

Climate-Resilient Integrated Coastal Zone Management Performance Indicators

Lauretta Burke

Gaia Larsen

Winnie Lau

Ben Kushner

Hori Tsuneki

Environment, Rural
Development and Disaster
Risk Management Division

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*World Resources Institute

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Contact information: Tsuneki Hori (Tsunekih@iadb.org)

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Acronyms

CC	Climate Change
DRM	Disaster Risk Management
IADB	Inter-American Development Bank
ICZM	Integrated Coastal Zone Management
IWRM	Integrated Water Resources Management
LAC	Latin American and Caribbean region
LDCF	Adaptation Fund or Least Developed Countries Fund
M&E	Monitoring and Evaluation
SMART	Specific, Measurable, Attainable, Relevant, Time-bound
VCD	Disaster Controlled Vocabulary (Vocabulario Controlado sobre Desastres)
VRA	Climate Vulnerability and Risk Assessment
WRI	World Resources Institute

Glossary of Key Terms

Adaptation (Climatic Change Adaptation) * – In human systems, the process of adjustment to the real or projected climate and its effects, in order to mitigate the damages or take advantage of the beneficial opportunities. In natural systems, the process of adjustment to real climate and its effects; human intervention can facilitate adjustment to the projected climate.

Benefit-Cost Analysis¹ – The standard decision support tool for appraising and evaluating investments, projects, and policies within many government departments and donor organizations. It compares the costs and benefits of alternative options in monetary terms over a period of time, to provide an indication of how much a prospective project or investment contributes to social welfare.

Climate Change* – A change in the state of the climate that can be identified (for example, through statistical tests) by changes in the average value of its properties and/or by their variability, and that persists for long periods of time, generally for decades or longer periods. Climate change can be due to natural internal processes, external forces or persistent anthropogenic changes in the composition of the Earth's atmosphere and / or in land use.

Climate Vulnerability and Risk Assessment² – This qualitative and/or quantitative scientific estimation of risks includes the analysis of the expected impacts, risks and the adaptive capacity of a region or sector to the effects of climate change. Vulnerability assessment encompasses more than simple measurement of the potential harm caused by events resulting from climate change: it includes an assessment of the region's or sector's ability to adapt.

Disaster++ – A situation or social process triggered by the manifestation of a phenomenon of natural, socio-natural or anthropic origin that, when combined with conditions of vulnerability in a population and its productive structure and infrastructure, causes an intense, serious and extended disruption of the normal functioning of the affected country, region, area or community. These disruptions take on diverse and differentiated forms and are represented by the loss of life and health of the population; the total or partial destruction, loss or disablement of assets of the

¹ Waite, R., L. Burke, E. Gray, *Coastal Capital: Ecosystem Valuation for Decision Making in the Caribbean*. World Resources Institute, 2014.

² From the European Climate Adaptation Platform - <https://climate-adapt.eea.europa.eu/knowledge/adaptation-information/vulnerabilities-and-risks>

*: IPCC, (2012). "Summary for Policymakers" in the special report: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.

++: Lavell, A. et al., (2003). Local Risk Management: Ideas and Notions Relating to Concept and Practice. CEPREDENAC, UNDP. CRID. Vocabulario Controlado sobre Desastres (VCD).

community or individuals; and by severe environmental damages; requiring an immediate response by the authorities and the population to help the affected community and restore acceptable thresholds of well-being and life opportunities.

Disaster Risk Management* – Processes to design, apply and evaluate strategies, policies and measures aimed at: improving the understanding of disaster risks, fostering risk reduction and financial protection from disaster risks, and promoting the continuous improvement of preparedness, response and recovery practices, with the explicit objective of increasing human security, well-being, quality of life, resilience and sustainable development. Disaster Risk Management is not only for emergency preparedness but, as indicated clearly in the definition, has a broader perspective to incorporate it in socioeconomic development planning and process both at the national and the local/community level.

Disaster Risk Reduction* – The disaster risk management process focused on minimizing vulnerabilities and risks in a society, to avoid (prevention) or limit (mitigation) the adverse impact of hazards, within the broad context of sustainable development.

Ecosystem-based Adaptation to Climate Change³ – Ecosystem-based Approaches to Climate Change Adaptation, or Ecosystem-based Adaptation (EbA) involves a wide range of ecosystem management activities to increase the resilience and reduce the vulnerability of people and the environment to climate change. Climate change magnifies the existing risks and vulnerabilities associated with disasters, due to changing patterns of some hazards and due to increased population exposure and land-use changes. Human and natural systems are influenced by climate variability and hazards, with the negative impacts most severely felt in developing countries. Increased climate variability is associated with climatic change, and climate change effects will intensify significantly in the future. Adaptation occurs in physical, ecological and human systems. Adaptation to climate change takes place through reducing vulnerability or enhancing resilience in response to climate change. This builds upon disaster risk management – considering risk from both current and future climate.

Ecosystem Services⁴ – Goods and services provided by ecosystems that contribute directly and indirectly to human welfare. Ecosystem goods and services are often divided into provisioning services, regulatory services, supporting services, and cultural services.

³ IUCN

⁴ Waite, R., L. Burke, E. Gray, Coastal Capital: Ecosystem Valuation for Decision Making in the Caribbean. World Resources Institute, 2014.

Ecosystem valuation⁵ – An assessment of the value of ecosystem goods and services, or changes in the value of ecosystem goods and services, using monetary, social, or biophysical metrics.

Exposure* – The presence of people; livelihoods; environmental services and resources; infrastructure; or economic, social or cultural assets in areas that could be negatively affected.

Hazard++ – Latent danger represented by the probable manifestation of a physical phenomenon of natural, socio-natural or anthropogenic origin, that is anticipated to generate adverse effects on people, production, infrastructure and assets and services. It is a factor of external physical risk to people and property, which is expressed as the probability that an event will occur with certain intensity, in a specific location and within a defined period of time.

Integrated Coastal Zone Management (ICZM)⁶ – a continuous and dynamic process by which decisions are made for the sustainable use, development and protection of coastal and marine areas and resources. It is multifaceted - it analyzes implications of development, conflicting use, and interrelationships among physical processes and human activities, and it promotes linkages and harmonization between sectoral coastal and ocean activities.

Integrated Water Resources Management (IWRM)⁷ – "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."

Climate-resilient ICZM – is an ecosystem-based approach to the sustainable development of coasts that incorporates: assessment, maintenance and restoration of coastal ecosystem services, disaster risk management, climate change adaptation including policy reforms, physical solutions, behavioral campaigns and economic and financial tools for evidence-based decision making and investment.

Land use planning⁸ – the process by which a society, through its institutions, decides where, within its territory, different socioeconomic activities such as agriculture, housing, industry, recreation, and

5 Ibid.

6 Cicin-Sain, B. and Knecht, R. Integrated Coastal and Ocean Management. Island Press. (1998)

*: IPCC, (2012). "Summary for Policymakers" in the special report: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.

++: Lavell, A. et al., (2003). Local Risk Management: Ideas and Notions Relating to Concept and Practice. CEPREDENAC, UNDP. CRID. Vocabulario Controlado sobre Desastres (VCD).

7 Global Water Partnership (GWP) Technical Committee –(<https://www.gwp.org/en/GWP-CEE/about/why/what-is-iwrm/>)

8 World Bank Guidance Note - <http://siteresources.worldbank.org/INTRANETENVIRONMENT/Resources/244351-1279901011064/GovLandUsePlanning.pdf>

commerce should take place. This includes protecting well-defined areas from development due to environmental, cultural, historical, or similar reasons, and establishing provisions that control the nature of development activities. These controls determine features such as plot areas, their land consumption or surface ratio, their intensity or floor-area ratio, their density or units of that activity (or people) per hectare, the technical standards of the infrastructure and buildings that will serve them.

Marine Zoning⁹ – Marine or Ocean Zoning refers to the process by which a society, through its institutions, decides where, within its maritime territory, different socioeconomic activities such as fishing, recreation, oil and gas exploration and extraction, and wind generation, among others, can occur. Marine reserves and marine protected areas are tools used in marine zoning. MPAs and MPA networks are better seen as starting points for more comprehensive spatial management, facilitated by ocean zoning. This involves a logical scaling up from discreet piecemeal protected areas to larger and more systematic planning of ocean areas.

Performance – the ability (or capacity) to plan, implement and monitor/evaluate development effectiveness in and around coastal areas.

Project environmental and social impact assessment¹⁰ – a process for predicting and assessing the potential environmental and social impacts of a proposal project, evaluating alternatives, and designing appropriate mitigation, management and monitoring measures.

Resilience* – the ability of a system and its components to anticipate, absorb, adapt or recover from the effects of a dangerous phenomenon, in a timely and efficient manner, even safeguarding the conservation, restoration or improvement of its essential basic structures and functions.

Risk Analysis ++ – In its simplest form, it is the hypothesis that risk is a combination of the hazard and the vulnerability of the exposed elements, with the aim of determining the possible social, economic and environmental effects and consequences associated with one or several dangerous phenomena in a territory and with reference to specific social and economic groups or units. Changes in one or more of these parameters modify the risk itself, that is to say, the total anticipated losses and consequences in a certain area. The analysis of hazards and vulnerabilities constitute

9 Agardy, T. Ocean Zoning: Making Marine Management More Effective. Earthscan. 2010.

10 BBOP (2012) Glossary. Business and Biodiversity Offsets Programme, Washington DC, USA

*: IPCC, (2012). "Summary for Policymakers" in the special report: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.

++: Lavell, A. et al., (2003). Local Risk Management: Ideas and Notions Relating to Concept and Practice. CEPREDENAC, UNDP. CRID. Vocabulario Controlado sobre Desastres (VCD).

facets of risk analysis and ought to be articulated with this purpose and not comprise separate and independent activities. Of note for risk assessments, climate change is expected to change some countries' disaster risk (their probable losses) by changing the characteristics of the hydro-meteorological hazards

Vulnerability++ – Internal risk factor of an element or group of elements exposed to a hazard. It corresponds to the physical, economic, political or social predisposition or susceptibility of a community to being affected or undergo adverse effects in the event that a dangerous phenomenon of natural, socio-natural or anthropogenic origin occurs. It also represents the conditions that prevent or hinder subsequent autonomous recovery.

Source: Unless otherwise noted, these definitions were adapted from Lacambra, S., *et al. Index of Governance and Public Policy in Disaster Risk Management*, which relied on:

- *: IPCC, (2012). “Summary for Policymakers” in the special report: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. [A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 1-19.
- ++: CRID. Vocabulario Controlado sobre Desastres (VCD). Visit online at (cidbimena.desastres.hn). Source: Lavell, A. et al., (2003). Local Risk Management: Ideas and Notions Relating to Concept and Practice. CEPREDENAC, UNDP.

1. Introduction

Coastal ecosystems provide a wide variety of goods and services in countries across the Latin American and Caribbean (LAC) region, including protection of the shoreline, carbon sequestration, fisheries habitat, and a magnet for tourism (Waite et al., 2014). To maintain the value that coastal ecosystems provide in a sustainable manner, countries need to implement effective Integrated Coastal Zone Management (ICZM) with an emphasis on managing climate change-related vulnerabilities and risks. In this study, ICZM is defined as a continuous and dynamic process by which decisions are made for the sustainable use, development and protection of coastal and marine areas and resources. It is multipurpose oriented: it analyzes implications of development, conflicting use, and interrelationships among physical processes and human activities, and it promotes linkages and harmonization between sectoral coastal and ocean activities (Cicin-Sain and Knecht, 1998). ICZM is particularly appropriate for responding to climate change as it takes a holistic approach to risk assessment, planning, and management. It emphasizes long-term sustainable use, resilience-building, and ecosystems-based management, in which the provision of ecosystem services and co-benefits are considered (e.g., the ability of mangroves to protect coastlines, provide habitat, and serve as a sink for carbon). Such “natural capital” is vital for reducing risk and increasing resilience under a changing climate. ICZM is a valuable framework, as it helps address information and institutional silos by bringing relevant agencies and stakeholders together. For example, urban planning, coastal planning, adaptation planning and disaster risk reduction are sometimes spread across different agencies or ministries, with challenges for enough integration and collaboration. Integrating information and sharing institutional goals is a key element for promoting alignment and improving efficiency (See glossary for key definitions used in this framework).

A fundamental requirement for effective ICZM is adequate and sustainable financing. Coastal management agencies, especially in developing countries, often face challenges in accessing sustainable financial resources to cover operating costs as well as capital investments. This deficit can be manifest by insufficient staff for enforcement of regulations, inadequate training of staff, lack of capital investments for conservation and restoration of habitats, and insufficient maintenance of coastal infrastructure. These financial constraints also hamper long-term planning for climate preparedness. How coastal management agencies are funded vary by country, but can include annual budget allocations, taxes, dedicated fees (e.g., for marine protected areas), maintenance funds, etc. These domestic sources of financing can be complemented by external funds (e.g. from development finance institutions), most appropriately for capital investments. Internal financing is, however, at the core of a permanent resilient ICZM program. In addition,

there is a growing availability of external finance to help developing countries prepare for climate change and a growing recognition of the role ICZM plays in managing and adapting to climate change-related hazards, such as sea-level rise and increased storm intensity. Funding from international climate funds, such as the Adaptation Fund and Green Climate Fund, could play an important role in helping to fund some coastal adaptation activities, including investment in natural coastal infrastructure in LAC countries. These funds, however, are project-oriented, and do not offer the long-term sustainable financing needed for stable, effective ICZM.

These indicators of Climate-Resilient ICZM Performance (or “the indicators”) were developed as a tool to assist countries in the LAC to evaluate progress toward sustainable, climate-resilient management of coastal areas. The indicators serve as a diagnostic tool to support countries in their assessment of whether they have the right policies, institutions, implementation practices and monitoring frameworks in place, as well as the right information available, to support sustainable management of coastal areas, in light of the changing climate. Results are not intended for comparison between countries; rather, results are for better within-country understanding of strengths and weaknesses regarding the basic principles of ICZM and climate preparedness in coastal areas. The indicators were co-developed by the World Resources Institute and the Inter-American Development Bank (IADB) under the Technical Corporation: Knowledge and Innovation: Disaster and Climate-Resilient Coastal Zone Management (RG-T2675), which aims to catalyze sustainable, replicable, and innovative investments in disaster and climate-resilient ICZM.

The aim of these indicators is to highlight key conditions and good practices that can help a country support ICZM, climate adaptation and resilience building in coastal areas. Key conditions evaluated include: a) legal and institutional frameworks for ICZM and climate preparedness; b) the availability and quality of information – both on the coastal environment and resilience to climate change; c) whether the requisite technical capacity is present to develop and evaluate initiatives to reduce climate-related risk; and d) whether there is sufficient and sustainable financing for ICZM.

The indicators were created based on an extensive review of relevant literature complemented by interviews with experts on coastal zone management and disaster risk management in the LAC region. The literature review included 14 existing indexes or diagnostics, covering coastal management, governance, disaster risk reduction and management, climate vulnerability and adaptation, and environmental performance. Appendix 1 provides a summary of the 14 indexes / diagnostics reviewed, their relevance to climate-resilient ICZM performance and how they informed the selection and development of the indicator categories, the individual

indicators, and their ranking criteria. Broadly, five of the 14 indexes / diagnostics reviewed covered coastal/ocean health and management, three focused on environmental (including coastal) governance, and six dealt with climate risk/resilience and disaster risk reduction. However, none of the diagnostics reviewed encompassed the full suite of measures and information needed to assess ICZM with climate considerations. Based on this literature review, the indicators provided in this document aim to fill this gap, while also being easy to implement and understand.

The primary audience for these indicators of climate-resilient ICZM performance includes government officials working on coastal zone management, disaster risk reduction, and climate preparedness, as well as those working in sectoral agencies in coastal areas. A secondary audience is potential investors in coastal areas that seek information on the preparedness of the country (or area) for climate change.

These indicators were pilot tested in Belize from January to February 2019. Feedback from pilot testing was used to revise several of the indicators, resulting in this final set of indicators, which is ready for application in other countries. These indicators are accompanied by an Excel spreadsheet which is used to record results and automatically score the indicators.

Indicators, Criteria and Scoring Methods

Indicators were selected based on the degree to which they highlight good practices in sustainably managing coastal areas while also reducing climate-related risk and enhancing resilience. In developing the indicators and grouping them into logical categories, several important factors were considered including:

- The number of indicator categories, to ensure that they could be easily understood and applied by policy makers;
- The degree to which indicators (under each category) measure important and understandable aspects of the category;
- Inclusion of indicators which have the ability to highlight good practices in coastal management, disaster risk reduction, climate vulnerability and risk assessment, information management, and ICZM financing;
- An approach that is national in scope, but flexible for application at sub-national levels;
- Inclusion of indicators that are as SMART (Specific, Measurable, Attainable, Relevant, Time-bound) as possible; and
- Inclusion of indicators that consider the difficulty and time required for data collection.

Given the range of legal, institutional, technical, physical, social, and fiscal issues associated with ICZM, there are multiple options for grouping and categorizing these

topics. The Indicators arrived at four categories that highlight the key aspects of ICZM performance, and which are distinct, understandable and relevant. These four categories include 15 indicators:

1. Legal and Institutional Framework for ICZM and Climate Preparedness

- a. Status of National ICZM Regulatory Framework
- b. Status of National Regulatory Framework on Climate Change Adaptation and Disaster Risk Management
- c. Regulatory Environment for Coastal Development
- d. Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change
- e. Institutional Responsibility for Monitoring and Evaluation of ICZM Activities and Projects

2. Assessing Climate Risks in the Coastal Zone

- a. Data on Environmental Condition and Trends in Coastal Areas
- b. Shared Information Platform
- c. Climate Vulnerability and Risk Assessment (VRA)
- d. Timeliness of Data and Assessments

3. Identifying Adaptation Opportunities and Protecting Investments

- a. Identifying ICZM-related Responses to Climate Change
- b. Skills and Experience Developing and Evaluating Adaptation Solutions
- c. Monitoring and Protecting Investments in Infrastructure

4. Financing ICZM

- a. Sustainable Funding for ICZM Operations
- b. Access to International Development Finance
- c. Financial Incentives and Schemes to Incentivize Private Action

Indicator Criteria. Each indicator includes criteria that allow for the collection of relevant details. The criteria were selected with consideration of what information is likely to be available. Table 1 presents the number of criteria and possible total point score for each indicator. All criteria are described in the next section.

Scoring Method. Individual indicator scores are meaningful in themselves as each individual indicator provides information on the preparedness of the country (or subnational area) to sustainably manage coastal areas and increase climate resilience, including through investment in ecosystem-based adaptation (natural infrastructure) options. In addition, indicators can be meaningfully aggregated to the category level. The simplest means of deriving a category score is to take a simple average of the component indicators. As such, each aggregate category score calculated in the Scoresheet does not weight the indicators because this is a subjective process (Weighting of indicators within a category is an option if users deem it appropriate for their country context and can be done outside of the scoresheet, using the indicator scores from the scoresheet).

Table 1- Indicator Categories, Indicators and number of criteria

	Number of criteria	Maximum points possible
1. Legal and Institutional Framework for ICZM and Climate Preparedness		
a. Status of National ICZM Regulatory Framework	8	8
b. Status of National Regulatory Framework on Climate Change Adaptation and Disaster Risk Management	5	5
c. Regulatory Environment for Coastal Development	5	5
d. Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change	5	5
e. Institutional Responsibility for Monitoring and Evaluation of ICZM Activities and Projects	3	3
2. Assessing Climate Risks in the Coastal Zone		
a. Data on Environmental Condition and Trends in Coastal Areas	22	66
b. Shared Information Platform	17	17
c. Climate Vulnerability and Risk Assessment (VRA)	7	32
d. Timeliness of Data and Assessments	6	6
3. Identifying Adaptation Opportunities and Protecting Investments		
a. Identifying ICZM-related Responses to Climate Change	3	3
b. Skills and Experience Developing and Evaluating Adaptation Solutions	5	5
c. Monitoring and Protecting Investments in Infrastructure	4	4
4. Financing ICZM		
a. Sustainable Funding for ICZM Operations	5	5
b. Access to International Development Finance	4	4
c. Financial Incentives and Schemes to Incentivize Private Action	3	3

Scoring. The four categories and 15 indicators cover a broad range of topics. Each indicator, in turn, has multiple criteria that are evaluated individually, and subsequently averaged to arrive at the indicator score. Most criteria are binary (yes/no, achieved/not achieved), though some allow for more graded responses (such as whether a given environmental variable has been assessed once, multiple times, or is routinely monitored), or the criteria might include a list of variables monitored (with one point for each). To address this variety, a scoring method was developed that is both flexible and scalable. The unifying element of the scoring approach is that each indicator receives a score ranging from 0 to 1, based on the percentage of criteria achieved.

Information Collection for the Indicators

This document describes the 15 indicators and the associated criteria. The actual scoring of indicators is done in the spreadsheet, independent from this spreadsheet, the application of the indicator can be done with the process as follows:

- a) Read this document in its entirety to have a complete understanding of the breadth of information to be collected.
- b) To make information collection more efficient and minimize repeat contact of a given source, develop a general strategy regarding which agencies / data sources will be approached for each indicator. Cluster the collection of information by data source.
- c) For each indicator, review the indicator description and the description of all criteria since every criterion should be scored.
- d) For each criterion, it is important to note how the information was collected.
 - Some criteria are likely to be resolved and supporting information found through online searches. In these cases, the web address should be noted, and the supporting documentation (such as a PDF) should be downloaded and saved in a folder for the given indicator. It is ideal to be as specific as possible about the source of the supporting information, the document / name of legislation, etc., relevant page number, if possible.
 - Some criteria will require interviews with expert(s) on the topic. In these cases, it is important to note who was interviewed and when, their affiliation and contact information, the nature of the response (including whether absolute or qualified), and any supporting documentation they provide.
- e) The criteria scores, short summary of response / finding, and source of information should be recorded. In a scoresheet and the information is organized as follows:
 - **Column A1B.** The criteria name is listed in the first (merged) column.

- **Column C.** The response is selected from a drop-down menu in in the second column (such as Yes or No; or sometimes related to a frequency (e.g. for data collection))
- **Column D.** The third column will automatically populate with the corresponding numeric score, such as Yes = 1; No = 0. (This is used to automatically generate a score for the indicator.)
- **Column E.** A short summary of the finding supporting the response/score should be filled in here. (e.g. ICZM legislation was approved in 2013).
- **Column F.** Any qualification or important comment on the criteria could be entered here (e.g. coral reef condition was monitored annually from 1995 – 2001, and only once since then.)
- **Column G.** The data source should be provided (e.g. Interview with X; Legislation named XX; the online information system for coastal management reference webpage

If any of the information for columns E, F, or G is lengthy, it can be included on the “Additional Information” tab of the spreadsheet, on the row for the given indicator.

All supporting documentation for each indicator should be compiled into its own individual folder.

Supporting documentation could include:

- a. A link to a website indicating the type of information gathered, such as:
 - i. a document download location (and note the page or paragraph which is relevant),
 - ii. web text,
 - iii. data table, or
 - iv. database query platform;
- b. A PDF of a document;
- c. Notes from an interview, etc., but with as much specific supporting information as possible.

2. Climate-Resilient ICZM Performance Indicators

This section presents the four indicator categories, 15 indicators and the associated criteria for evaluation of each indicator.

2.1 Legal and Institutional Framework for ICZM and Climate Preparedness

Overview: This category covers the legislative and institutional arrangements that support planning, coordination, and service delivery for ICZM and climate preparedness. For this assessment, several measures are considered, such as whether the country has in place framework legislations for ICZM that incorporates climate change and disaster risk management and whether a lead institution has been identified with designated counterparts across sectors. In addition, this category examines the regulatory environment governing development in the coastal zone, the degree of interagency coordination for ICZM and DRM, and the existence of an M&E system to monitor the success of coastal zone management efforts.

2.1.1 Status of National ICZM Regulatory Framework

Justification: ICZM legislation provides the mandate, structure and processes that enable effective coastal zone management. The content of ICZM legislation is of critical importance for laying out the framework for meaningful on-the-ground action.

Ranking Criteria: (percent of the following achieved)

1. ICZM-specific or inclusive legislation has been approved, which designates a lead agency.
2. Legislation designates sectoral competencies, including an agency responsible for environment, planning, public works, and fisheries.
3. Legislation establishes collaboration with the agency responsible for climate change adaptation.
4. Legislation establishes a process for public participation, review and comment on the ICZM planning process and on the approval of coastal development public-investment projects. ("Public" includes citizens, community groups, as well as stakeholders with vested economic interests.)
5. A coastal zone management plan has been officially published.
6. Regulations have been officially published to implement the ICZM plan.
7. Regulations establish a system of penalties to public and private entities when ICZM-related regulations are violated.
8. A system for reporting violations of ICZM or related regulations is in place.

Scoring: Percent of criteria achieved (n / 8)

Means of verification: review of national policies and legislation, interviews with coastal resource managers, literature review.

Likely institutional source: ICZM entity, legislative body.

2.1.2 Status of National Regulatory Framework on Climate Change Adaptation and Disaster Risk Management

Justification: This policy/legislation provides the mandate, structure and processes that enable national planning and management for climate and disaster preparedness, including coordination with key sectoral agencies.

Ranking Criteria:

1. National legislation to implement DRM has been officially published (not only for an emergency preparedness. See the definition of DRM).
2. There is also an officially published national policy or legislation focused on climate change adaptation.
3. National regulations on DRM coordinate with related standards on climate change adaptation, integrated water resources management, and land use planning.¹¹
4. National policy / legislation on DRM establishes a process for public participation, review and comment in the development of disaster risk management plans.
5. National policy / legislation on climate change adaptation establishes a process for public participation, review and comment in the development of climate adaptation plans.

Scoring: Percent of criteria achieved (n / 5)

Means of verification: review of national policies and legislation, interviews with climate and disaster preparedness managers, literature review.

Likely institutional source: DRM/DRM entity, legislative body.

2.1.3 Regulatory Environment for Coastal Development

Justification: Rules governing developments in the coastal zone can help the government ensure that investments incorporate climate risks into decision-making processes.

¹¹ Adapted from iGOPP.

Ranking Criteria:¹²

1. The regulations that standardize the carrying out of environmental impact assessments (or equivalent process) integrate climate-hazard analysis.
2. The regulations that standardize the carrying out of project impact assessments (or equivalent process) prior to project implementation require evaluation of social and environmental impacts.
3. The National Development Plan (or equivalent instrument) contains objectives, targets and / or indicators about climate risk reduction and / or climate resilience.
4. Regulations establish a system of penalties to entities when coastal development-related regulations are violated.
5. The lead agency for ICZM has defined priority (or critical) areas for coastal management.

Scoring: Percent of criteria above achieved (n / 4)

Means of verification: review of national policies and legislation, interviews with urban development managers, department of housing and development, climate and disaster preparedness managers, natural resource managers.

Likely institutional source: Environment ministry, ministry of planning/housing.

2.1.4 Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change Adaptation

Justification: Authority over coastal ecosystem resource use, management, and development resides across multiple agencies and sectors. In addition to coastal resource managers, the cooperation of the land use planning authority, business development authority, waste managers, fisheries managers, and disaster risk management authorities, are needed for truly integrated and effective coastal zone management.

Ranking Criteria:

1. An inter-institutional framework¹³ for ICZM has been officially established.

¹² These criteria were adapted from iGOPP.

¹³ An inter-institutional framework (with assignment for lead (or coordination) agency) operationalizes ICZM. It pertains to the network of actors operating in this space, and defines functions, roles, organizational structures, and formal relationships.

2. The framework includes the agency(ies) responsible for DRM and climate change adaptation.
3. Actions of the framework includes provisions for technical-information sharing mechanism necessary for ICZM development planning decision making, and relevant agencies/entities share data for this purpose.
4. Relevant agencies/entities meet regularly (at least twice per year) to discuss and make joint planning decisions or development monitoring plans on climate-related ICZM.
5. The relevant agencies/entities develop joint multi-year work plans to coordinate and collaborate on assessing and addressing climate-related risks in coastal areas.

Scoring: Percent of criteria above achieved (n / 6)

Means of verification: review of national policies and legislation, interviews with natural resource managers, consultation and/or drafting reports, meeting minutes, technical briefs, workshop reports, briefing documents, literature review.

Likely institutional source: CZM unit, land use planning office, permitting office, finance ministry, fisheries agency, waste management authority.

2.1.5 Institutional Responsibility for Monitoring and Evaluation of ICZM Activities and Projects

Justification: Consistent and targeted M&E enables the extraction of lessons learned which make future ICZM-related projects more sustainable and allow for adaptive ICZM management.

Ranking Criteria:

1. Regulations assign a public or academic entity or a third party to undertake independent monitoring during implementation of ICZM-related projects.
2. Regulations assign a public or academic entity or a third party to undertake independent technical performance evaluations at the end of ICZM-related projects.
3. Regulations mandate the project monitoring results are presented to the ICZM authority at regular intervals (at least annually) and inform updates to management plans.

Scoring: Percent of criteria achieved (n / 3)

Means of verification: review of national ICZM policies and legislation, interviews with coastal resource managers, literature review.

Likely institutional source: ICZM entity, legislative body.

2.2 Assessing Climate Risks in the Coastal Zone

Overview: Understanding status and trends of ecosystems, as well as current and potential future climate-related hazards and risk in coastal areas, is essential to planning actions to reduce risk and build coastal resilience. This category examines a) what data are collected through environmental monitoring and the frequency and density of data collection; b) whether data are integrated (available in a central or shared information hub); and c) the quality and completeness of data on risk from climate change in coastal areas.

2.2.1 Data on Environmental Condition and Trends in Coastal Areas

Justification: Monitoring of coastal habitats and coastal condition is important for management of coastal areas, including the planning of actions to reduce risk from climate-related hazards. Baseline information, complemented by repeat measurement, allows tracking of change and is an important input to both the design and evaluation of actions.

Ranking Criteria:

For each of the following environmental or ecological variables, there are two parts to the evaluation – a) spatial extent of monitoring coverage, and b) temporal frequency of monitoring.

a) *Spatial extent (and density) of coverage of assessment* - please note whether:

- (0) This variable is not assessed;
- (1) The variable has been assessed for a single location or relatively limited area relative to the extent of physical feature (i.e., monitoring reflects less than one quarter of coral reef area in the country; fewer than 25% of beaches monitored);
- (2) The assessment of the variable, at a minimum, covers all areas defined as priority (or critical) for coastal management (if such areas have been defined – see criteria 1.C.5);
- (3) The assessment of the variable is national in scope and sampling is at *adequate density* to capture the variability of the variable. (e.g., water quality monitored in enclosed and open waters; beach erosion monitored on different exposures).

Environmental / Ecological Variable	0- not assessed	1- single location / limited area	2- covers all "critical" areas	3- monitored across country at adequate density
a. Coral reef condition				
b. Mangrove extent				
c. Sea grass extent				

d. Commercial fish stocks and condition (for at least 50% of commercial fish species)				
e. Bycatch from fishing activities				
f. Coastal water quality – bacteria				
g. Coastal water quality – nutrients				
h. Physical shoreline change – coastal erosion / beach profile change				
i. Waves and surge – tides, wave height, storm surge				
j. Precipitation in coastal areas				
k. Water temperature				

b) Temporal frequency of assessment - please note whether:

- (0) No information is available on the topic;
- (1) The variable has been assessed at least once, so “baseline” information is available;
- (2) The variable has been assessed more than once;
- (3) The variable has been assessed more than once and the most recent is within the past two years (which can be called “regularly monitored”).

Environmental / Ecological Variable	0- none	1- baseline available	2- info available for multiple time periods	3- regularly monitored
a. Coral reef condition				
b. Mangrove extent				
c. Sea grass extent				
d. Commercial fish stocks and condition (for at least 50% of commercial fish species)				
e. Bycatch from fishing activities				
f. Coastal water quality – bacteria				
g. Coastal water quality – nutrients				
h. Physical shoreline change – coastal erosion / beach profile change				
i. Waves and surge – tides, wave height, storm surge				
j. Precipitation in coastal areas				
k. Water temperature				

Scoring: Based on total score / maximum points possible. In this case, point score / 66 (when considering both tables a and b).

Means of Verification: Interviews with environment agency, resource managers, weather agency, review of reports, examination of monitoring systems and databases.

Likely institutional source: Environmental agency or coastal agency and resource managers.

2.2.2 Shared Information Platform

Justification: Climate risk assessment in the context of ICZM requires information from multiple sources to come together for integration, unified display and analysis. It is vital that there be an information hub – likely in the form of a GIS – to house this information, or some system (likely cloud-based) which allows integrated viewing of data from multiple platforms. The first criterion evaluates whether this shared information hub exists, while subsequent criteria examine whether specific data are included.

Ranking Criteria:

1. An information hub or integrated information-sharing platform exists supporting the management of coastal areas. (A note on scoring – if the relevant data are spread across multiple platforms, but the functionality exists for viewing and using said data from a single point, this counts and scores a yes.)

The information hub or platform includes the following:

2. Information on ecosystem extent and condition (mapped location and data from monitoring condition - for each of the following ecosystems, if present in the country – coral reefs, mangroves, sea grass, salt marsh, other wetlands, sandy beach)
3. Information on monitoring of coastal waters – all of the following: water quality, tidal range / storm surge / wave heights
4. Information on land use and the built environment – including all of the following (if present in area)– location of roads, public infrastructure and public/private housings, wastewater treatment facilities, and energy facilities
5. Information on shoreline areas with built coastal protection infrastructure present (such as sea walls, jetty, breakwater, etc.), as well as information on the condition of the infrastructure.
6. Information on permits for infrastructure construction and operation
7. Information on elevation in coastal areas
8. projections of sea level rise
9. Information on drainage system – both natural (rivers, creeks) and built (canals, culverts, etc.)
10. Information on land use zoning (for urbanized areas)
11. Information on marine zoning / marine protected areas / fisheries management areas
12. information on shoreline change – including all the following: coastal erosion; change in beach profile; shifting of the coastline

13. Information on proposed coastal development (applications pending approval, including preliminary design information which contains type of development, proposed location, and building footprints)
14. Information on past flooding in coastal areas (extent and date)
15. Information on estimates of damage from past storms (for at least one storm event)
16. Information on ecological impacts in coastal areas (such as algal blooms, fish kills, marine mammal stranding)
17. The system includes some projections related to climate change (at least one of the following
 - projections of temperature, changes in storm intensity, change in intensity and frequency of precipitations, or probabilities of loss due to future hazards)

Scoring: Percent of criteria achieved ($n / 17$)

Means of Verification: Interviews with coastal agency or environment agency, review of reports, examination of information system.

Likely institutional source: Environmental agency or coastal agency.

2.2.3 Climate Vulnerability and Risk Assessment (VRA)

Justification: Understanding risks posed by climate hazards across the land and seascape is an important step toward being able to manage for climate-associated vulnerabilities. Relevant factors include who conducted the analysis; which climate hazards are included; which sectors are included; whether all priority/critical area is covered; whether national/local climate data is used; and whether number of climate change scenarios/projections are incorporated.

Ranking Criteria:

1. At least one climate VRA is available for the country or pre-identified priority/critical area.
 - 1 pt. if done for the region (such as Caribbean or Eastern Caribbean region); 2 pts if available for the specific country (whole country or addressing all pre-identified priority/critical areas)
2. Data on ecosystems (reflecting the protective role of ecosystems for ecosystem-based adaptation) were included in the climate VRA. (Options below need to be adjusted based on the ecosystems occurring in the country; then one point for each of the following): (up to 4 points)
 - Map of coral reefs
 - Map of mangroves
 - Map of salt marsh / and or wetlands
 - Map of sand dunes

3. 1 point for each hazard which is relevant to the area and has been evaluated (hazards or examples which are not relevant can be excluded):¹⁴
- Coastal flooding (should include tide, waves and storm surge)
 - Flooding from rainfall and over-flowing rivers and drains
 - Damage from winds
 - Temperature-related hazards (stress to plants, coral bleaching or water quality impacts)
 - Coastal erosion
 - Coastal landslides
4. 1 point for each economic sector that is relevant to the area and has been evaluated for its climate-related vulnerability (sectors or examples that are not relevant can be excluded):¹⁵
- Coastal development (should include housing, roads and coastal protection)
 - Tourism
 - Agriculture
 - Fisheries and aquaculture
 - Energy
 - Water and wastewater
 - Cultural assets
 - Marine transportation
5. 1 point for evaluating each of the following for influence on climate vulnerability (factors which are not relevant can be excluded):¹⁶
- Economic factors (wealth and poverty levels)
 - Environmental factors (ecosystems and natural capital)
 - Demographic characteristics (including age distribution, disability, gender and ethnicity)
 - Social factors (education, literacy, phone ownership and access to internet)
 - Public service provision (drinking water, trash-pickup, shelters and cooling centers)

¹⁴ A comprehensive VRA would consider the full range of important climate-related hazards in the area and the probability that they will take place. Not all areas experience all hazards. As such, the list below can be adjusted to local circumstances.

¹⁵ A comprehensive VRA would look at the exposure and vulnerability to identified hazards of relevant sectors in coastal areas. Not all areas have all sectors present. As such, the list below can be adjusted to local circumstances.

¹⁶ A comprehensive VRA would look at social and economic characteristics. Not all areas have people present. As such, the list below can be adjusted to local circumstances.

- Construction materials
6. 1 point for evaluating each of the following for influence on climate risk (items which are not relevant can be excluded):¹⁷
- Projected change in temperature, including intensity and duration of extreme heat events
 - Projected change in precipitation and precipitation variability
 - Projected change in frequency and intensity of storm events
 - Exploration of thresholds – Examining past impacts in coastal areas (such as floods or coral bleaching) in conjunction with the temperature and precipitation events at the time.
7. The climate VRA evaluates different possible futures by doing the following (1 point each):
- Using multiple climate projections (projections for multiple emissions scenarios, such as RCP4.5 and RCP8.5)
 - Using projections from multiple models (either through comparing results from more than one climate model, or through using the mean value from an ensemble of models)

Scoring: Number of points achieved / total possible. (If the above lists are not altered, the total possible is 32.)

Means of verification: Review of any / all VRAs for the country / area / region, coupled with consultations with the agencies responsible for ICZM, environment, DRM and climate.

Likely institutional source: Environmental agency, or agencies responsible for ICZM, DRM and climate.

2.2.4 Timeliness of Data and Assessments

Justification: Physical conditions change over time – this can include level of development along the shoreline; slope and elevation of coastal areas; extent of mangroves along the coast; ocean temperature; sea level; and storm intensity. In addition, a country's ability to monitor coastal conditions improves with changes in technology (e.g. sensors and information management

¹⁷ A VRA should combine examination of past climate (climate averages and variability) with associated impacts. Climate risk is not only about the future – it should also take into account past climate in the area – to consider historic averages, the frequency of extreme events and how these seem to be changing (considering the past 30 – 50 years is ideal, but what is possible depends on data available).

technologies). These changes and improvements provide impetus for regular updates to assessments.

Ranking Criteria:

1. The entity/ies responsible for data collection on coastal environmental condition maintain or replace equipment periodically (checked at least every two years).
2. Early warning systems for coastal flooding are in place and are checked at least annually by the responsible entity/ies.
3. Satellite (or other data) are used to revise coastal ecosystem maps periodically (at least one habitat, such as coral reefs or mangroves updated within the past 5 years).
4. The responsible entities update climate VRA periodically (within the past five years) and make these publicly available.
5. The responsible entities update coastal ecosystem assessments (such as a state of the coasts report) periodically (within the past five years) and make these publicly available.
6. The responsible entities update coastal ecosystem economic valuations periodically (within the past five years) and make these publicly available.

Scoring: Percent of criteria achieved ($n / 6$).

Means of verification: Review of publications; review of regulations; consultations with the agencies responsible for ICZM and environment.

Likely institutional source: Environmental agency or agency responsible for ICZM.

2.3 Identifying Adaptation Opportunities and Protecting Investments

Overview: Good information on coastal ecosystem condition and climate-related hazards, coupled with broad stakeholder input are important foundational elements for identifying key policies, plans and actions to reduce climate-related risk in coastal areas. These provide inputs, while project proposals, which can be operationalized, are the outputs. This category looks at the degree to which data on climate risks has been translated into appropriate risk-mitigation actions and whether some of the key skills required to do this are present. It also looks at whether monitoring of coastal infrastructure occurs to protect investments made in both built and natural infrastructure.

2.3.1 Identifying ICZM-related Responses to Climate Change

Justification: Once information is available on climate risks, actions need to be identified that can most effectively help reduce these risks and prepare for a changing climate. This indicator

looks at the degree to which the government has been able to identify appropriate responses to reduce climate-related risk in coastal areas.

Ranking Criteria:

1. Specific actions for responding to climate-related risks in the coastal zone have been identified and listed in one or more national plans (e.g. in national development plans, ICZM plans, National Adaptation Program of Actions, National Adaptation Plan or Nationally Determined Contributions).
2. Potential actions to reduce climate-related risk have *been prioritized* with consideration of where climate impacts will be most severe (geographically) and who among the country's population is the most vulnerable, as identified in the climate VRA.
3. Potential actions to reduce climate-related risk have *been prioritized* with consideration of who among the country's population is the most vulnerable, as identified in the climate VRA (within the sectors evaluated in the VRA).
4. In developing actions to reduce climate-related risk in coastal areas, ecosystem-based adaptation options (e.g. restoration or protection of ecosystems providing natural infrastructure) have been evaluated for potential use (in at least one of the proposals in the last three years).

Scoring: Percent of criteria above achieved ($n / 4$)

Means of verification: Planning documents, climate change strategy and policy documents, project proposals, impact assessments or similar studies, stakeholder interviews.

Likely institutional source: Climate agency, environmental agency, ICZM agency / unit.

2.3.2 Skills and Experience Developing and Evaluating Adaptation Solutions

Justification: A variety of technical skills are required to interpret VRA results for coastal areas and turn these into operationalizable actions. Some of these requirements are commonly outsourced to engineering or consulting firms. There are, however, some core skills which are valuable either for interpreting consultant or engineering reports, or for developing comparisons of project options. For example:

- Economic valuation of ecosystems services is an important tool for decision-makers in assessing trade-offs in ICZM planning and implementation, and for evaluating the benefits of natural infrastructure.

- Environmental impact assessment is an important tool for evaluating the likely effects of a proposed project or development, considering inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.
- Cost-Benefit Analysis is a tool which translates project (or policy costs) and benefits (including ecosystem services or social benefits) into a common currency for comparing the relative costs and benefits of different development or management options.
- A basic capacity in coastal engineering and / or in coastal processes / geomorphology is needed to identify green infrastructure solutions for coastal protection and to review designs.
- Competency in monitoring of coastal physical processes (tides, waves and erosion) is also important for developing adaptation solutions.

Ranking Criteria:

Whether agencies collaborating on ICZM have at least one staff person who has experience in the following in the past two years:

1. Conducting or evaluating environmental impact assessments (based on the national standards / regulations, if such exist).
2. Conducting or evaluating reports on ecosystem service valuation.
3. Conducting or evaluating cost-benefit analysis (as a tool for comparison of options) - based on the national standards / regulations, if such exist.
4. Conducting or evaluating studies on effectiveness of natural infrastructure (green infrastructure solutions).
5. Conducting or evaluating analyses of coastal processes / dynamics.

Scoring: Percent of criteria achieved (n / 5)

Means of verification: Interviews with agency staff, project documents and proposals; review of publications.

Likely institutional source: Agencies developing projects to reduce climate risk – environmental agency; agency responsible for climate preparedness, other sectoral agencies.

2.3.3 Monitoring and Protecting Investments in Infrastructure

Justification: Climate-resilient ICZM performance usually requires (green / conventional) infrastructure operations with a long-lasting life span (typically 25-40 years), and these require periodic monitoring and maintenance.

Ranking Criteria:

1. Standards and metrics exist for monitoring and evaluating the integrity of coastal infrastructure and operations and for upgrades or decommissioning.
2. The national entity responsible for ICZM undertakes periodic monitoring and maintenance work of existing conventional coastal infrastructure, such as groins, jetties, and other coastal protection structures (monitoring at least every three years).
3. The national entity responsible for ICZM undertakes periodic monitoring of the natural (green) infrastructure that are or have been a subject of a coastal project to assess function and integrity (monitoring at least every three years).
4. Evaluating the effectiveness of built coastal protection investments – temporal data on storm conditions and storm surge / water height are combined with information on coastal flooding to evaluate the effectiveness of built coastal protection structures (evaluation conducted within the past 5 years).

Scoring: Percent of criteria above achieved ($n / 4$)

Means of verification: Interviews with agency staff, project documents; review of agency logs, databases, and publications.

Likely institutional source: Environmental ministry, ICZM authority, protected areas authority, infrastructure and urban planning authorities.

2.4 Financing ICZM

Overview: ICZM can only be implemented if adequate financial resources are available to implement relevant activities. Funding sources for coastal management agencies vary by country, but sources of funding can include annual budget allocations, taxes, dedicated fees (e.g. for marine protected areas), maintenance funds, etc. These domestic sources of financing can be complemented by external funds (e.g. from development finance institutions), most appropriately for capital investments.

2.4.1 Sustainable Funding for ICZM Operations

Justification: Successful ICZM requires sustainable sources of financing to cover operating costs as well as capital investments. Adequate and predictable government financing is at the core of a permanent climate-resilient ICZM Program.

Ranking Criteria:

1. ICZM regulatory framework includes a strategy or policy for financing ICZM including an estimation of financial demand necessary for successful ICZM studies, planning, implementation, maintenance and M&E.
2. Annual government budget contains a dedicated (not discretionary) line item to support operating costs of government entities responsible for implementing ICZM.
3. In the most recent fiscal year, the government (e.g. ministry of finance) dispersed the annual budget allocation to support operating costs of government entities responsible for implementing ICZM.
4. The government makes use of dedicated fees (e.g. for marine protected areas) to raise funding to support ICZM.
5. The government dispersed more than 50% of the dedicated fees collected (described in 4.a.4) in direct financial support to marine protected areas (MPAs) or to the ICZM agency during the most recent fiscal year.

Scoring: Percent of criteria above achieved (n / 5)

Means of verification: Copies of relevant legislation, regulations, program documents or interviews with relevant government entities.

Likely institutional source: Finance ministry, environmental ministry, tourism agency/ministry, protected areas authority.

2.4.2 Access to International Development Finance

Justification: In addition to funding at the national level, LAC countries can access external sources of finance to support ICZM. This includes, for example, resources from international development finance institutions, dedicated funds (such as international climate funds), or private foundations. This indicator looks at whether the country has such funding institutions in place, and whether these institutions have knowledge on coastal zone activities.

Ranking Criteria:

1. The country has accessed public international finance (loans, grants or other types of finance) for ICZM in the past (e.g. from multilateral development banks or bilateral aid agencies) within the last five years.
2. The country has accessed grant funding from private sources of finance (e.g. private foundations) for ICZM implementation in the last five years.
3. The country has accessed finance for coastal-zone activities from multilateral climate funds and has not reached its funding cap for any of the climate funds (e.g. the Adaptation Fund or Least Developed Countries Fund [LDCF]).

4. The country has in place all relevant focal points / designated authorities and accredited entities for international funds and these have knowledge of ICZM.

Scoring: Percent of criteria above achieved (n / 5)

Means of verification: Development bank and climate fund project databases, private foundation websites.

Likely institutional source: Finance ministry, national designated authorities for the international funds (varies by fund), private foundations.

2.4.3 Financial Incentives and Schemes to Incentivize Private Sector and Individual Action

Justification: Public financial incentives and schemes for ICZM play a fundamental role in encouraging diversification of the local economy away from activities that are misaligned with ICZM and climate risk reduction. This indicator measures the degree to which a government has applied incentives to encourage actions that align with ICZM and climate adaptation.

Ranking Criteria:

The national or provincial government provides any of the following incentives to encourage engagement of private actors (companies or individuals) in actions that support ICZM and/or climate change adaptation:

1. Tax incentives for actions that support resilient ICZM activities (e.g., restoration of mangroves or sand dunes).
2. Government-supported grant programs to fund ICZM efforts.
3. Concessional finance (e.g. loans, equity) to support climate-compatible ICZM investments by private actors.

Scoring: Percent of criteria above achieved (n / 3)

Means of verification: Copies of relevant legislation or regulations, program documents, interviews with relevant government entities.

Likely institutional source: Finance ministry and environmental ministry.

3 Conclusion

This set of indicators is designed to bring together all the key elements of ICZM, climate resilience, and DRM into one integrated diagnostic tool that allows countries to assess its performance with respect to climate-resilient ICZM. These indicators can also serve to raise awareness about good practices, help countries evaluate their current approaches to coastal zone management, and

promote adoption of actions to support more effective climate adaptation and resilience building in coastal areas. The indicators bridge an important gap that previous indexes and diagnostics have yet to integrate – climate change adaptation, DRM and coastal zone management – and encourage collaboration among these efforts. By necessity, the indicators span a wide range of aspects of coastal zone management, including legislative and institutional arrangements, information collection and sharing, capacity to translate information into operational plans, and the availability of enough and sustainable financing for ICZM.

The indicators have been pilot tested in Belize, revised based on feedback, and are now robust for implementation in countries across the LAC region.

These indicators, as designed, are straightforward to apply and the results, easy to interpret and is a useful tool for recording results (by criteria), automatically scoring the indicators, and providing the scores at the indicator and category level for easy review.

The overarching goal is for countries to apply these indicators to evaluate the effectiveness of current practices and identify areas where their performance could be improved. As countries in LAC confront the increasingly acute challenges of climate change, DRM, and natural resource management in coastal areas, tools such as this can help countries identify more effective actions, including sources of financing, to protect coastal areas and advance more sustainable and climate-resilient ICZM. These actions will enable countries in LAC to better maintain the wide variety of goods and services that coastal ecosystems provide to their people, economies, and livelihoods.

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Appendix 1 – Summary of indexes and diagnostics reviewed and relevance to indicator selection

Reference	Purpose	Relevance to Climate-resilient ICZM Performance	Gaps with respect to climate/ICZM performance	How it informed the ICZM performance index
<p>1. Coastal Governance Index (CGI)</p>	<ul style="list-style-type: none"> - Measures the extent of government regulation and management to assess the state of play in the environment for effective coastal governance 	<ul style="list-style-type: none"> - Identifies best practices and areas for improvement in policy and institutional capacity, the business environment, and four asset categories (water quality, minerals and energy, land and living resources) 	<ul style="list-style-type: none"> - Minimal connection between coastal governance and climate change adaptation and DRM. - Good breadth of categories, indicators and sub-indicators; however, very shallow coverage for each. - Lacks specific indicators to assess ICZM performance. 	<ul style="list-style-type: none"> - Highlighted the need for indicators that can evaluate the balance between the needs of the environment and economic development, e.g., including the private sector and dispute resolution mechanisms. - Connection between inclusivity/ stakeholder participation and quality of policies/decision making. Helped inform ranking criteria in Category 1 - Strong institutional capacity correlates with better coastal governance. Informed Category 1 and 2 and indicator selection and ranking criteria. - Highlighted the need to develop indicators with more detailed and nuanced ranking criteria to understand performance.

<p>2. Coastal Resilience Tool</p>	<ul style="list-style-type: none"> - Online, interactive tool comprising multiple apps that allows for visualization of current and future hazards for coastal areas, including potential ecological, social, and economic impacts 	<ul style="list-style-type: none"> - Provides an inventory of the information and data needed to understand current and future coastal hazards, as well as natural, social, and economic resources at risk 	<ul style="list-style-type: none"> - Lacks assessment of presence/absence, status, and quality of strategies, policies, capacity, and stakeholder engagement. 	<ul style="list-style-type: none"> - Key resource for developing the indicators under Category 2 and their ranking criteria. - Helped identify the environmental variables that require monitoring, the type of information/platforms needed to understand climate risk, and the types of climate vulnerability and risk analyses for good planning and management.
<p>3. Disaster Resilience Indicators for Benchmarking Baseline Conditions</p>	<ul style="list-style-type: none"> - Measures the present conditions influencing disaster resilience in communities - Establishes the baseline information to allow for monitoring changes over time and for measuring the effectiveness of programs, policies, and interventions 	<ul style="list-style-type: none"> - Provides an understanding of important elements of overall resilience in a community 	<ul style="list-style-type: none"> - indicators are specific for establishing baselines for the four categories of resilience measured. - Lacked specifics to ICZM and understanding of climate change risks and vulnerabilities. 	<ul style="list-style-type: none"> - In addition to improving the natural systems and government institutions, community engagement and participation and local understanding of risks are also important elements for reducing risks and improving resilience. - The indicators point to what makes communities resilient and helped us include in the ranking criteria the types of information platforms and institutional capacities to include in the ICZM indicators.

4. Eco-Audit (Meso-American)	<ul style="list-style-type: none"> - Systematic multinational evaluation of Belize, Guatemala, Honduras, and Mexico's implementation of recommended coastal management actions of the Mesoamerican Reef 	<ul style="list-style-type: none"> - Provides routine accounting of efforts and a measurement of progress to protect and sustainably manage the region's coral reefs 	<ul style="list-style-type: none"> - Lacks assessment of the institutional and policy capacities. - Does not address climate change impacts, risks or vulnerabilities. 	<ul style="list-style-type: none"> - Helpful for developing indicators and ranking criteria for Category 2 - suggests the categories of information needed to assess coastal ecosystem health and management needs. - Also helped in identifying the technical skills needed by ICZM personnel (in category 3) - The scoresheet format is a good model for presenting results by category.
5.Environmental Democracy Index (EDI)	<ul style="list-style-type: none"> - Interactive platform and tool that allows users to track their countries' progress in protecting the public's rights to information, participation, and justice in environmental decision-making 	<ul style="list-style-type: none"> - Measures the extent and degree to which national laws in 70 countries promote environmental democracy rights 	<ul style="list-style-type: none"> -With a focus on environmental democracy and its laws and processes, this index does not address the policies, strategies, or activities associated with ICZM or climate change. 	<ul style="list-style-type: none"> - Access to information and public participation are important elements of good decision-making and policies, as outlined in the UNEP Bali Guidelines. - Supported the development of indicators to assess stakeholder participation in ICZM and climate adaptation planning.
6.Environmental Performance Index (EPI)	<ul style="list-style-type: none"> - Provides a global view of environmental performance and country-by-country metrics to inform decision-making - biennial ranking of how well countries protect the health of their 	<ul style="list-style-type: none"> - Measures MPA coverage and fisheries health via fish stocks 	<ul style="list-style-type: none"> - Global view of key environmental problems, mainly on health and land-based issues. - Very narrowly focused. - Does not assess the policy environment, capacity, or processes. - Does not assess 	<ul style="list-style-type: none"> - Confirmed that establishing MPAs and managing fisheries health were important. Otherwise not very helpful.

	populations and ecosystems		ICZM/CZM or climate change risks.	
7.Environmental Vulnerability Index (EVI)	<ul style="list-style-type: none"> - Estimates the vulnerability of the environment of a country to future shocks and reflects the status of a country's environmental vulnerability 	<ul style="list-style-type: none"> - A few indicators related to coastal environment: marine reserves, sea temperatures, tsunamis, coastal settlements, fishing effort. 	<ul style="list-style-type: none"> - Focuses on broad range of indicators with hard data; did not address policy and institutional capacity. - Lacks indicators on ICZM and climate change. 	<ul style="list-style-type: none"> - Complicated matrix style scoring is not easy to apply. - Fifty indicators are too many. - These indicators informed some of the ICZM performance indicators and ranking criteria, particularly for Category 2, such as the information that should be included in climate vulnerabilities and risks analyses.
8. A Handbook for Measuring the Progress and Outcomes of Integrated and Coastal Management	<ul style="list-style-type: none"> - Step-by-step guide and analytic framework to develop, select, and apply a common set of governance, ecological, and socioeconomic indicators to measure, evaluate, and report on the progress and outcomes of ICZM interventions 	<ul style="list-style-type: none"> - Provides a proposed framework to integrate governance, ecological and social dimensions; a proposed menu of indicators for integrated coastal and ocean management 	<ul style="list-style-type: none"> - Not an actual index that could be applied but has the components that could be pulled to develop one. - Does not address climate risks, vulnerabilities, and risk reduction and management. 	<ul style="list-style-type: none"> -Helpful framework for developing the categories and indicators, especially for narrowing to a reasonable number of SMART indicators. - Informed the selection of categories to cut across governance, ecological and social dimensions. - Menu of indicators helped in focusing the set of indicators and in refining their ranking criteria.

9. Index of Governance and Public Policy in Disaster Risk Management (iGOPP)	<ul style="list-style-type: none"> - Evaluates the formal existence of a series of legal, institutional and budgetary conditions that are fundamental so that DRM processes can be implemented in a specific country 	<ul style="list-style-type: none"> - Provides in-depth understanding of the components important for assessing capacity for DRM. 	<ul style="list-style-type: none"> - Very comprehensive indicators for assessing different capacities needed for DRM, but has only limited specifics on ICZM or climate vulnerabilities and risks 	<ul style="list-style-type: none"> - The details under each indicator helped inform the choice of indicators and their ranking criteria, such as: understanding the scope of legislation (not just the presence/absence), coordination among authorities, competence of management authorities, information availability, inclusion of multiple sectors and their authorities, having strategic and response plans.
10. IDB Indicators of Disaster Risk and Risk Management	<ul style="list-style-type: none"> - Measures risk and vulnerability and progress in managing risk at the national level 	<ul style="list-style-type: none"> - Identifies risks and helps propose adequate disaster risk management policies and actions in Latin America & the Caribbean 	<ul style="list-style-type: none"> - Focuses on a country's overall risks and vulnerabilities and therefore did not focus on issues specific to the coastal environment or the challenges of integrated coastal management. 	<ul style="list-style-type: none"> - Helped in formulating indicators under Category 2, in particular, the level of detail and types of variables to assess. - These informed the ranking criteria, such as looking at past flooding and landslides, socioeconomic conditions and factors, public services, incorporation of risks and vulnerabilities to planning and actions, among others.

11. Notre Dame-Global Adaptation Index (ND-GAIN)	<ul style="list-style-type: none"> - Summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience and facilitates businesses and the public-sector investments by prioritizing areas for a more efficient response 	<ul style="list-style-type: none"> - General assessment of climate vulnerabilities and readiness. - Specific indicator on infrastructure in coastal environment. 	<ul style="list-style-type: none"> - Heavily focused on assessing vulnerabilities and readiness across all sectors, especially social and political systems. - Lacks specific focus on coastal systems - cumbersome for a country to apply on its own 	<ul style="list-style-type: none"> - The vulnerability indicators highlighted the important sectors that needed to be looked at, such as water, infrastructure, ecosystem services, energy, food. These helped inform the present indicators in Category 2. - Readiness indicators showed the importance of the private sector as well as financial systems in preparing for climate change mitigation and adaptation. Helped inform indicators in Category 3 and 4.
12. Ocean Health Index (OHI)	<ul style="list-style-type: none"> - Assessment framework that comprehensively evaluates the global marine environment 	<ul style="list-style-type: none"> - Compares all dimensions of the ocean - ecological, social, economic, and physical - to measure how sustainably people are using ocean and coastal resources 	<ul style="list-style-type: none"> - Does not assess ICZM or climate change risks and vulnerability, nor DRR/DRM directly. - Uses complex mathematical equations for scoring indicators. 	<ul style="list-style-type: none"> - Helped inform that aspects of ocean health are important and incorporated into the ranking criteria under category 2.
13. Reefs at Risk Revisited: Vulnerability Assessment	<ul style="list-style-type: none"> - Global analysis of threats to coral reefs (including a social vulnerability analysis) 	<ul style="list-style-type: none"> - Maps out local and global pressures on reefs, assessing the vulnerability of people in reef-dependent countries 	<ul style="list-style-type: none"> - Focuses on socioeconomic aspects associated with risks to coral reefs only. - Does not look at ICZM. 	<ul style="list-style-type: none"> - Helped inform the ICZM indicators on shared information platform and some of the ranking criteria to include.

14. State of the Seascape	<ul style="list-style-type: none"> - Assesses the current status and trends of key ecological and social conditions at Bird's Head Seascape (BHS) MPA network in West Papua, Indonesia 	<ul style="list-style-type: none"> - Measures coral reef ecosystem health, marine fisheries, and human well-being, and the management status and marine resource governance at each MPA in the BHS MPA network 	<ul style="list-style-type: none"> - Lacks assessment of policies, strategies and capacities of the communities and managers. - Only covers coral reef ecosystems. - Does not cover ICZM or climate change risks and vulnerabilities. 	<ul style="list-style-type: none"> - Multiyear monitoring underscores the importance of having baselines. - Helped inform the development of indicators on participatory decision-making, monitoring and enforcement.
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Appendix 2 - Case Study Databases:

Adaptation Fund Database. The World Bank:

(<http://fiftrustee.worldbank.org/Pages/adapt.aspx>)

- Peru: *Adaptation to the Impacts of Climate Change on Peru's Coastal Marine Ecosystem and Fisheries*. Available at <<https://www.adaptation-fund.org/project/adaptation-to-the-impacts-of-climate-change-on-perus-coastal-marine-ecosystem-and-fisheries-2/>>
- Belize: *Belize Marine Conservation and Climate Adaptation Project*. Available at <<https://www.adaptation-fund.org/project/belize-marine-conservation-and-climate-adaptation-project/>>
- Cuba: *Reduction of Vulnerability to Coastal Flooding through Ecosystem-based Adaptation in the South of Artemisa and Mayabeque Provinces*. Available at <<https://www.adaptation-fund.org/project/reduction-of-vulnerability-to-coastal-flooding-through-ecosystem-based-adaptation-in-the-south-of-artemisa-and-mayabeque-provinces/>>
- India: *Conservation and Management of Coastal Resources as a Potential Adaptation Strategy for Sea Level Rise*. Available at <<https://www.adaptation-fund.org/project/conservation-and-management-of-coastal-resources-as-a-potential-adaptation-strategy-for-sea-level-rise/>>

Global Climate Change Alliance Database: (<https://climatefundsupdate.org/the-funds/global-climate-change-alliance/>)

- Gambia: *ICZM and the Mainstreaming of Climate Change*. Available at <<http://www.gcca.eu/national-programmes/africa/gcca-the-gambia>>
- Senegal: *Integrated management of Senegal's coastal areas: in-depth assessments and concrete measures for responding and adapting to climate change*. Available at <<http://www.gcca.eu/national-programmes/africa/gcca-senegal>>

Green Climate Fund Database: (<https://www.greenclimate.fund/what-we-do/portfolio-dashboard>)

- Tuvalu: *Tuvalu Coastal Adaptation Project*. Available at <<https://www.greenclimate.fund/-/tuvalu-coastal-adaptation-project>>
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Least Developed Countries Fund Databale: (<https://www.un.org/ldcportal/least-developed-countries-fund-ldcf/>)

- Yemen: [Integrated Coastal Zone Management in Yemen](https://www.oecd.org/cgfi/forum/). Available at <<https://www.oecd.org/cgfi/forum/>>