working Paper WECAFC/XVI/2016/2, 14 pp.

¹³ *Cite evidence, similar to:* Isaac, V.J. and S.F. Ferrari, S.F. (2017). Assessment and management of the North Brazil Shelf Large Marine Ecosystem. *Environmental Development* 22: 97-110.

¹⁴ Pérez Roda, M.A., Gilman, E., Huntington, T., Kennelly, S.J., Suuronen, P., Chaloupka, M., Medley, P., 2019. A third assessment of global marine fisheries discards. FAO Fisheries and Aquaculture Technical Paper, 633, 78 pp.

¹⁵ Gilman, E. et al., (2020). Benchmarking global fisheries discards. *Scientific Reports* 10:14017.

¹⁶ Gilman, E. et al., (2020). Benchmarking global fisheries discards. *Scientific Reports* 10:14017.

¹⁷ Lam, V.W.Y. et al., (2020). Climate change, tropical fisheries and prospects for sustainable development. *Nature Reviews Earth & Environment* 1: 440–454.

¹⁸ NOAA Fisheries (2021). [Improving International Fisheries Management](#). Report to Congress.

¹⁹ *Cite source for analysis, e.g.:* CLME Project, 2013. The Strategic Action Programme for the sustainable management of the shared living marine resources of the Caribbean and North Brazil shelf large marine ecosystems (CLME+SAP). The UNDP/GEF Caribbean Large Marine Ecosystem and Adjacent Areas (CLME) Project, 123 pp.

²⁰ FAO and Caribbean Regional Fisheries Mechanism, 2021. Protocol on Climate Change Adaptation and Disaster Risk Management in Fisheries and Aquaculture in the Caribbean. Barbados, 18 April 2018. Rome, Belmopan, 22 pp.