

BLUE - TINTED WHITE PAPER

INVESTMENT PROTOCOL: UNLOCKING FINANCIAL FLOWS FOR COASTAL CITIES ADAPTATION TO CLIMATE CHANGE AND RESILIENCE BUILDING



OCEAN & CLIMATE
PLATFORM



SHARING SOLUTIONS WITH COASTAL
CITIES TO TACKLE SEA LEVEL RISE



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Design and layout by William de Villiers

Recommended citation

Bongarts Lebbe, T., Beguin Billecocq, I., Vegh, T., & Sarkozy-Banoczy, S. (2022) *Investment Protocol: Unlocking Financial Flows for Coastal Cities Adaptation to Climate Change and Resilience Building*. Blue-tinted white paper. [Race to Resilience, High-Level Climate Champions](#).

INTRODUCTION

Located at the interface between land and sea, coastal cities and communities of all sizes are centers of economic productivity and cultural hubs, absorbing ever increasingly large numbers of people and assets.

But as our physical link to the ocean, coastal cities are highly exposed to climate change – and as such, carry the duty of being the first responders to the shocks and stresses associated with it.

Globally, approximately 40% of the population is currently living within 100 km of the coast¹, and 1 billion people are projected to be at risk from coastal-specific climate hazards by 2050². With a tenth of the world's population, physical assets and cultural sites located in less than 10 meters above sea level, coastal cities are disproportionately affected by sea level rise, and other compounding climate and ocean-driven impacts, experiencing cascading negative effects when these collisions of shocks and stresses occur. The role of cities as drivers of climate adaptation and mitigation action is substantiated in the IPCC WGII AR6³ report that states, among other things: “these coastal cities and settlements make key contributions to climate resilient development”.

Given the important role that coastal cities play in supporting global economies and safeguarding communities, actions must be scaled to ensure they have the resources necessary to set up a pipeline of bankable projects as well as for implementation.

If mechanisms exist to support cities to adapt to climate change, coastal cities face unique challenges but also hold opportunities which require tailored efforts. As highlighted in the **Blue-Tinted White Paper, Investment Protocol: Unlocking financial flows for coastal cities adaptation to climate change and resilience building**, mobilizing various sources of funding and financing can be explored (philanthropy, public grants, public and private investments). A particular opportunity for coastal cities to attract funding for adaptation is to integrate such objectives in the development of blue economy industries and broader equitable resilience building, which are capital intensive, such as ports energy transition, tourism infrastructure, or offshore wind.

The time has come for radical collaboration and the scaling up of action that helps unlock financial flows for coastal resilience solutions for cities, communities and regions.

¹https://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/oceans_seas_coasts/pop_coastal_areas.pdf

² IPCC Special Report on the Ocean and Cryosphere in a Changing Climate. eds H.-O. Portner, D. C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, et al, 2019

³ IPCC, 2022: *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Lösche, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.

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NOTICE OF INTENT

What

With the objective to deliver on the Race to Resilience's target of making 4 billion people more resilient by 2030, the **High Level Climate Champions, the Ocean and Climate Platform, Resilient Cities Network and ICLEI** are partnering to unlock financial flows that promote climate change coastal adaptation and resilience solutions for cities, communities and regions.

Why

In order to tackle the dual challenges of setting up innovative, scalable and bankable adaptation and resilience projects in coastal cities, while securing private and public capital at a variety of stages and vehicles, the approach is to develop a **Coastal Cities Resilience Investment Protocol** to help address structural barriers (e.g., capacity, resources, feasibility studies, risks aversion, etc.) and provide an avenue for "radical collaboration" among key private and public financial institutions, relevant blue economy industries and coastal cities.

How

This Blue-Tinted White Paper is the first pillar of the protocol. It provides a summary of funding and financing options and mechanisms, as well as a mapping of the key stakeholders. This paper highlights main gaps and puts forward recommendations to unlock financial flows at the scale needed. The second pillar will create a framework for investments in coastal cities (including objectives, criteria for success, operating principles/standards for investment). The third pillar, focusing on implementation, is a funding platform to encourage holistic collaboration for investment in coastal cities' adaptation and building resilience, focusing on coastal cities in the Global South.

Who

The Blue-Tinted White Paper is intended to inform the key stakeholders involved in funding and financing coastal cities adaptation and building resilience. These include: private banks, asset managers, pension funds, private equity firms, insurance and credit rating agencies; multilateral banks, international development aid; philanthropic and impact investment sectors, relevant blue economy/blue tech industries such as coastal tourism, real estate, shipping, ports, fisheries and aquaculture, offshore renewable energy, as well as innovators at a variety of scales; and coastal cities leaders, practitioners and related funding and financing institutions.

It should be noted that subnational climate finance tracking is currently lacking (compared with national tracking) and data is often incomplete. City climate finance and investment data are currently not disaggregated into coastal and land locked components. There is limited scientific data, indigenous knowledge and academic research in the space. While progress is being made in the assessment and measurement of holistic resilience impact for projects and solutions across shocks and stresses in cities and communities of varying sizes, these tools and principles are in staggered development and have a variety of definitional foundations. Findings of the Blue-Tinted White Paper include informal inputs by cities, ocean, finance experts and coastal cities representatives (Cf. List of contributors).

This paper is work in progress. The authors welcome additional inputs and comments. If you wish to contribute, please email: Théophile Bongarts (tbongarts@ocean-climate.org) and Ignace Beguin (ignacebeguin@climatechampions.team)

1. THE URGENCY OF ADAPTATION IN COASTAL CITIES

Coastal cities are particularly vulnerable to a set of threats because they concentrate a large and growing portion of the global population, cultural assets, and critical economic activities while being exposed to multiple climatic and non-climatic shocks and stresses compounded by unique ocean-based risks, such as sea level rise.

Indeed, coastal areas attract a rising portion of the world's population in a multitude of small settlements as well as some of the most densely populated and fastest-growing urban areas. With population growth expected to reach 1 billion in low-lying areas by 2050⁴, exposure and vulnerability to sea level rise and the associated risks are projected to increase exponentially, while on a collision course with risk to lives, livelihoods, economy, habitat and biodiversity. Given that USD 6,500 and USD 11,000 billion worth of economic assets and infrastructures respectively (transport routes, ports, energy plants, etc.) are exposed in the 1-in-100-year floodplain, ocean-compound hazards and impacts could severely affect coastal economies⁵, not to mention valuable natural and cultural resources. Average flood-related losses suffered by the world's 136 largest coastal cities are expected to rise to USD 52 billion per year by 2050⁶.

Besides, as coastal cities are highly integrated into global economic and geopolitical systems, the impacts could reach far beyond the coastal city zone. In this respect, flood-induced damages to ports have the potential to severely affect global economies by disrupting supply chains and maritime transport⁷ which accounts 80% of the world's trade by volume and more than 70% of its value.

Finally, urban growth is not limited to large cities. Secondary cities⁸ are projected to absorb the majority of urban growth in the next 50 years, yet these cities struggle to a great degree to access climate adaptation finance due to a weak investment profile and often disjointed governance. This is particularly the case in low income nations where many of the world's fastest growing cities are located⁹ and may lack the political voice or resources to advocate for investments in resilience. This is a prominent challenge given that vulnerability to climate change is associated with and exacerbated by inequalities and social exclusion.¹⁰ In addition, in secondary cities, where coastal ecosystems still exist, the demographic growth is likely to be at the expense of coastal ecosystems that can provide Nature-based Solutions (NbS).

⁴ Glavovic, B., R. Dawson, W. Chow, M. Garschagen, M. Haasnoot, C. Singh, and A. Thomas. Cross-Chapter Paper 2: Cities and Settlements by the Sea. In: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel. 2022

⁵ Glavovic et al. (2022)

⁶ WWF, Metabolic, Navigating Ocean Risk: Value at Risk in the Global Blue Economy, Amsterdam, 2021. <https://www.wwf.baltic.org/news/navigating-ocean-risk-value-at-risk-in-the-global-blue-economy/>

⁷ Glavovic et al. (2022)

⁸ Ranging in size from between 150,000 and five million, [secondary cities] represent one of the biggest opportunities for urbanising economies globally. Some 75 per cent of the world's population lives in urban settlements of fewer than 500,000 people (<https://www.citiesalliance.org/themes/secondary-cities>)

⁹ UNCDF, Financing urban futures in the world's Least Developed Countries. Reviewed - Platz, D., Hilger, T., Intini, V., Santoro, S. 2022

¹⁰ OCDE. Innovative Approaches to Building Resilient Coastal Infrastructure. OECD Environment Policy Papers, n° 13. Éditions OCDE, Paris. 2018. <https://doi.org/10.1787/9c8a13a0-en>.

As climate-driven ocean changes are expected to continue for centuries to millennia under all emission scenarios¹¹, the scale of impacts on coastal cities will largely depend on the implementation of adaptation and resilience strategies along with mitigation measures. Meanwhile, the relative inertia of the built environment combined with complex socio-economic and outmoded institutional systems, as well as high climatic and non-climatic uncertainties require coastal cities to urgently implement transformative change.

This implies difficult decision-making, but the political and economic costs will increase if adaptation is delayed. The Navigating Ocean Risk study finds that up to USD 8.4 trillion worth of assets and revenues could be lost over the next 15 years, impacting key sectors such as tourism and fisheries, without immediate action to safeguard ocean resources and align financial portfolios with the Paris Agreement's target to prevent a rise in global temperatures within 1.5°C¹². In the long run, adaptation today will be more cost-effective as coastal cities shift away from an incremental, recovery and reactive approach which heavily relies on hard protection. While densely populated and rich cities keep pursuing protection-based strategies, these remain and will become increasingly unaffordable and impractical for smaller settlements and cities from low income countries and under-resourced communities. The paradigm of protection, consisting in "holding the line" by fighting against nature, must be overcome and new forms of adaptation need to be designed, in particular by integrating inclusive approaches that address the needs of marginalized populations as well as coastal ecosystems, while considering that innovation and scaling can play to support coastal resilience¹³.

Finally, coastal cities have much to gain by investing in some adaptation measures for their coastlines. "The Ocean as a Solution to Climate Change: Five Opportunities for Action"¹⁴ report shows that every dollar invested in sustainable ocean solutions yields at least \$5; every \$1 dollar invested in mangrove conservation and restoration generates a \$3 benefit. With the right incentives, regulatory environment, and risk reduction mechanisms, there is definitely an economic case for climate adaptation and building resilience.¹⁵ Beyond the economic case for resilience, such investments should also be considered as investments in risk mitigation that tangibly benefit not only the private sector, but coastal cities as well.¹⁶ For coastal cities, such returns on investment can be realized as higher desirability for living or for relocation of people, businesses, or assets which can ultimately translate to a larger tax base, higher employment, or credit rating.

¹¹ Glavovic et al. (2022)

¹² WWF (2021)

¹³ Thiele, T, Alleng, G, Biermann, A et al. Blue Infrastructure Finance: A new approach. integrating Nature-based Solutions for coastal resilience. IUCN. 2020

¹⁴ Total net benefits over a 30-year period, including financial, environmental and health benefits. High Level Panel for a Sustainable Ocean Economy

¹⁵ Begion Billecocq, I., Vegh, T. The business case for investing in resilient coastal ecosystem. 2021. Retrieved July 2022 from <https://climatechampions.unfccc.int/the-business-case-for-investing-in-resilient-coastal-ecosystems/>

¹⁶ Vegh, T., Beguin Billecocq, I., A guide to private sector investment in coastal resilience. 2022. Retrieved July 2022 from <https://climatechampions.unfccc.int/a-guide-to-private-sector-investment-in-coastal-resilience/>

2. COASTAL CITIES REQUIRE A TAILORED APPROACH

As a sign of widespread recognition of the urgency of delivering tangible solutions to interconnected risks in the coastal zone, coastal municipalities worldwide are launching adaptation projects and programs at an increasing rate. In 2019, over 800 cities reported a collective 3,177 projects aimed at addressing 36 identified climate hazards, of which 25% were aimed at addressing *Flooding and Sea Level Rise*.¹⁷ While the need for scaling up coastal adaptation projects continues to grow, between 2010 and 2014, cities received less than 5% of global adaptation finance¹⁸ despite containing more than half of the world's population. Also, financing for adaptation remains less than 5% of total climate finance for cities.¹⁹

To ensure that funding meets the level of adaptation finance needed, additional sources of investment and innovative funding and financing mechanisms are required, relative to current levels. However, to deliver the expected results, finance mechanisms must consider four aspects specific to coastal urban adaptation: (1) the need for a wide range of responses to fit local needs; (2) consideration of the complex web of stakeholders to create the necessary enable environment for adaptation actions; (3) consideration of varying time scales that correspond to different levels of risk and time required for implementation while also incorporating uncertainty; (4) a particularly unbalanced system of financial actors, often dependent on public grants and unattractive to private investors.

2.1. One solution does not fit all

Although there are different types of adaptation responses (see BOX 2), the various technical, social and ecological constraints prevent reliance on a single adaptation solution for the challenges faced by all coastal cities²⁰. A sustainable strategy indicates a hybrid response to coastal cities' adaptation, which means a combination of multiple technical and social responses. Examples of hybrid responses are increasingly numerous. The IPCC special report of the ocean and cryosphere in a changing climate (SROCC) recognizes that hybrid responses are often a combination of protection, retreat, advance of the sea, and ecosystem-based adaptation (EbA) responses. In practice, they are a combination of natural and grey infrastructure to protect coastlines from erosion and flooding, aiming to be more cost-effective in the long term than constructed infrastructure alone.²¹ This could also include the use of certifications and assessments to structure and guide that are beginning to take hold, like the Waterfront Edge Design Guidelines (WEDG) Associate Certification, the Wood PLC Resilience Lens (RLens) and others entering the adaptation and resilience arena. Such tools also highlight that efforts in cities and communities in coastal areas may be non-infrastructure projects and

¹⁷ Cities Climate Finance Leadership, Alliance An Analysis of Urban Climate Adaptation Finance Figure 1. Number of Projects Reported by Climate Hazard, CDP Cities 2019 <https://www.climatepolicyinitiative.org/wp-content/uploads/2021/02/An-Analysis-of-Urban-Climate-Adaptation-Finance.pdf>

¹⁸ GCA, 2019

¹⁹ Cities Climate Finance Leadership, Alliance An Analysis of Urban Climate Adaptation Finance Figure 1. Number of Projects Reported by Climate Hazard, CDP Cities 2019 <https://www.climatepolicyinitiative.org/wp-content/uploads/2021/02/An-Analysis-of-Urban-Climate-Adaptation-Finance.pdf>

²⁰ Bongarts Lebbe T, Rey-Valette H, Chaumillon É, Camus G, Almar R, Cazenave A, Claudet J, Rocle N, Meur-Férec C, Viard F, Mercier D, Dupuy C, Ménard F, Rossel BA, Mullineaux L, Sicre M-A, Zivian A, Gaill F and Euzen A (2021) Designing Coastal Adaptation Strategies to Tackle Sea Level Rise. *Front. Mar. Sci.* 8:740602. doi: [10.3389/fmars.2021.740602](https://doi.org/10.3389/fmars.2021.740602)

²¹ Sutton-Grier et al., Future of our coasts: The potential for natural and hybrid infrastructure to enhance the resilience of our coastal communities, economies and ecosystems, *Environmental Science & Policy*, 2015

solutions, with potential for small scale, innovative, blue tech as well as policy and regulation.

2.2. Engaging stakeholders from the coastline to inland territories

One of the particularities of coastal cities lies in the fragmentation of their governance at different geographical scales. Given the diversity of risks and social, economic and environmental issues that coastal cities concentrate, building climate resilience requires above all a strong collaboration among the different actors of the territory, beyond the land and administrative boundaries of the city (see the [Coastal Partners](#), around the city of Portsmouth, UK). Due to the fact that they bridge land and sea, coastal cities exist in complicated overlapping regulatory frameworks, bodies, and governance structures. Management plans intersect and overlap to form a wide range of public jurisdictions, split between different actors with their own areas of expertise, distinct mandates and legal authority. First, this makes decision-making more complex and reduces the coherence of policies. Second, a dense network of actors exerts a significant impediment and tends to slow down complex decisions, which are often already subject to reluctance or even opposition from certain social groups. From the largest to the smallest cities and communities, key actors and anchor institutions like port authorities, harbor operations, terminals, etc., may all be the responsibility of multiple institutions or hybrid agencies.

The multi-level coordination challenge of adaptation involves financial arrangements that go beyond the administrative boundaries of coastal communities directly affected by the impacts of climate change. Financing adaptation requires national and local governments to work together. Many times, human interventions within one jurisdiction affect neighboring jurisdictions; for example, dam construction or deep-water harbors block sediment drift downstream^{22 23}. This issue prompts communities to cooperate in order to avoid impact transfer, especially impacts caused by gray infrastructure. Coastal cities cannot be separated either from the basins within which they sit. Building on the water governance mechanisms already in place, sub-national institutions dealing with water could have their mandates expanded to cover adaptation to water-related risks. This new spatial approach must lead communities to distribute costs more equitably, notably for research or joint payment.

Stakeholder engagement is essential and ensures that effective and appropriate climate resilience strategies are designed. Most importantly, the involvement of local, indigenous, marginalized, remote coastal and small island communities, in addition to improving overall coastal resilience by incorporating local knowledge and insight, promotes community ownership and commitment and defuses future conflicts that may slow progress, even if it increases connectivity and “buy in” from necessary stakeholders.

²² Almar et al., Response of the Bight of Benin (Gulf of Guinea, West Africa) coastline to anthropogenic and natural forcing, Part1: Wave climate variability and impacts on the longshore sediment transport, Continental Shelf Research, 2015

²³ Guerrero et al., Shoreline Changes and Coastal Erosion: The Case Study of the Coast of Togo (Bight of Benin, West Africa Margin), Geosciences, 2021

BOX 1: OECD RECOMMENDED STAKEHOLDERS ENGAGEMENT PROCESSES

Effective stakeholder engagement enables an inclusive and systemic approach to policy making at all stages, which can result in a higher return on time and resources invested.²⁴ In the case of resilient coastal infrastructure,²⁵ highlights that stakeholders should be engaged across the infrastructure cycle to achieve different objectives. This is essential to apprehend the aspirations of local communities, avoid asymmetric impacts within communities, protect cultural heritage and facilitate the acceptability of the adaptation responses and their implementation.

Table. Infrastructure cycle and stakeholder engagement

Phase	Objectives of stakeholder engagement and examples of mechanisms
Assessing	Identification of risks to different categories of stakeholders and assets; information provision (e.g. through perception-based surveys) for climate risk assessments and adaptation planning.
Planning	Development of a common vision for the development of resilient coastal infrastructure, through consultations, and a range of stakeholder engagement mechanisms.
Financing	Enhancing the willingness to pay for innovative project and identifying new sources of finance (e.g. property developers, insurance companies).
Monitoring	Multi-stakeholder meetings and ad hoc surveys to help monitor social, environmental and economic impacts of coastal infrastructure, as well as of the stakeholder process itself.

Source: OECD, “Innovative Approaches to Building Resilient Coastal Infrastructure”, OECD Environment Policy Papers, No. 13, OECD Publishing, Paris, 2018. <https://doi.org/10.1787/9c8a13a0-en>.

²⁴ OECD, *Stakeholder Engagement for Inclusive Water Governance*, OECD Studies on Water, OECD Publishing, Paris, 2015. <https://doi.org/10.1787/9789264231122-en>.

²⁵ OECD, “Innovative Approaches to Building Resilient Coastal Infrastructure”, *OECD Environment Policy Papers*, No. 13, OECD Publishing, Paris, 2018. <https://doi.org/10.1787/9c8a13a0-en>.

2.3. *Opting for a systemic and long-term approach*

Adaptation projects are generally designed in response to climatic hazards, or to deal with an imminent risk. Hard protection solutions, such as dykes, are therefore preferred. The financiers of adaptation responses must work more upstream, opt for a sustainable approach and align themselves with the projects of cities that integrate a long-term vision, at horizon 2050, 2100.

Planning for climate resilience in coastal cities takes place in a context of high uncertainty about future climate change and its impacts. Although numerous scientific projections indicate the trend towards an acceleration in the rate of sea level rise, the occurrence of extreme weather events, and the destruction of coastal ecosystems, the extent and intensity of these phenomena cannot be predicted without some level of uncertainty.²⁶

To integrate the evolution of climatic phenomena as they occur and as our knowledge is improved or refined, it is recommended to opt for a systemic approach of long-term coastal adaptation that allows us to understand the interactions between physical and socio-economic components of the coastal urban system. In this way, it is possible to deal with high uncertainty by starting to act now.

We emphasize the importance of dynamic coastal management and planning that allow a coastal adaptation strategy to shift in response to climatic, economic or social changes and to manage uncertainty.²⁷ One such planning tool, adaptive pathways offer a low-cost means for defining long term adaptation responses to reducing coastal risks and minimizing inefficient investments and social inequities.²⁸

Climate change impacts and contingent liabilities tend to lie beyond the time horizons considered by investors, policy makers, and decision makers.²⁹ This poses a challenge to access adaptation finance by incentivizing and rewarding short term gains at the expense of, or instead of, long term benefits. In contrast to emergency response such as deploying emergency protection or recovery responses after an extreme event, successful adaptation strategies require long term planning to transform homes, infrastructures and activities to reduce risk exposure and vulnerability in a coastal municipality, while recognizing significant cultural, social and economic intricacies.

²⁶ Bongarts Lebbe et al. (2021)

²⁷ Ibid

²⁸ Haasnoot et al., Pathways to coastal retreat, Science, 2021

²⁹ OCDE, « Innovative Approaches to Building Resilient Coastal Infrastructure », OECD Environment Policy Papers, n° 13, Éditions OCDE, Paris, 2018. <https://doi.org/10.1787/9c8a13a0-en>.

BOX 2: SOLUTIONS FOR COASTAL CITIES TO RESPOND TO OCEAN HAZARDS

Broadly, there are two opposing paradigms. The first paradigm consists in fighting against the advancing sea and contributing waterways in order to protect the threatened populations and infrastructures. By accepting the mobility of the coastline, the second paradigm consists in "dealing with" and adapting to coastal risks: if some areas must be ceded to the sea and deltas, it recommends planning in advance for the relocation of communities and activities in safe spaces, reducing the vulnerability of exposed assets rather than limiting the risk itself. A variety of responses can enable densely populated coastal areas to adapt to coastal hazards, including sea level rise, erosion, and coastal flooding. There are 3 broad categories of responses: protection, accommodation, and managed retreat.

Hard protection responses are widespread and particularly concentrated in northwestern Europe, East Asia, and in deltas or densely populated areas such as coastal cities (IPCC, 2019). Despite this, "gray" responses (seawalls, overhangs, groins, riprap...) have been shown to alter the overall functioning of coastal ecosystems, degrade the quality of ecosystem services, and result in habitat loss or reduced species diversity (Bilkovic and Mitchell, 2013; Sutton-Grier et al., 2015; Warner et al., 2018). Despite their effectiveness, these responses are very expensive, if not completely unaffordable-add maintenance costs-(Hinkel et al., 2018), and while the technology exists to build extremely high levees, economic constraints and social acceptability will prevent their viability (Esteban et al., 2019).

Soft adaptation can be an 'environmentally friendly', more integrated form of protection. In a lot of countries, there is an increased interest in developing adaptable, sustainable, and effective soft engineering alternatives to beach nourishment to preserve sandy coasts. However, the literature reports negative physical and biological changes that this response can cause in beach ecosystem services (Fegley et al., 2020), as well as other ecological and socioeconomic impacts, including on recreational activities (de Schipper et al., 2020). Finally, the main limitations to the development of beach nourishment are the accessibility of beach-compatible sand, as not all coastlines have large sand reserves, and the high cost of the operation which will have to be reproduced in general every 3 to 5 years.

Ecosystem based adaptation (EbA) consists in letting coastal ecosystems mitigate marine flooding and coastal erosion (Cheong et al., 2013; Temmerman et al., 2013) and reduce risks for people living in coastal areas (Barbier et al., 2011; Zhang et al., 2012). Beyond climate adaptation, coastal marshes, seagrass, and mangroves are referred to as "blue carbon" due to their contribution to long-term carbon storage (Mcleod et al., 2011). Salt marshes, mangroves, oyster reefs, and coral reefs also provide multiple ecological functions, such as nursing grounds for fish and shellfish, resting places for migratory birds, and groundwater and surface water runoff filtration. However, the IPCC (2019) shows that accelerated SLR and climate change may lead to significant coastal ecosystem loss by the end of the century.

Accommodation responses are not homogeneous but rather encompass diverse methods with a common goal: mitigating coastal hazards. Rather than building infrastructure, accommodation responses comprise a variety of technological, architectural, and urban planning responses. It includes information systems, flood hazard mapping, contingency plans, and insurance schemes that improve understanding and awareness of coastal risks among residents and elected officials and enable the development of appropriate responses.

Managed Retreat involves rethinking living on the coast by accepting that certain coastal infrastructure, neighborhoods, or even entire cities will need to relocate. This response can take place at different scales and levels of complexity – resettling a few particularly exposed houses, relocating entire neighborhoods, moving large cities. Managed retreat is approached and deployed differently around the world. Apart from a few emblematic examples such as Jakarta, where the Indonesian government decided to relocate part of the city of Borneo (van de Vuurst and Escobar, 2020), or the ongoing relocation of the densely populated fishermen’s district of Guet’Ndar in Saint-Louis, Senegal (World Bank, 2018), managed retreat responses with public support have primarily been carried out in high income countries (North America and Western and Northern Europe). Beyond an extremely high implementation cost, thinking about managed retreat strategies must above all be an inclusive process to assess communities’ needs and priorities, and ensure that inequalities are not exacerbated.

2.4. A fragmented ecosystem of actors, particularly in the Global South

The 2022 Financing for Sustainable Development Report³⁰ identifies a “great finance divide” – the inability of low-income nations to raise sufficient resources for, and borrow affordably for investment into adaptation, leaving them unable to respond to crises and invest in sustainable development.

Insufficient public budgets combined with a strong reliance on international donor aid, which is often inconsistent, short-term and project-based, hinder their capacity to invest in longer-term strategies. Like any form of investment, adaptation has a cost: on average, high income nations use 3.5% of revenue to pay interest on their debt, versus 14% of revenue for low income nations.³¹ Thus, emerging economies face greater struggles to access finance for low-carbon and climate resilience projects. As a result, globally, just 2% of green financing goes to cities in emerging markets.³² Even where cities in low income nations are permitted to access finance, 96% are unable to do so in international markets because of their low creditworthiness or a lack of credit rating, severely constraining their ability to raise funds for climate-related projects.³³ In addition, lack of enabling environment such as corruption, strong uncertainty and infrastructure

³⁰ Ibid

³¹ United Nations, Inter-agency Task Force on Financing for Development, Financing for Sustainable Development Report 2022. (New York: United Nations, 2022), available from: <https://developmentfinance.un.org/fsdr2022>.

³² Earth security, Strategic report Financing the Earth’s Assets: The Case for Mangroves <https://earthsecurity.org/report/financing-the-earths-assets-the-case-for-mangroves/>

³³ Ibid

inequalities in emerging economies in the Global South make the social impacts of this playing field even less palatable.³⁴

The private sector, which represents an important potential source of financing, is not sufficiently present either. Especially in the Global South, cities have difficulties in both financing long-term adaptation and costs from losses and damages. To ensure that lower-income nations and lower-income communities of high-income nations are sufficiently able to access finance for adaptation, significant additional efforts are required to redirect funds towards them, and in particular to support the efforts of coastal cities towards coastal resilience.

3. ENABLERS TO UNLOCKING PUBLIC FUNDING AND PRIVATE INVESTMENTS

The 2016 Biennial Assessment and Overview of Climate Finance Flows (UNFCCC), refers to climate finance as financial resources dedicated to adapting and mitigating climate change globally, aiming at reducing emissions of greenhouse gases (GHG), reducing vulnerability, and maintaining and increasing the resilience of human and ecological systems to negative climate change impacts. Although here the adaptation options are more detailed, it is essential that they are backed by ambitious GHG emission reduction policies.

In its 6th Assessment Report of Working Group II³⁵, the IPCC stresses insufficient, inadequate, and difficult access to finance presents a critical obstacle to cities' undertaking of long-term and innovative adaptation. Even in relatively richer coastal cities, budgets are strained by the lack of public funds combined with more and more competencies attributed or applied to cities, while maintenance and protection costs grow progressively as sea level rise and associated impacts grow³⁶.

Hence, unlocking adaptation and resilience funds for coastal cities has the potential to foster their capacity to design innovative and flexible strategies, tailored to their specific environmental, socio-economic and institutional conditions. With expected substantial and growing costs of adaptation, the provision from governments and public finance will not be sufficient, thereby making private investments is critical for meeting finance needs³⁷. Investing in resilience and adaptation is an exercise motivated by risk mitigation. Based on the latest scientific literature that discusses interconnected and multi-dimensional risk³⁸ in this era of blue acceleration,³⁹ while some economic sectors might have a bigger stake in investing in coastal resilience, all private sector actors can mitigate certain types of risk they are now facing, or will be facing in the near future.⁴⁰

³⁴ Yale, School of environment, 4 of April 2022, <https://environment.yale.edu/news/article/built-infrastructure-inequality-challenge-urban-sustainability-environmental-justice>

³⁵ IPCC (2022)

³⁶ Glavovic, et al. (2022).

³⁷ Bisaro, Alexander; Hinkel, Jochen (2018). Mobilizing private finance for coastal adaptation: A literature review. Wiley Interdisciplinary Reviews: Climate Change, e514-. doi:10.1002/wcc.514

³⁸ Beatrice Crona, Carl Folke, Victor Galaz, The Anthropocene reality of financial risk, One Earth, 2021

³⁹ Crona et al. (2021)

⁴⁰ Tibor Vegh and Ignace Beguin, A guide to private sector investment in coastal resilience, Climate Champion, 2022. <https://climatechampions.unfccc.int/a-guide-to-private-sector-investment-in-coastal-resilience/>

3.1. Structuring cities' demand to scale up number and amount of projects

At the “origin of demand”, the problem might be the formulation of the strategy and plan at the local level. Almost all adaptation finance was provided by public actors in 2019-2020, with Development Finance Institutions (DFIs) alone accounting for 80% in the period including a leading role of multilateral and national DFIs.⁴¹ DFIs have a wide range of tools and funding mechanisms at their disposal: from risk and feasibility assessments to financing the implementation of concrete responses, there seems not to be any particular lack of instruments. In contrast, there are not many straight requests from coastal cities in less developed and emerging countries to explicitly support transformational coastal adaptation and resilience of urban infrastructures and services.

On the other side, a consistent complaint of departments in charge of adaptation in coastal cities is the lack of scaling funding to incentivize smaller pilot projects or contribute to building a layering of funding with multiple financing institutions or vehicles to overcome some of the barriers to larger pure capital sources. If existing, the length of accessing finance is difficult and too long compared to immediate needs. Thus, local decision makers are discouraged, defiant, skeptical to engage these processes.

The challenge is to think about how to structure the demand over the long term so that cities in need of support, both technical and financial, and DFIs can work together more effectively. There is still a need for linking the financial actors (donors, investors, DFIs...) to local, small-sized coastal cities. Actors agree on the need for more aggregation of secondary cities projects to enable global capital markets to finance coastal adaptation and resilience and collectively get large grants and investments. For this, some cities already committed can play the role of "champion" to drive a territorial dynamic and be joined by other cities or communities less advanced. Creating a “pool” of cities is also an excellent opportunity to think about adaptation strategies on a large territorial scale, in an integrative logic, favoring the global coherence of the project, rather than a juxtaposition of isolated actions thought out without consultation.

3.2. Assessing risk and pricing to mobilize private investment

Various studies have made the economic case for investing in coastal adaptation, including resilience through resilient coastal ecosystems and several estimates and projections exist for the cost of delayed action⁴². In coastal cities, WRI underlines that the annual cost of global adaptation is only one-tenth the total cost of no action.⁴³ Preventive adaptation actions early in the project cycle helps to avoid high future costs if climate conditions worsen.⁴⁴ However, there are few concrete examples of ambitious and sustainable responses developed by coastal cities. It is even emphasized that the chosen responses are developed in reaction to extreme events rather than in anticipation.⁴⁵ This underlines again the need for designing and building with a precovery mindset and with holistic resilience guidelines to get off of the “recovery treadmill” that will only put more and more cities along coasts in danger. In this regard, a World Bank study (ESMAP, 5) estimates that adaptation measures cost no more than two percent of total infrastructure asset costs.

A key challenge in accelerating adaptation action by mobilizing private investment is the absence of mechanisms to convert the benefits of coastal resilience (and often

⁴¹ Climate Policy Initiative. 2021. “Preview: Global Landscape of Climate Finance 2021.

⁴² Ignace Beguin and Tibor Vegh, The business case for investing in resilient coastal ecosystems, Climate Champions, 2021.

<https://climatechampions.unfccc.int/the-business-case-for-investing-in-resilient-coastal-ecosystems/>

⁴³ WRI, Unlocking the Potential for Transformative Climate Adaptation in Cities, 2019

⁴⁴ PPP, International Bank for Reconstruction and Development/World Bank, 2017

⁴⁵ OECD (2018)

resilience as a whole) into predictable and clearly identifiable revenue streams.⁴⁶ This hurdle is exacerbated by the lack of tested business models for financing up-front investments, which in turn lead to finance gaps and bottlenecks for adaptation. It is also notable that small-scale, innovative, non-grey projects and solutions, as well locally supported and demanded resilience interventions, will not inherently present revenue streams and a return on investment (ROI) in the traditional sense, but will promote and demand more creative, longer-term analysis to determine a viable “return on resilience value” (RRV) that supports government, financing and community level KPIs that cities can support and manage themselves.

However, when cost-benefit studies are conducted, they are a powerful tool for taking action. Putting a price tag on the different solutions, the co-benefits they offer and integrating adaptation benefits in coastal cities projects will help to attract finance. For example, in the city of Miami, a cost-benefit analysis estimated that integrating a mangrove ‘living shoreline’ with a cement sea wall would increase net present value by USD 116 million and reduce the costs of a 10-year storm by USD 148 million, compared to a cement sea wall investment only.

Last but not least, multi-criteria analysis rather than a cost-benefit analysis can be recommended for any project implementing an adaptation action in coastal area, which allows for the examination of alternative projects taking into account elements that can’t be quantified or estimated such as equity, social acceptability, human well-being, vulnerabilities, the environment or landscape heritage.

3.3. Leveraging the Blue Acceleration to attract private capitals

Sectors in the rapidly growing blue economy⁴⁷ have an outsized interest to de-risk their investments in coastal areas. These sectors can offer opportunities for coastal cities to attract new sources of capital for building and implementing adaptation solutions that mutually benefit both, and positively affect the lives, livelihoods, employment prospects, and safety of people living in coastal cities. Several principles, when applied, can ensure that such investments are maximized.

Climate change adaptation measures could be integrated or connected to pre-existing or planned investments, such as port and maritime works (terminals, breakwaters, etc.), to finance major coastal



⁴⁶ Ibid

⁴⁷ OECD, *Water Governance in Cities*, OECD Studies on Water, OECD Publishing, Paris, 2016. <https://doi.org/10.1787/9789264251090-en>.

infrastructure improvements that are connected to an existing activity that it is vital for the economy.

Blue Economy industries, and in particular green shipping and ports transition must ensure that local community interests are considered. For example, the investments flowing for Green Maritime Corridors or ports energy transition should consider the need to build the resilience of the ports' infrastructure as well as the surrounding communities (e.g.: connecting the ports clean power to cities energy grids; ports to invest in NBS)

Leveraging ports' efforts to adapt to the effects of climate change is an opportunity to accelerate mitigation and adaptation action. As one of the core blue economy sectors operating on the coasts, ports are scaling up their climate change mitigation ambition, thereby contributing to accelerating the domestic and global transition through efforts to decarbonize the shipping sector and accelerate domestic green energy transition. Such projects provide opportunities to build partnerships with local stakeholders, businesses, and research institutions thereby contributing to socio-economic and institutional enhancement as well as knowledge production.

4. CURRENT LANDSCAPE OF STAKEHOLDERS AND MAPPING OF FINANCIAL MECHANISMS

This section aims to present a panoply of financing mechanisms that coastal cities' managers and financial actors can use to address climate-related risks faced by cities. Inspired from the Cities Climate Finance Leadership Alliance Report of February 2021,⁴⁸ *Table 1* provides concrete examples of coastal cities adaptation responses and the corresponding financing mechanisms. Note that this list is not exhaustive.

There are a large number of existing financial mechanisms that are able to finance cities - coastal or not - in their climate adaptation. However, the diversity of financial instruments has not translated into the deployment of adaptation strategies and measures. On the one hand, administrative complexities can prevent potential beneficiaries from accessing finance sources, due to lack of staff and/or capacities. On the other hand, a potential "investor" (*Financing Sources*) faces rules and regulations limitations and would sometimes need other "investor partners" to get in.

So far, traditional blended finance mechanisms have not been able to respond properly to the magnitude of challenges. However, some of the examples listed in the table below illustrate concrete examples of financing that have enabled coastal cities to adapt to climate issues.

⁴⁸ Cities Climate Finance Leadership Alliance, An Analysis of Urban Climate Adaptation Finance, 2021

Table 1 - How can coastal cities finance climate resilient adaptation?

Table 1 presents the **Financing Sources**, the main financing **Instruments** used, **Sample sub-instrument for urban settings** and one or several **Examples** of responses implemented to adapt coastal cities to climate change. A line without an example does not mean that an operation has not been performed, but that the authors have not found any relevant examples.

Type of Funds	Financing Sources	Instrument	Sample sub-instruments for urban settings	Examples
Public	Municipal government	Local revenue generation	Utility fees; Open space funds/land value capture; General obligation bonds; Local property, income, and sales taxes.	<u>EXAMPLE 1</u> USA - The city of San Francisco voted a USD 425 million general obligation bond measure to begin fortifying a sea wall along a central bayfront road. The general obligation bond will fund planning, design, engineering, and construction management for retrofitting and replacing the seawall and other coastal facilities as well as for flood protection projects and enhanced foundations.
		Adaptation Municipal Bond		<u>EXAMPLE 2</u> USA - The city of Miami issued the USD 400 million Miami Forever Bond , set to direct USD 192 million of proceeds to green-grey infrastructure, including sea-walls and replanting mangroves, in order to mitigate the impacts of sea-level rise and flooding, in a first for municipal bonds. <u>EXAMPLE 3</u> USA - The city of Washington D.C issued the 1st U.S. Environmental Impact Bond to reduce flood risks and ensure that city resident have access to clean water. The money raised is invested in green infrastructure to help absorb stormwater and reduce the rising risk of sewage overgoing into the city's rivers and streams.
	State/provincial government			<u>EXAMPLE 4</u> USA - In the city of Malibu (Las Tunas & Broad Beach), Geologic Hazard Abatement districts (GHADs) - a public agencies formed by communities - provide management structures and funding source for coastal adaptation.
	National government	Grants Incentives Technical assistance funds Concessional loans Subsidies	Insurance Tax advantages Low-cost project debt Infrastructure investment funds Shared taxes Intergovernmental funding Transfers/revenue sharing	<u>EXAMPLE 5</u> Philippines - The Philippine City Disaster Insurance Pool was launched by the Philippine Department of Finance and supported with technical assistance from ADB as part of a 'local' level strategy to address the need for rapid access to early recovery financing. <u>EXAMPLE 6</u> France - Nouvelle Aquitaine Region contributes to funding the implementation of the Local Strategy for Coastal Risk Management led at a smaller scale by the Communauté d'Agglomération du Pays Basque, an urban area of which the cities of Biarritz and Bayonne are part. <u>EXAMPLE 7</u> France - In the city of Sète, state agencies (Agence de l'eau, ADEME) support renaturation action. The primary objective is to preserve and restore biodiversity but can also benefit adaptation. Sète has also benefited from ministerial funding listed through the Recovery Plan which supports the organization of workshops and studies on managed retreat, innovation and experimentations towards coastal adaptation, as well as by the Region of Occitanie .

Public Finance	National DFIs			
	Bilateral DFIs			<p>EXAMPLE 8 Early reflections are taking place about designing contingency loan for coastal cities. Contingency loans are tools deployed at state level since they require the labelling of an event as a "natural disaster" by executive order. Nevertheless, developing a contingency loan at the city level would allow a more precise dialogue between cities and well-suited solutions.</p>
	Multilateral DFIs	Grants, project debt (low-cost or market rate) Technical assistance Risk instruments	Risk mitigation support of PPP Project level debt Project preparation facilities and other technical advisory Insurance	<p>EXAMPLE 9 France - In the city of Biarritz, Project MAREA, funded by the European cross-border cooperation programme POCTEFA (Programme Interreg V-A Espagne-France-Andorre), aiming at developing modelling and decision, provides tools to assess coastal risks in the Basque Country.</p> <p>EXAMPLE 10 France - In the city of Sète, local Fisheries and Aquaculture Action Groups working on adaptation of fishing practices and shellfish operations affected by climate change are funded through the European Maritime Affairs and Fisheries Fund (EMAF).</p> <p>EXAMPLE 11 Tunisia - The City of Bizerte has been relying on funding provided by international development banks such as the African Development Bank (AfDB) and Kreditanstalt für Wiederaufbau (KfW).</p> <p>EXAMPLE 12 Asia - Cities Development Initiative for Asia (by the Asian Development Bank & the Government of Germany, with funding from EU countries) is a fund which supports infrastructure projects and emphasizes poverty reduction, environmental improvement, climate change mitigation and/or adaptation, and inclusive governance in secondary cities of Asia and the Pacific.</p>
	Climate Funds	Grants Debt Equity Guarantees	Dedicated climate funding (i.e., Adaptation Fund)	
	Pool of DFIs	Preparation Grants from international cooperation programmes		<p>EXAMPLE 13 Africa - Launched by AFD with the support of the European Union and SECO in 2017, the CICLEIA (Cities & Climate in Africa) facility aims to provide support to 38 cities in sub-Saharan Africa for the preparation of resilient, low-carbon urban projects. CICLEIA finances urban strategies, feasibility studies and technical assistance in all sectors of sustainability, to assist local authorities of the region to develop projects contributing to climate change adaptation.</p>

Private	Commercial fees	Project debt and equity (market-rate) Guarantees	Internal climate risk mitigation PPP financing Corporate loans	
	PE/ infrastructure funds	Project equity (market-rate)	Direct urban infrastructure investment	
	Institutional investors	Project debt and equity (market-rate)	Corporate equity investments	
	Private insurance	Insurance	Public and private risk mitigation Catastrophe bonds Parametric insurance	<p><u>EXAMPLE 14</u> Mesoamerican Reef - ORRAA partner MAR Fund, working with WTW, Axa Climate and Insuresilience Solutions Fund, has created the MAR Insurance Programme that models hurricane risk and delivers cost-effective parametric insurance cover to fund prompt, community-led repairs at four pilot reef sites along the Mesoamerican Reef (MAR). The MAR is a vitally important ecosystem stretching along the coasts of Mexico, Belize, Guatemala and Honduras - estimated by the InterAmerican Development Bank to provide annual environmental services worth US\$183 million in fisheries, US\$3.9 billion in tourism, and US\$320 to US\$438 million in coastal protection.</p> <p><u>EXAMPLE 15</u> Axa Climate has developed a parametric sea temperature cover to help protect coral reefs against bleaching events due to high water temperature. A payout is sent immediately when a pre-defined number of consecutive hot water days is reported by satellite and/or local stations. It is then used to carry out restoration activities such as coral transplantation.</p> <p><u>EXAMPLE 16</u> Mexico - Swiss Re collaborated with The Nature Conservancy (TNC) as well as national and regional governments to help protect against reef damage in the Mesoamerican Barrier Reef System by creating a new “parametric” insurance solution. The insurance product provides rapid payouts to fund essential reef restoration measures following strong hurricanes. Premium payments come from the Coastal Zone Management Trust, set up by the state government of Quintana Roo, with support from TNC. The Trust collects funds from tourism taxes and other government sources that benefit from the reef’s protection. By combining private capital with public resources to fund insurance, regional governments can plan more consciously to protect the reef system.</p>
	Corporate actors	Balance sheet financing and project equity (market-rate)	Internal climate risk mitigation Leasing (e.g., buildings, vehicles) PPP	
	Households	Balance sheet financing, equity	Internal climate risk mitigation	

	Nonprofits, philanthropies, and foundations	Grants, technical assistance, donations	Microfinance Impact investment	<p><u>EXAMPLE 17</u> Africa - Transformation Action Program (TAP) is a project pipeline and project preparation facility developed by ICLEI and partners. It acts as an incubator that supports local and regional governments by catalyzing capital flows for low-to-no emission and climate-resilient development. Through the TAP, local and regional governments receive support to develop climate project concepts into low-risk, high-feasibility, high-impact sustainable infrastructure projects. The TAP is designed to connect local climate actors, technical experts and financial institutions.</p> <p><u>EXAMPLE 18</u> Tanzania - The City of Dar es Salam has benefited from funding from the City Resilience Program (CRP) - a partnership between the World Bank and the Global Facility for Disaster Reduction and Recovery – to fund Land Value Capture and awareness-raising through virtual reality.</p>
	Private Bank			<p><u>EXAMPLE 19</u> Baltic Sea - The Nordic-Baltic Blue Bond is a five-year SEK 1.5 billion bond (approximately EUR 140 million) issued by the Nordic Investment Bank's Environmental Bond Framework which will be used to finance water management and protection projects, e.g. wastewater treatments, water-related climate change mitigation projects.</p>
Blended	Municipality led pool of investors: public funds, private sector corporations and Official Development Assistance			<p><u>EXAMPLE 20</u> Philippines - In the city of Del Carmen, the municipality raised USD 1.3 million from public funds, private sector corporations and ODA to conserve and rehabilitate 5,000 hectares of mangrove forest.</p> <p><u>EXAMPLE 21</u> The United Nations Capital Development Fund's Municipal Investment Financing (MIF) Programme supports local governments in low-income countries to build capacity and facilitate access to sustainable sources of capital financing.</p>
		Debt swap for adaptation	Restructuring debt with savings invested in coastal adaptation	<p><u>EXAMPLE 22</u> Seychelles - The SeyCCAT is particularly relevant for cities in low-income countries which have more risks of defaulting on their payments and anticipated benefits of preserving existing ecosystems. The mechanism mainly works through bilateral agreements but is sometimes multilateral with NGOs acting as 'brokers'. Benefits of the latter setting lie in the fact that swaps are depoliticised and raise fewer risks of misalignments with domestic needs.</p>
		Buyout programmes		<p><u>EXAMPLE 23</u> USA - In New-Jersey, the Blue Acres program uses state money to buyout homeowners in repeat-flood coastal areas at their home's pre-storm value and on a voluntary basis.</p>

Inspired from: *The Global Landscape of Climate Finance 2019. Table 2.*

5. “TIPS” FOR INVESTORS TO FINANCE COASTAL CITIES RESILIENCE

Financing coastal cities adaptation is a complex landscape that requires coordination at multiple levels.

The summary list below has been prepared for investors through input and experience in both the urban resilience and ocean arenas. It should be noted that attracting investments require an enabling environment. This includes i) strong, long-term policy signals; ii) effective project preparation - setting up and streamlining scalable and bankable adaptation projects, and iii) the use by cities of the relevant financial instruments.

> Precovery rather than recovery

For coastal adaptation and resilience investments, capital expenditures tend to be lower than business value generated and are substantially lower than the cost of inaction/delayed action. Therefore, it is paramount to invest in adaptation and resilience building actions and to better integrate adaptation “cascading benefits” and a precovery framework into financial decision making at large, avoiding or reducing the constant cycle of recovery.

> Explore the different financial mechanisms (Cf Table1)

A large set of financial options are available and investors should partner with other stakeholders to set up bankable projects and reach the level of investment required.

> Leveraging the attractivity of ocean-based industries

The growing blue economy sectors offer opportunities for coastal cities to attract new source of capitals, which should be directed, in part, to building and implementing adaptation solutions. Adaptation measures should be integrated into blue investments, such as port energy transition, tourism infrastructure and offshore wind development.

> Invest in nature

Estimating the value of Nature-based Solutions for adaptation and factoring other benefits (e.g. carbon sequestration, biodiversity gain, tourism) into existing frameworks, such as cost-benefit analysis, help make the business case and increase the willingness to invest in coastal adaptation infrastructure. Capturing cost-savings can be facilitated by the insurance sector while financial institution can shape the market to manage risks associated with nature-based solutions (by increasing premiums for projects including nature-based solutions for instance).

> Build local capacity

In low-income countries in particular, investments must seek to enhance the capacities of local institutions in order to improve understanding of climate risks and uncertainties, as well as to move away from reliance only on donor funding, which is based on a project-based logic that is contrary to long-term planning.

> Engage with local communities

Coastal adaptation must be planned on a large spatial scale, which allows the participation of all stakeholders concerned (see OECD methodology for stakeholders engagement in annex) and local challenges and governance structure.

LIST OF CONTRIBUTORS

The **Blue-Tinted White Paper, Investment Protocol: Unlocking financial flows for coastal cities adaptation to climate change and resilience building** has benefited from the input of organizations and cities which shared their experience and valuable insights, as well as contributed to the review of this document. We are very grateful for their contribution. Views expressed in this report are solely those of the authors and do not represent the positioning of the contributors and their organizations.

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