

# Considerations for Marine and Coastal Indicators under the Global Goal on Adaptation

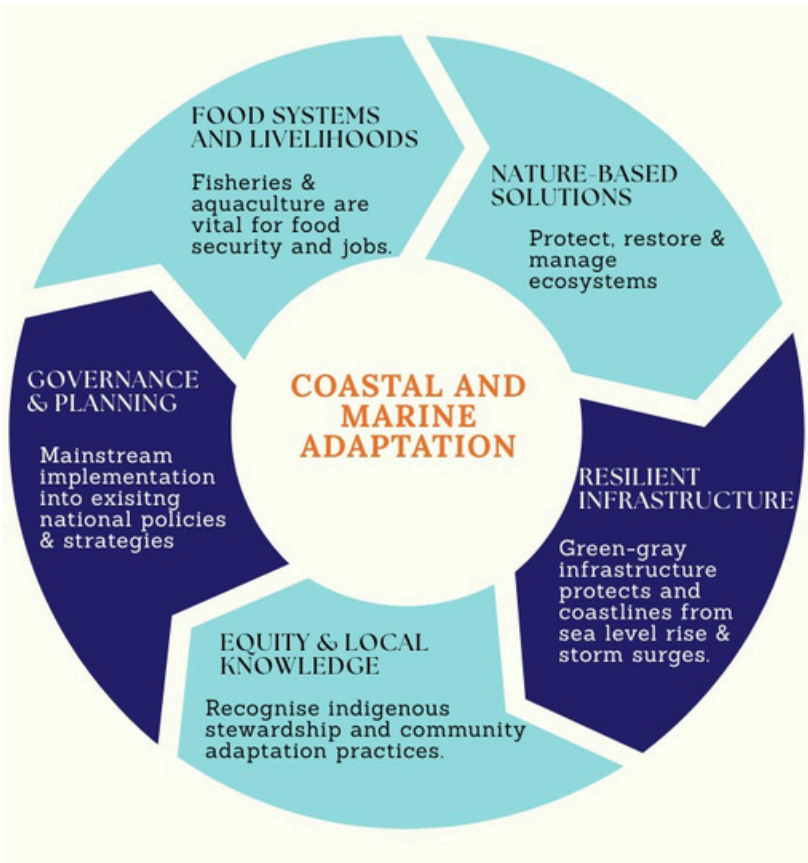
## 1. Introduction

Coastal and marine Ecosystem-based Adaptation (EbA) and Nature-based Solutions (NbS)-including the protection, restoration and sustainable management of mangroves, salt marshes, seagrasses, and coral reefs, together with climate-adaptive management of fisheries and aquaculture, are essential to deliver effective ocean and coastal adaptation. Coastal and marine ecosystems reduce climate-related impacts but also provide co-benefits through biodiversity, livelihoods, and carbon sequestration and storage. However, these ecosystems are facing increasing pressures and differentiated responses to climate change-related stressors.

The Global Goal on Adaptation (GGA), established under [Article 7 of the Paris Agreement](#)<sup>[1]</sup>, aims to enhance adaptive capacity, strengthen resilience, and reduce vulnerability to climate change. The goal is relevant in the ocean and coastal context, where communities, ecosystems, and economies are on the frontlines of climate change impacts. As Parties work to define indicators for the GGA, ocean adaptation offers a unique pathway to achieve its ambition.

A team of experts published a consolidated list of 490 indicators comprising 288 main indicators and 202 sub-indicators<sup>[2]</sup> to be discussed by Parties at SB62 in June 2025 during which a final decision is expected at COP30 in November 2025.

This briefing paper focuses on marine and coastal seascapes<sup>[3]</sup> with a succinct assessment and recommendations for consideration by negotiators on the refined 490 potential indicators<sup>[4]</sup> under the [UAE-Belém Work Programme](#)<sup>[5]</sup>, and as part of the Global goal on adaptation (GGA)<sup>[6]</sup> targets, ahead of the upcoming sessions in Bonn, Germany in June 2025.



<sup>[1]</sup> [Paris Agreement text English](#)

<sup>[2]</sup> [Consolidated list of indicators for assessing overall progress towards achievement of the targets referred to in paragraphs 9–](#)

<sup>[3]</sup> We focus both on the socio-economic and biophysical aspects of marine and coastal areas, therefore referring to the concept of landscape/seascape.

<sup>[4]</sup> [Consolidated list of indicator options, UAE-Belém work programme on indicators | UNFCCC](#)

<sup>[5]</sup> [FCCC/PA/CMA/2023/16/Add.1 | UNFCCC](#)

<sup>[6]</sup> [Global goal on adaptation | UNFCCC](#)

## 1.1 Coastal and Marine Adaptation & the Global Goal on Adaptation

The GGA framework for thematic and dimensional targets provides the foundation for monitoring and reporting ocean-related climate action. Several targets are directly relevant to the marine and coastal space, such as targets 9b (Food and agricultural production) which addresses sustainable aquatic food systems and resilience of coastal livelihoods; 9d (Ecosystem and biodiversity) includes coastal and marine nature-based solutions; and 9e (Infrastructure and human settlements) relates to resilient coastal infrastructure, early warning systems and nature-based defenses.

Marine and coastal areas play a vital role achieving GGA targets related to water (9a), cultural heritage and knowledge (9g), all dimensional targets, and Parties may wish to highlight these interconnections within their reporting under these Targets.

Efforts to scale marine and coastal adaptation can be enhanced when strengthening the alignment between Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), and Nationally Biodiversity Strategies and Action Plans (NBSAPs), National Development Plans (NDPs), by ensuring that data management systems, capacity-building, finance, and technology are in place to track and deliver results at scale.

In practice, integrating the ocean into the iterative adaptation cycle and its associated adaptation indicators begins with climate risk assessments that account for the vulnerability of marine and coastal ecosystems and communities. The second step involves designing adaptation measures, such as budgeting for green-grey infrastructure and planning multi-hazard early warning systems tailored to ocean-related climate risks. During implementation, it is essential to ensure that marine actors, sectors, and ecosystems are not left behind. Ocean-based climate actions can encompass ecosystem restoration, disaster risk reduction and management (DRR and DRM) using indicators from the Sendai Framework, and early warning systems. This process and respective adaptation indicators should also address both economic and non-economic loss and damage—the adverse impacts that occur when the limits of adaptation and resilience are exceeded.

## 2. Key Messages

### General Recommendations:

1. Integrate nature-based solutions across GGA thematic and dimensional targets to strengthen their role in achieving adaptation outcomes.
2. Align with and leverage existing indicators (SDGs, KM-GBF, Sendai Framework) and global datasets (Global Mangrove Watch) to enhance cohesive, cost-effective adaptation and investment monitoring, where possible.

### Recommendations on Fisheries and Aquaculture:

1. Explicitly include fisheries and aquaculture in indicators or sub-indicators to address food systems.
2. Ensure that aquaculture is addressed alongside fisheries-related indicators.
3. Prioritize the special needs of smallholder producers, including small-scale fishers and fish farmers, in relevant indicators.
4. Embed the ecosystem approach to fisheries (EAF) and aquaculture (EAA) in relevant indicators, with a holistic and systems-thinking perspective.
5. Incorporate existing multilaterally agreed-upon indicators, including those from the FAO Questionnaire on the Implementation of the Code of Conduct for Responsible Fisheries (CCRF).

### Recommendations on Coastal and Marine Ecosystems:

1. Retain indicators that enable disaggregation by ecosystem type within sub-indicators.
2. Retain indicators that involve the development of policy-enabling conditions for adaptation action.
3. Retain indicators that leverage the value of nature-based solutions in adaptation and resilience, specifically coastal and marine ecosystems
4. Retain indicators that incorporate community or indigenous knowledge and participation in adaptive planning and implementation, especially for target 9d.

**3. State of Play**

**3.1 Fisheries and Aquaculture**

**3.1.1 Status of fisheries and aquaculture-related indicators**

Examination of the latest set of refined indicators published on May 22, 2025 revealed 21 indicators with reference to fisheries (harvesting of wild fish and other aquatic organisms) and/or aquaculture (farming of aquatic animals and plants), however aquaculture is less frequently referenced than fisheries with 4 indicators explicitly referencing the term “aquaculture” (See 9b13, 9b38, 9b57, 10c22h). For a complete list of indicators referencing fisheries and aquaculture, please see Table 1 in Annex 1.

**3.1.2 Recommendations on fisheries and aquaculture-related indicators**

Sub-indicators pertaining to sustainable fisheries and aquaculture are strongly recommended to be retained:

- **Sub-indicator 9b13** - “2.7 Proportion of farmers engaged in sustainable fisheries and aquaculture practices,” with a recommendation of minor wording change to use “fishers and farmers” instead of “farmers” for inclusiveness and accuracy.

**Rationale:** Tracking the share of fishers and farmers who have adopted sustainable practices directly links to more resilient food systems, especially relevant for countries and communities where aquatic products constitute major livelihoods, supports stable incomes over time, and better ecosystem outcomes.

- **Sub-indicator 9b38** - “8.1 Number of countries integrating climate change adaptation priorities into crops, livestock, fisheries, aquaculture, and forestry policies, strategies, and plans”.

**Rationale:** Integration of adaptation priorities into national fisheries and aquaculture instruments signals high-level policy commitments to ensure that the sector benefits from dedicated resources, technical assistance, and regulatory support for adaptation.

- **Sub-indicator 9b52** - “10.6 Proportion of fish stocks within biologically sustainable levels” (also proposed under 9d as a main indicator with the Original ID 6 but without a new indicator ID, this indicator corresponds to SDG14 indicator 14.4.1).

**Rationale:** Effective and sustainably managed fish stocks provide a foundation for climate-resilient fisheries which corresponds to SDG 14.4.1. Countries can utilize existing reporting frameworks, thereby minimizing the need for additional effort to monitor and report progress.

In Table 2, five general recommendations are proposed to be accompanied by specific wording suggestions for relevant indicators to ensure that the adaptation needs of countries and communities reliant on fisheries and aquaculture are adequately considered.

**Table 2: General and indicator-level recommendations on fisheries and aquaculture**

General recommendations	Specific recommendations for relevant indicators
<p><b>General recommendation 1: Explicitly include fisheries and aquaculture in indicators or sub-indicators addressing food systems.</b></p> <p><u>Rationale for the recommendation:</u> Aquatic food systems—encompassing both fisheries (harvesting of wild fish and other aquatic organisms) and aquaculture (farming of aquatic animals and plants) are an integral part of global food security, and fisheries and aquaculture-dependent communities are often among the most vulnerable to climate change.</p> <p>In developing countries, fisheries and aquaculture have a critical economic value for national revenue. More than 3 billion people worldwide depend on fish for at least 20% of protein intake, and in many coastal or riverine communities, aquatic foods account for more than 50% of animal-protein intake.</p> <p>Globally, around 600 million people rely, directly or indirectly, on fisheries and aquaculture for their livelihoods. Nearly 500 million of them are small-scale fisheries, with women making up nearly 40% of workers across the aquatic food value chains.</p>	<p><b>Sub-indicator 9b49:</b> It is suggested to include “aquaculture” alongside “crop/ livestock” here, given that a prominent climate risk to aquaculture is the increased frequency and severity of disease outbreaks.</p> <p><b>Main indicator 9e25:</b> This indicator contains a sub-indicator 9e26 that currently lists categories of infrastructure including hospitals, schools, roads and agricultural land. Broadening the contents of this sub-indicator to include infrastructure vital to sustainable fisheries and aquaculture, such as ports and quays, would improve the applicability of this indicator to important blue economy sectors including fisheries and aquaculture.</p> <p><b>Sub-indicator 10c22e:</b> Along the same lines, in target 10c on Implementation, sub-indicator 10c22e could be improved by broadening its applicability from “land or livestock users” to also include fishers and fish farmers.</p>

**General recommendation 2: Ensure that aquaculture is addressed alongside fisheries related indicators.**

Rationale for the recommendation:

Aquaculture has been the fastest growing food production sector in recent decades, now supplying more than 50% of all fish globally.

World aquaculture production reached a new record of 130.9 million tonnes in 2022, valued at USD 313 billion and comprising 94.4 million tonnes of aquatic animals and 36.5 million tonnes of algae.

Better inclusion of aquaculture alongside fisheries indicators will allow for improved capacity to track and foster climate-resilient aquaculture practices.

**Sub-indicators 9b08, 9b24, 9b26, 9b27, 9b50, 9b51 and 10b02:** It is suggested to add the wording “aquaculture” next to “fisheries” (or “fishery”) in the Final Indicator Name for each of these sub-indicators.

**Sub-indicator 9b47:** Given the paramount importance of water use in aquaculture development (FAO, 2016), it is recommended to explicitly mention “aquaculture” in the Final Indicator Name, e.g. using the wording “agriculture including aquaculture”. It is also suggested to add the wording “aquaculture” next to “fisheries” in the Rationale for Inclusion text that says: “indicating crops, livestock and fisheries” and “water smart crops, fisheries and livestock”

**General recommendation 3: Prioritize the special needs of small-scale food producers including small-scale fishers and fish farmers in relevant indicators.**

Rationale for the recommendation:

Small-scale fisheries produce an estimated 40% of the global catch and support 90% of the capture fisheries workforce.

Small-scale fishers and fish farmers contribute the least to climate change but suffer the most from adverse climate change impacts. Being located at the waterfront, the small-scale fisheries and aquaculture communities are exposed to gradual or slow-onset events, as well as climate-related extreme events and natural disasters, affecting their food security, nutrition, and livelihoods.

Adaptation indicators that focus mainly on national- or sectoral-level outputs or outcomes may risk masking subnational inequities. Therefore, it is important to have indicators that explicitly measure whether and how the most vulnerable communities are building adaptive capacity, to ensure that investments reach those who need them most and that policy interventions truly leave no one behind.

**Sub-indicators 9b31, 9b44 and 9b57:** It is suggested to add the wording “specifying the share specifically supporting (or affecting) smallholders including small-scale fishers and fish farmers, disaggregated by production systems (e.g. crops, livestock, forestry, fisheries and aquaculture)” at the end of the Final Indicator Name in each of these sub-indicators.

**General recommendation 4: Embed the ecosystem approach to fisheries (EAF) and aquaculture (EAA) in relevant indicators, with a holistic and systems-thinking perspective.**

Rationale for the recommendation:

The holistic, systems-thinking perspective of ecosystem approach to fisheries (EAF) and aquaculture (EAA) views ecosystems as tightly coupled socio-ecological systems and is a process for achieving a balance between ecological well-being (e.g. target stock, habitat, general ecosystems) and human well-being (e.g. local communities, national economy). In the face of severe climate impacts, governments can employ climate-adaptive, sustainable fisheries and aquaculture management practices such as the implementation of ecosystem-based fisheries management (EBFM), to support coordinated and informed decision-making in the face of short-term, extreme climate events such as marine heatwaves (Barbeaux, Holsman, and Zador 2020). Over longer timescales, model projections indicate that EBFM measures outperform non-EBFM measures in forestalling climate-driven species collapse (Holsman et al. 2020). As part of the EBFM approach, management measures such as harvest strategies underpinned by management strategy evaluation can serve as effective adaptation tools (Ortega-Cisneros et al. 2021; Kritzer et al. 2019; Yin et al. 2023).

**Main indicator 9d - Original ID 3279:** It is recommended to amend the wording of this indicator to explicitly cover national policies that address the impacts of climate change and ocean acidification on fisheries and aquaculture production, especially changes concerning shellfish, finfish and other commercially important species, that are highly relevant to the nutrition and livelihood needs of coastal communities.

Please see also suggestions on retention of [sub-indicators 9b13, 9b38 and 9b52](#) at the top of section 3.1.2 on fisheries and aquaculture sustainability.

## General recommendation 5: Incorporate existing multilaterally agreed indicators, including those from the FAO Questionnaire on the Implementation of the Code of Conduct for Responsible Fisheries (CCRF).

### Rationale for the recommendation:

In addition to SDGs, Kunming-Montreal Global Biodiversity Framework, and Sendai Framework, there are other existing multilaterally agreed indicators that are very relevant to track adaptation progress in the fisheries and aquaculture sector. These include indicators from the FAO Questionnaire on the Implementation of the Code of Conduct for Responsible Fisheries (CCRF), which is regularly disseminated to 194 FAO Member States to collect data and responses.

It is recommended to consider the inclusion of the following indicators building on the respective climate change related questions from the FAO CCRF Questionnaire.

**Possible new sub-indicator on climate-proofing fisheries and aquaculture value chains**, to be proposed under “9b. Food and agricultural production”: “Number of countries that have integrated climate change adaptation and mitigation measures along the fisheries and aquaculture value chains into national policies or research and development activities”; relevant measures include, for example, the use of renewable energy, life cycle assessments, adaptation of consumption patterns, adaptation of transport or distribution methods, landing and marketing location. This new indicator corresponds to Question 2.9 of the revised questionnaire on Article 11 of the FAO CCRF.<sup>[7]</sup>

**Possible new sub-indicator on climate preparedness in aquaculture**, to be proposed under “9b. Food and agricultural production”: “Number of countries that have measures in place to strengthen climate change and disaster preparedness”. This new indicator corresponds to Question 3.6.1 of the revised questionnaire on Article 9 of the FAO CCRF.<sup>[8]</sup>

## 3.2 Coastal and Marine Ecosystems

Coastal zones are some of the most densely populated, highly developed, and ecologically rich areas in the world (Defeo and Elliott, 2021; Sandifer and Scott, 2021). However, along the coast, large populations of people, infrastructure and ecosystems are jeopardized by climate change, facing threats of storm surges, erosion, flooding, and sea level rise (Vousdoukas et al., 2020). **Coastal blue carbon habitats** (mangroves, seagrass and salt marsh) and coral reefs play a crucial role in helping communities adapt to the impacts of climate change and enhancing coastal resilience.<sup>[9]</sup> The Global Mangrove Alliance, with data from the Global Mangrove Watch, is developing robust, science-based approaches to measuring progress in global mangrove restoration that can help inform GGA indicators.

### 3.2.1 Status of coastal and marine ecosystem indicators

Out of the current list of indicators, 40 fall under target 9d, Ecosystems and biodiversity, and there are several significant indicators for oceans under other targets. Six (6) of the 40 Ecosystem and Biodiversity indicators explicitly reference oceans or coasts, and many other indicators mention “by ecosystem type,” implying eventual disaggregation of the indicators. Four headline indicators and 6 sub indicators for marine and coastal ecosystems are located under Infrastructure and human settlements (9e), which clearly emphasize the role of nature-based solutions.

The targets on Water (9a29) and Implementation (10c27) both include significant indicators on river basins and their water resources management plans (and their tracking) that can affect, in particular, coastal ecosystems as well as semi-enclosed seas and marginal seas through freshwater quality and quantity flowing to the coasts. Furthermore, “the proportion of populations within species with an effective population size greater than 500” is the only indicator with an existing reporting process (under the CBD) that would capture the preservation of genetic diversity, which is key for adaptive capacity and resilience, both on land and sea.

On the dimensional targets, the different targets include indicators that take into account marine and coastal areas in the climate hazard, impact, risk and vulnerability assessments (10a01); and especially in the integration of EbA or NbS in NAPs, other planning processes (10b01); and the finance allocations for implementation by target (10c04).

For a complete list of indicators referencing coastal and marine ecosystems, please see Table 3 in Annex 2.

<sup>[7]</sup> <https://openknowledge.fao.org/server/api/core/bitstreams/63123a50-6b6c-4c58-b647-fb9e5ebdc782/content>

<sup>[8]</sup> <https://openknowledge.fao.org/server/api/core/bitstreams/98c2548a-b389-4210-8beb-e1369130269a/content>

<sup>[9]</sup> [Blue carbon as a natural climate solution | Nature Reviews Earth & Environment](#)

### 3.2.2 Recommendations on coastal and marine ecosystems

The following indicators are strongly recommended to be retained:

1. “Managed terrestrial, inland waters, coastal and marine areas under climate-resilient management practices as a proportion of the total area of the country and total ha and km” (headline indicator 9d08)

- Rationale: This indicator partially aligns with GBF Target 1.b<sup>[10]</sup>, and can be adjusted to further match this target by quantifying the number of countries with areas under climate-resilient practices. This indicator also ensures that essential blue carbon habitats are managed for climatic threats and in a way to enhance long-term adaptive capacity.
- We suggest the language of the above indicator be combined with the following indicator; “Managed terrestrial, inland waters, coastal and marine areas under climate-resilient management practices (% , ha, km) (sheet 9d, row 40),” as indicated in bold above.

2. “Percent of municipalities with climate change adaptation plans that integrate nature-based solutions (NbS) and ecosystem-based adaptation (EbA) measures (green/ blue infrastructure) to manage and reduce climate change impacts, with identified actions, targets, and resource allocations (9e06).”

- Rationale: This indicator references both green and blue infrastructure, highlighting the value of coastal blue carbon habitats and hybrid coastal ‘green-gray’ infrastructure solutions as NbS, and is measurable.

In Table 4, four general recommendations are proposed accompanied by specific indicators—to ensure that the adaptation needs of countries and communities with coastal ecosystems are adequately considered.

**Table 4: General & indicator-level recommendations on coastal and marine ecosystems**

Recommendations	Relevant Indicators
<p><b>Recommendation 1: Retain indicators that directly relate to coastal and marine ecosystems or indicators that enable disaggregation by ecosystem type within sub-indicators.</b></p> <p><u>Rationale for the recommendation:</u> There are datasets that will support tracking restoration progress including the Global Mangrove Watch. In addition to protecting ecosystems, restoring habitats will help store additional carbon and support increased resilience.</p> <p>As the largest carbon sink on Earth, the ocean absorbs 25% of human CO<sub>2</sub> emissions and captures 90% of the heat generated by these emissions.<sup>[11]</sup> Tracking the rates of change for metrics such as sea level rise, sea surface temperature and marine heatwaves is essential to understand the extent of climate impacts, as these factors affect the health of marine and coastal ecosystems.</p>	<p><b>Recommendation: Retain indicators, with disaggregation by ecosystem type in sub-indicators to ensure reporting of coastal and marine ecosystem restoration vital to climate adaptation:</b></p> <ul style="list-style-type: none"> <li>• “Area under restoration” (sheet 9d, row 1, GBF headline indicator 2)</li> </ul> <p>The following 9d indicators (no IDs) in the consolidated list are also relevant to coastal and marine ecosystems, however we recommend to amend the wording to more explicitly illustrate the connection to adaptation goals:</p> <ul style="list-style-type: none"> <li>• “Rate of sea level rise” (sheet 9d, row 17).</li> <li>• “Mean temperature anomaly (compared to climate normal 1991 - 2020) for components (atmosphere, continents, ocean, inland water and cryosphere)” (sheet 9d, row 18).</li> <li>• “Heat wave index and duration (atmosphere, ocean, freshwater)” (sheet 9d, row 19).</li> </ul>

[10] <https://www.gbfi.org/metadata/headline/1-B>

[11] *The ocean – the world’s greatest ally against climate change* | United Nations

**Recommendation 2: Retain indicators that involve the development of policy enabling conditions for adaptation action.**

Rationale for the recommendation: The establishment of such policies creates an enabling environment for positive action and investment towards protecting biodiversity and increasing the resilience of ecosystems, including the vulnerable communities that rely on them. The inclusion of NBSAPs will strengthen climate-biodiversity linkages.

**Recommendation: Retain the following 9d indicators to capture the incorporation of coastal and marine NbS in policy, specifically NDCs and NAPs. The addition of NBSAPs to the first indicator could strengthen the integration of biodiversity co-benefits and help align indicators with the Global Biodiversity Framework:**

- “Number of countries with NAPs and NDCs and NBSAPs that incorporate nature-based solutions (NbS) for adaptation, categorized by the stage of NbS implementation (e.g., identified, planned, piloted, scaled-up, mainstreamed) and reporting on key outcomes related to adaptive capacity, resilience, and vulnerability reduction.” (9d01)
- “Policy and/or incentives for green infrastructure as nature-based solutions” (sheet 9d, row 30).

**Recommendation 3: Retain indicators that leverage the value of NbS, specifically coastal ecosystems, in adaptation and resilience and as infrastructure solutions**

Rationale for the recommendation: Nature-based solutions and ecosystem vulnerability to climate change should be incorporated in both thematic and dimensional targets as a cross-cutting theme that recognizes nature as an essential adaptation solution and an asset vulnerable to climate impacts. Nature-based solutions, including hybrid, ‘green-gray’ infrastructure approaches in blue carbon ecosystems, offer multiple co-benefits for carbon storage, biodiversity protection, livelihoods, and climate resilience, and should be considered alongside traditional gray infrastructure in resilience planning.

**Recommendation: Retain the following indicators which recognize the role of NbS in enhancing resilience:**

**9d indicator:**

“Number of Nature-based Solutions (NbS) projects implemented, categorized by their stage of implementation (e.g., pilot, scaled-up, mainstreaming) and reporting on key outcomes related to adaptive capacity, resilience, and vulnerability reduction.” (9d06)

**9e (Infrastructure) indicator:**

- “Proportion of NbS and EbA projects (e.g., wetlands, urban forests - green/ blue infrastructure) that have been monitored and shown to reduce at least two climate hazards (e.g., flood attenuation + heat mitigation) (9e08).”

**Recommendation 4: Indigenous Peoples and local communities**

Rationale for the recommendation: Indigenous Peoples have historically been strong environmental stewards, and together with local communities have valuable knowledge and experience in adaptive management that will be essential in achieving the GGA. Yet Indigenous Peoples and local communities often face disproportionate risk from climatic hazards and long-term impacts. Indicators that feature subnational government and community involvement helps ensure bottom up implementation of adaptation measures. To better ensure local stakeholders’ role in adaptive management, retain indicators that directly include Indigenous people, communities, and traditional knowledge systems, in addition to indicators that recognize their leadership and contribution to climate goals, strong engagement in climate-related processes, and/or their increased vulnerability to climatic threats.

**Recommendation: Retain the following indicators that recognize the role of and impacts on Indigenous Peoples and local communities in climate adaptation:**

**9d indicators (no IDs):**

- “Number of community-based climate adaptation strategies implemented aimed at enhancing local capacity to manage and respond to changes and hazards related to ecosystems.” (sheet 9d, row 38).
- “Number of countries taking action towards the full, equitable, inclusive, effective and gender-responsive representation and participation in decision-making and access to justice and information related to biodiversity by indigenous peoples and local communities, respecting their cultures and their rights over lands, territories, resources and traditional knowledge, as well as by women and girls, children and youth, and persons with disabilities, and the full protection of environmental human rights defenders.” (sheet 9d, row 13)

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## Annexes

**Annex I. Table 1. Overview of indicators that refer to fisheries and aquaculture**

**Annex II. Table 2. Overview of indicators that refer to coastal or marine ecosystems**

## Acknowledgements

### Contributing Authors

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