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A Framework for Climate Resilience Metrics in Financing Operations

Joint MDB IDFC technical paper

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following institutions:

African Development Bank
Asian Development Bank
Asian Infrastructure Investment Bank
Inter-American Development Bank
International Development Finance Club
Islamic Development Bank
European Investment Bank
European Bank for Reconstruction and Development
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Executive Summary

Climate resilience metrics are needed to align financing flows with the climate resilience goals of the Paris Agreement, which calls for scaling up both the volume and the effectiveness of financing flows for climate resilience. While multilateral development banks (MDBs) and members of the International Development Finance Club (IDFC) have made progress in scaling up their adaptation financing flows in recent years, this has led to increasing demand for information about how these flows contribute to climate resilience goals. There is also a need for climate resilience metrics to be adopted and used across financial markets more widely in order to help mobilize commercial financing in support of the Paris Agreement's climate resilience goals and shift financing from the billions to the trillions. MDBs and IDFC members have an important innovation and leadership role to play in developing and using climate resilience metrics in financing operations, which requires them to go beyond their traditional adaptation finance tracking and develop a wider range of metrics. This paper sets out principles, including core concepts and other characteristics of resilience metrics, together with a high-level framework for climate resilience metrics in financing operations, focusing mainly on MDB and IDFC operations but with wider applicability to other types of financial institutions.

Climate resilience metrics complement adaptation finance tracking through a broad and flexible approach that reflects the great heterogeneity and diversity of climate vulnerability contexts and of potentially appropriate financing responses. Accordingly, the four core concepts underpinning the framework reflect the need for:

1. a context-specific approach to climate resilience metrics,
2. compatibility with the variable and often long timescales associated with climate change impacts and climate resilience building,
3. an explicit understanding of the inherent uncertainties associated with future climate conditions, and
4. the ability to cope with the challenges associated with determining the boundaries of climate resilience projects.

In response, the climate resilience metrics framework is a flexible structure based on a results chain model that is derived from well-established good practices in project-level monitoring and evaluation.

This framework enables projects to be assessed in terms of the *quality* of their design, their actual or expected project *results*, or both. *Quality* of project design encompasses diagnostics, inputs, and activities, whereas project *results* encompass outputs, outcomes, and impacts. This climate resilience metrics framework can be applied different ways by distinct financial institutions, as illustrated by some non-exhaustive examples from a number of MDBs and IDFC members as well as from commercial finance. These examples illustrate the use of climate resilience metrics at the *input-level*, such as the joint MDB adaptation finance tracking approach, and the *outcome level*, such as the European Bank for Reconstruction and Development's Climate Resilience Benefit approach. They also illustrate *hybrid* approaches, such as KfW Development Bank's framework for assessing climate resilience outputs and outcomes or the World Bank Group's emerging Resilience Rating System.

Mobilizing the diverse types of financing required to meet the climate resilience goals of the Paris Agreement requires a correspondingly diverse set of climate resilience metrics that can be applied across a wide range of financing operations and modalities that contribute to building resilience to climate change impacts. The proposed climate resilience metrics framework provides a common language that can be used across a diverse range of financial institutions and financing operations, recognizing varied financing operations require different approaches to climate resilience metrics. MDBs and IDFC members will continue to develop their own specific climate resilience metrics systems using the common language set out in this framework as they continue to develop and implement their respective and joint approaches to aligning their operations with the Paris Agreement goals.

Introduction

Climate resilience metrics will be key to assessing the extent to which adaptation financing activities contribute to climate resilience in order to align financing flows with the goals of the Paris Agreement. The 2015 Paris Agreement called for financing flows to be made consistent with pathways to climate-resilient development (Article 2). It also set out a global goal on adaptation (Article 7), with the aim of enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change. Multilateral development banks (MDBs)[1] and International Development Finance Club (IDFC)[2] members are now orienting their operations around the Paris Agreement, as detailed in Box 1. The ambitions of the Paris Agreement are an opportunity for financing institutions, whether MDBs, other development finance institutions, including IDFC members, or commercial financial institutions, to develop measurement systems to assess the extent to which their financing operations are aligned with climate resilience objectives. In support of this process, this paper presents a set of principles and an overall framework for climate resilience metrics for financing operations that can be used to guide the development and use of more specific climate resilience metrics and indicators by different types of financial institutions. Such metrics can be used to enhance the effectiveness of financing operations in contributing to building climate resilience. In particular, they may be useful to:

- **Learn** at the project level because they can help identify best-in-class projects that can serve as examples. And they can be used to **learn** from successes and failures.
- **Monitor** at the portfolio level because these metrics can help ensure enough is being done to promote climate resilience.
- **Inform** investors and decision-makers who usually have an incentive to select more climate-resilient projects but may not have the information to do so.

Climate resilience metrics can therefore help to inform decision-makers and create a stronger incentive for them to consider climate resilience in their resource allocation.

Increasing adaptation finance flows are leading to growing demand for information about their contribution to climate resilience goals. MDBs and IDFC members have successfully scaled up their adaptation finance commitments over the past decade, with MDBs delivering US$52.4 billion during 2011–2018, and IDFC members delivering US$30.5 billion during 2015–2018. The growth in adaptation finance volumes focuses attention on the extent of their contribution to climate-resilient development. Stakeholders such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Conference of the Parties are requesting more information on the results of climate financing (including adaptation finance), for example as stated in the UNFCCC's 2018 Biennial Assessment (UNFCC, 2018). As the mobilization of climate finance by MDBs and international financial institutions continues to accelerate, expanding coverage across broad sectors and geographies and catalyzing both market and non-market mechanisms, MDBs and IDFC members require a common framework of metrics to monitor, evaluate, compare, and report on the contribution of their adaptation financing activities to climate resilience goals. This requires MDBs and IDFC members to go beyond their existing reporting on adaptation finance flows to develop complementary approaches to assess and report on the quality and results of their adaptation financing operations. This calls for the development of climate resilience metrics that can be used to measure progress toward climate resilience goals and to help optimize the effectiveness of financing activities in building climate resilience. Box 2 explains the terminology used in this paper with respect to adaptation finance and climate resilience metrics.

[1] The members of the Joint MDB Climate Finance Group are the African Development Bank, the Asian Infrastructure Investment Bank, the Asian Development Bank, the European Bank for Reconstruction and Development (EBRD), the European Investment Bank, the Inter-American Development Bank Group, Islamic Development Bank, and the World Bank Group (WBG).
[2] IDFC members are listed at: https://www.idfc.org/members/.

Box 1. Joint MDB Approach to Paris Alignment

At the Conference of the Parties 24 in December 2018, the MDBs jointly launched the Paris Alignment Approach to guide the process of aligning their operations with the objectives of the Paris Agreement. The approach is based on six building blocks that have been identified as the core areas for alignment with the objectives of the Paris Agreement. These serve as the basis for a joint MDB approach that acknowledges each MDB's mandate, capability, and operational model. Accordingly, differentiated ways and timing of implementation are possible within robust common principles, framework, criteria, and timeline.

There is a dedicated building block (2) on adaptation and climate resilience that articulates the operational criteria for categorizing development operations as consistent with a climate-resilient development pathway through five macro tasks. There is also a building block on reporting (5) that covers tools and methods to characterize, monitor, and report on the results of MDBs' Paris Alignment Activities. This paper is intended to contribute, inter alia, to the Paris Alignment Approach, with a specific focus on macro task 5 of building block 2 (Monitoring and Evaluation).

Box 2. What Are Climate Change Adaptation and Climate Resilience?

(Adapted from the World Bank Group's [WBG] Adaptation & Resilience Action Plan 2019 [WBG, 2019])

The terms *climate change adaptation* and *climate resilience* are sometimes used interchangeably. Although there is overlap in how the terms are used, one may not necessarily substitute for the other.

- *Climate change adaptation* is the process of human and natural systems adjusting to the actual or expected impacts or effects of climate change. It includes adapting to short-term weather fluctuations, inter-annual variability, and longer-term changes over decades, and it relates to adjustments in behaviors, practices, skill sets, natural processes, and knowledge that anticipate short-, medium-, and long-term changes.
- *Resilience* is the ability of a human or natural system to withstand the impacts of exogenous shocks and to cope with or rebound from them. The term encompasses the capacity of a system to face multiple shocks and stressors—socioeconomic, market related, climate related—and withstand them.
- *Climate resilience* is strengthening a system to withstand climate-related shocks or stressors where adaptation and resilience intersect. It constitutes an important and growing subset of building system-level resilience to multiple shocks. Climate resilience is the capacity of a system to cope with, or recover from, those effects, while retaining the essential components of the original system.

For the purposes of this paper, and in line with existing MDB/IDFC terminology, financing committed to advancing climate change adaptation and building climate resilience is referred to as adaptation finance. Metrics for assessing the quality and results of such financing activities insofar as they contribute to the climate resilience goals of the Paris Agreement are referred to as climate resilience metrics.

Climate resilience metrics can help leverage wider financial system action on climate resilience. There is growing demand from commercial financial institutions, and from financial markets more widely, for metrics that can integrate climate resilience considerations (especially physical climate risks) into financial decision-making and measure the contributions of financing activities to climate resilience. This information is needed to leverage much wider financial market action on climate resilience and then to make the much-needed shift from the billions to the trillions of dollars required to meet global, regional, national, and local adaptation needs. For example, the Financial Stability

Board's Task Force on Climate-Related Financial Disclosure[3] calls for metrics that can be used to assess and disclose physical climate risks and climate resilience opportunities in business and financing operations. These recommendations have been taken up by the Network for Greening the Financial System,[4] a coalition of central banks and financial regulators that is mainstreaming climate action into the supervision of financial markets. Other market-defining processes, such as the European Union's Sustainable Finance Action Plan[5] and the Climate Bonds Initiative's climate resilience principles for climate bonds,[6] have also called for the development of climate resilience metrics. These calls were echoed in a major report prepared by the United Nations Environment Programme Finance Initiative for the Global Centre on Adaptation (UNEP-FI and GCA, 2019) as an input to the September 2019 Secretary-General of the United Nations Climate Summit. It is therefore necessary for climate resilience metrics to provide a common language among the multiple stakeholders within the financial community and for asset owners, operators, and regulators, among others. MDBs and IDFC members can play an important role in leading and piloting the development of climate resilience metrics that may ultimately have wider applicability across financial markets and contribute to the transformative shift in financing flows that is needed to realize the climate resilience goals of the Paris Agreement.

There is no one-size-fits-all set of climate resilience metrics. Climate resilience metrics need to be context-specific and fit-for-purpose in order to accommodate the wide range of climate resilience activities that can be measured at different stages of the life cycle (e.g., project, organization, sector, program, and system) and on different scales of action (e.g., local, national, transboundary, regional, and global). Therefore, it is not feasible to develop a universal and interchangeable list of climate resilience indicators that could be used across all financing operations. Different types of financing institutions will need to develop their own systems to measure specific aspects of climate resilience that are relevant for their business needs and priorities. However, MDBs and IDFC members can undertake harmonization efforts around climate resilience metrics that focus on defining common elements or principles that provide guidance on the key characteristics of climate resilience metrics, enable comparison among indicators of the same type and purpose, and facilitate reporting across different financial institutions in the longer term.

To this end, this paper sets out principles and a high-level framework for climate resilience metrics in financing operations. The central goal of this paper is to provide an overview of high-level principles and to outline the main elements of work on a common framework for climate resilience metrics carried out by MDBs and IDFC members over the past two years. It also reflects initial experience from some members of this group (e.g., the Asian Development Bank, the European Bank for Reconstruction and Development, KfW, and the WBG) that have already begun to pilot and/or use more detailed methodologies. This common framework is intended to enable each financial institution to apply these principles in a way that respects its individual needs, business model, and internal practices. The framework is grounded in the principles of improving the effectiveness and sustainability of climate resilience actions by sharing information, good practices, experiences, and lessons learned, strengthening scientific knowledge and institutional capacity. This paper aims to share this framework, and some initial experience of applying it, with a wider group of stakeholders, including governments, the private sector, and civil society, all of which have an interest in assessing the quality and results of adaptation finance and its contribution to the climate resilience goals of the Paris Agreement.

[3] For more information about this task force, see https://www.fsb-tcfd.org.
[4] For more information about this network, see https://www.banque-france.fr/en/financial-stability/international-role/network-greening-financial-system.
[5] For more information about this action plan, see https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_en#overview.
[6] For more information about the Climate Bonds Standard, see https://www.climatebonds.net/standard/about.

Principles for Climate Resilience Metrics

Climate resilience metrics can help to assess, track, and incentivize designing and implementing adaptation financing operations and, where possible and relevant, to assess the avoided loss or effectiveness of adaptation activities in enhancing climate resilience. This is especially true for adaptation financing operations in developing countries, as they are intended to reduce the climate-related susceptibilities of particularly vulnerable human or natural systems and are therefore intrinsically linked with development activities. As a best practice, the use of climate resilience metrics should go hand in hand with tracking adaptation financing because climate resilience metrics that properly reflect the climate resilience components of an investment can provide justification for counting that investment as adaptation financing. The common framework for climate resilience metrics proposed in this paper aims to define principles for designing and employing such metrics, recognizing that climate resilience metrics can complement tracking adaptation finance by assessing and reporting the quality and results of those financing flows. The framework is flexible in order to capture the heterogeneity in financing activities and operational priorities across a wide range of financial institutions. It recognizes that climate resilience metrics may be used to set targets on an ex ante basis, as well as to evaluate results on an ex post basis, in order to enable the evaluation of multiple aspects of project quality and (expected) project results across varying temporal and spatial scales.

The term "metric" is presented in this document as a flexible catch-all concept. As the term metric is often used interchangeably with the terms "indicator" and "measure" and there is no universal agreement on terminology, the proposed framework in this paper uses metric as a catch-all term capturing indicators and/or measures that either qualitatively or quantitatively express the change in climate resilience due to specific project activities. Using this term broadly recognizes that there is no single universal metric that can be used to assess the full range of *adaptation* financing operations in the same way that metrics such as tCO_2eq/year are often employed to evaluate the outcome of *mitigation* financing operations. Climate resilience metrics used within this framework should be able to define, monitor, evaluate, and report on the quality and results of adaptation financing activities, respecting the guiding principles of context-specificity, flexibility, and diversity and being used in a way that is transparent, feasible, consistent, and comparable. In this regard, Box 3 presents some qualitative definitions that are being used by different organizations to support the construction of climate resilience metrics.

Moreover, from a technical perspective, a metric may be described as a measurement method and a measurement scale. To this end, it is important to take into consideration that a climate-resilient metric:

- has a name
- may have a classification of what sector, system, life cycle stage, market, and locality it covers
- has a description that states what it measures in terms of, for example:
  - the system, activity, or dynamic that the metric covers
  - the units in which the metric is measured
  - its conditions for measurement
  - stakeholder perspectives
- has a description that states how it can be measured, for example:
  - using best available scientific knowledge
  - in terms of a possible method to collect or obtain the data items
  - in terms of a possible coding
- will be identified as a minimum by an analysis of related climate change risk

Box 3. Synthesis of Climate Resilience Monitoring and Evaluation Approaches Recommended by Other Organizations

A meta-analysis of various definitions of resilience (ODI, 2016) highlighted that resilience should enable systems to function and even flourish in the face of shocks and stresses, that most definitions include components of limiting damage from disturbances and recovering from shocks, and that managing change is key, but only some definitions incorporate transformative shifts. Along these lines, climate resilience could be associated to a set of different verbs such as *absorb, accommodate, adapt, anticipate, resist, cope, improve, learn, maintain, preserve, recover, reorganize, respond, restore,* and *transform*. These verbs could consequently be linked to a set of specific attributes of climate resilience such as *protection, robustness, preparedness, recovery, diversification, redundancy, integration/connectedness, and flexibility,* which could be understood as characteristics of a climate-resilient system. In other words, any type of climate resilience metrics should be able to measure resilience along any of these attributes, depending on the specific aspect of resilience that is being measured.

These attributes of resilience could also be organized around different sets of capacities. For example, Béné, Godfrey Wood, Newsham, et al. (2012) defined three capacities: *absorptive*, which allows systems to remain stable in the face of shocks, *adaptive*, which is incremental adjustments to a system, and *transformative*, which is systemic change that happens when adaptive capacity is exceeded. Constas, Frankenberger, Hoddinott, et al. (2014) suggested that resilience is best understood as an ex ante capacity that helps reduce the likelihood that shocks will have lasting adverse development consequences and, actions taken or investments made presently can either increase the ability to recover from shocks or stressors after they have occurred or can reduce damage that occurs during any given weather event. For example, the EU-CIRCLE resilience framework (Hedel, Sfetsos, Million, et al., nd) defines five capacities—anticipatory, absorptive, coping, restorative, and adaptive—that are essentially derived from the core attributes presented above.

The proposed framework is based on four core concepts that reflect context-specificity and diversity, variable and often long timescales, inherent uncertainties, and variable project boundaries. In response, the framework adopts a flexible approach that explicitly takes account of these challenges. The framework is explicitly project-level, as projects are the basic units in which MDBs and IDFC members deliver their adaptation financing. The core concepts are as follows:

1. **Climate resilience metrics require a context-specific approach.** Due to the vast range and heterogeneity of potential physical climate-related risk sources, receptors, and responses, a context-specific approach is essential to determine the project-level climate vulnerability and appropriate climate resilience priorities. This context-specificity makes it challenging to define universal metrics to assess how financing operations align with climate resilience goals. Climate resilience metrics should reflect the specific contexts and circumstances of different projects. However, there may be circumstances in which harmonized climate resilience metrics may be relevant. These may include defining adaptation needs, tracking adaptation finance, or aggregating project-level information to national scales, all of which are less driven by highly heterogeneous or variable context-specific drivers. Climate resilience activities encompass responses to both acute physical climate risks (e.g., extreme weather events) and chronic physical climate risks (e.g., slow-onset shifts in climatic conditions) over short-, near-, and longer-term time horizons (e.g., 2030, 2050, and beyond). As such, the diagnostics and potential responses to these different types of risks are fundamentally different. There is high and increasing variability in the onset, duration, frequency, and occurrence of these climate risks, with impacts that may materialize differentially over short or long time horizons and in different geographic and vulnerability contexts. Furthermore, in terms of climate resilience financing, this diversity is further compounded by the diverse range of mandates, business models, and financing modalities of MDBs and international financial institutions. This means that a broad and flexible approach is required in order to accommodate the considerable diversity in both types of activities needed to achieve climate resilience and in the different types of financing.

2. **Climate resilience metrics must be compatible with the variable and often long timescales** over which intended project results may be delivered and reported. There may be long time lags between project design and implementation and the delivery of climate resilience results. Therefore, metrics should be appropriate for project-specific temporal as well as spatial scales.

3. **Climate resilience metrics must be able to cope with the inherent uncertainties associated with future climate conditions.** The longer the timescales for project implementation and the assessment of project results, the greater the climate uncertainties and their implications for project performance. This makes estimating future project quality and results even more challenging. It is therefore important that climate resilience metrics can take into account such uncertainties.

4. **Climate resilience metrics must be able to cope with challenges associated with determining the boundaries of climate resilience projects.** Potential impacts and opportunities may often lie outside the physical boundaries of the project—for example, impacts on supply chains—or on downstream communities.

These four core concepts are reflected in the design of the proposed climate resilience metrics framework. Taking into account the context and challenges outlined above, the proposed approach is based on a flexible framework that can accommodate a broad and diverse range of potential climate resilience activities, different financial institution mandates and business models, and varying and potentially long timescales, while explicitly recognizing uncertainties. It uses a results chain structure based on established good practice in project-level monitoring and evaluation as set out by the Organisation for Economic Co-operation and Development (OECD, 2002) among others. The framework is described schematically in Figure 1 on page 10.

- **The framework progresses from short to long time horizons**, setting out a clear activity-level results chain based on a robust theory of change that uses the core concepts described above as the starting point for defining context-specific indicators.

- **Climate resilience metrics can be used and reported at any point along the results chain,** depending on the nature and context of the specific financing operation in question. Different financial institutions may choose the points along the results chain at which they use and report climate resilience metrics, reflecting their respective mandates and business processes.

- **Climate resilience metrics may be used and reported at both the asset and system levels.** Asset level (climate resilience *of* the project) refers to the climate resilience of the specific assets and/or activities being financed, focusing mainly on climate resilience as a private good. System level (climate resilience *through* the project) refers to the climate resilience achieved through the project that benefits the wider system in which the assets and/or activities are located, focusing on climate resilience as a public good. It is possible for a project to deliver climate resilience on both levels.

Complementing the above and in light of these challenges and the broad range of projects identified in this report, climate resilience metrics will also have certain functional characteristics (as presented in Box 4) that, together with the core concepts presented above, will be considered for development into basic principles.

Box 4. Summary of Characteristics of Climate Resilience Metrics

- Metrics, where feasible, will be harmonized to support monitoring, evaluating, comparing, and reporting on the contribution of adaptation financing activities to climate resilience goals.
- Metrics will aim to be useful for as many stakeholders involved in the project as possible (e.g., asset owners, operators, local governments, developers, suppliers, investors, and users).
- Metrics will facilitate evaluation of the technical performance of the project, contributing to the sustainability and resilience of communities and businesses. This includes metrics that incorporate baseline status and progress stages throughout the project lifecycle.
- Metrics will be applicable to different lifecycle stages of the project and, if needed, over its entire lifespan, which may be decades.
- Metrics will reflect the dynamic properties of the project and inherent uncertainties associated with climate conditions.
- Metrics will accommodate a diverse range of financing sources and modalities.
- Metrics should allow for continuous improvement and advanced features, such as system interoperability and expandability, use of smarter technologies, and efficiency, rather than the status-quo.
- Metrics should consider multiple project or system-level elements (e.g., community infrastructures such as energy, buildings, water, transportation, waste, and information and communications technology) that interact to support the operations and activities of communities.

Components of the Climate Resilience Metrics Framework

The proposed climate resilience metrics framework covers the quality of project design and project results. As displayed in Figure 1, the components of the framework may be divided into two steps or levels: the *quality* of the project design (1) and project *results* (2); both for individual assets and systems as presented in table 1 below. Users of the framework are encouraged to employ climate resilience metrics all the way to level 2, project results. For those cases where this is not feasible, it is key that institutions develop tools that enhance or facilitate the measurement of effectiveness developed during level 1, quality of project design, as in the case of the WBG's Resilience Rating System (presented later in this paper).

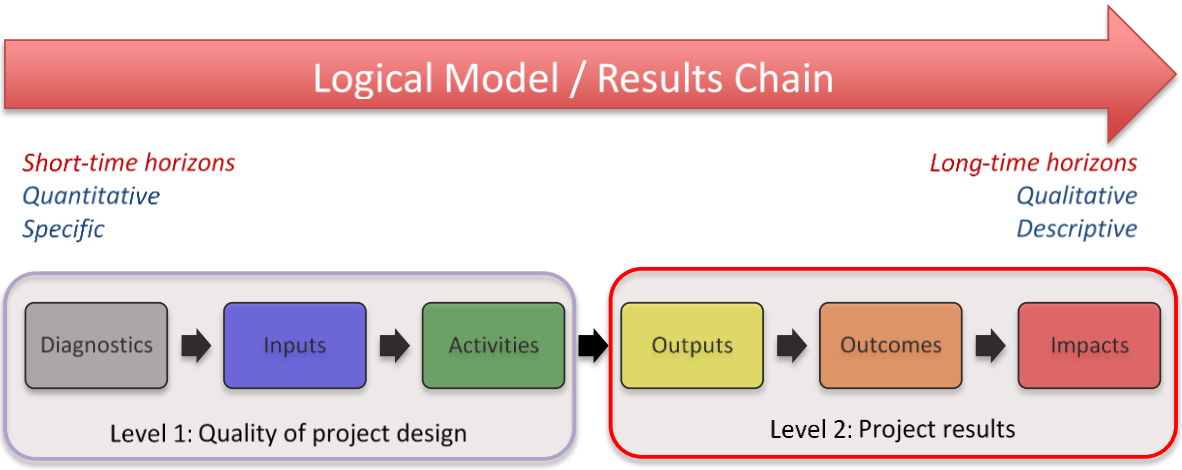

Figure 1. Logical Model / Results Chain

Quality of project design and implementation: project diagnostics, inputs, and activities.

- **Diagnostics** refers to the analytical activities and information resources used to define the project-specific context of climate vulnerability. This may include the specific physical climate risks to which the project and its underlying assets, activities, and beneficiaries are exposed, and the extent and severity of these risks and whether they are material. It may also include an analysis of gaps in the integration of climate risks and resilience in regional or national plans or policies, or analysis of specific sectors or value chains. These may be assessed and reported before the project is developed or as part of project development.
- **Inputs** refers to the financial, human, and material resources that are committed in response to the identified project-specific climate resilience priorities in order to integrate appropriate climate resilience considerations into the project. These may be reported at any stage of project development or implementation, such as at the point of project approval.
- **Activities** are the actions taken, work performed, and inputs mobilized to produce, implement, and deliver the project. In the context of climate resilience, activities may include several project lifecycle stages such as design, preparation, procurement, construction, delivery, and maintenance of assets and services; technical assistance; as well as knowledge transfer, policy dialog, and responding to the project-specific context of climate vulnerability in order to build climate resilience. Activities may be reported over the project implementation period.

Project results: outputs, outcomes, and impacts. The issue of uncertainties comes to bear in this category, as climate resilience results may not always be linear or first-order. They may also depend on the materiality (or non-materiality) of project externalities, may be highly spatially and temporally variable, and may have a complex relationship with underlying climate hazards or risks.

- **Outputs** are the products, capital goods, and services that are delivered through the project, responding to the project-specific context of climate vulnerability in order to build climate resilience. Outputs include relevant policies and plans at regional or national levels that the project is helping develop or update. They may also include changes resulting from the project that are relevant to achieving outcomes. These may be reported at the end of the project implementation period or on an ex ante basis at the point of project approval.
- **Outcomes** are the likely or achieved short- and medium-term effects of the project, which may take the form of adjustments of physical, human, or environmental systems and associated economic benefits, responding to the project-specific context of climate vulnerability in order to build climate resilience. Outcomes may be reported over the intended lifespan of the assets and/or systems being financed or on an ex ante basis at the point of project approval. They may also be verified through ex post evaluations. Typical time horizons may be one to five years following project completion.
- **Impacts** are the primary and secondary long-term effects of the project, directly or indirectly, intended or unintended, that may contribute to longer-term climate resilience, adaptive capacity, and/or reduced climate vulnerability. Due to the much longer time horizons and inherent uncertainties, impacts are usually inferred and/or expressed in purely qualitative or descriptive terms or may be assessed through longer-term ex post evaluations. Time horizons may be in the range of years to decades following project implementation.

Table 1. Summary of Definitions for Each of the Elements of the Climate Resilience Framework Results Chain Presented in Figure 1.

Framework Level	Level 1: Quality of Project Design			Level 2: Project Results		
	Diagnostics	**Inputs**	**Activities**	**Outputs**	**Outcomes**	**Impacts**
Asset	Analytical activities to define the context of climate vulnerability of the specific assets or activities of the entity being financed. For example: – Exposure to specific physical climate risks – Extent and severity of these risks – Whether they are material to the asset, activity, or entity being financed	Financial, human, and material resources that are committed as part of the project. For example, the incremental costs of climate-resilient measures.	Actions taken, work performed, and inputs mobilized in order to produce, implement, and deliver the project. For example: – project design, preparation, asset procurement, and construction – delivery of assets and services – technical assistance, knowledge transfer, or policy dialog	Products, capital goods, and services that are delivered within the boundaries of the specific assets, activities, or entity being financed. For example: – hectare of mangroves restored – participatory climate-proofed coastal city master plan approved	Likely or achieved short- and medium-term effects of the project, which may take the form of adjustments to human, physical, or financial systems within the boundaries of the specific assets, activities, or entity being financed. For example, kilometers of coastline protected from climate-induced disaster risk as a result of mangrove forest rehabilitation.	Long-term effects of the project that may contribute to long-term climate resilience within the boundaries of the specific assets, activities, or entity being financed. For example, increased resilience of coastal communities and assets as measured by ex post analysis of coastal city preparedness to and reduced loss of income from climate-related hazards.
System	As above but also covering the wider system (e.g., economic sector, community, ecosystem, or region) in which the assets, activities, or entity are located or of which they form a part.	As above but also covering inputs provided to improve the climate resilience of the associated wider system.	As above but also covering activities that aim to improve the climate resilience of the associated wider system.	Same as above but going beyond the boundaries of the specific assets, activities, or entity being financed.	Same as above but going beyond the boundaries of the specific assets, activities, or entity being financed.	Same as above but going beyond the boundaries of the specific assets, activities, or entity being financed.

Application of Climate Resilience Metrics

Climate resilience metrics can be applied differently by different financial institutions. The high-level and flexible framework described in this paper can be applied by individual financial institutions in various ways, reflecting the diverse business models and internal processes of different types of financial institutions. It is not intended to replace the individual systems of different financial institutions and it does not prescribe a one-size-fits-all approach. Instead, it provides a flexible framework that sets out high-level common principles for climate resilience metrics that may provide some consistency and coherence between different climate resilience metrics systems. For example, financial institutions that deliver project financing may find it appropriate to use climate resilience metrics at the output and outcome levels since the financing interventions are more likely to be location-specific with more definable project boundaries. On the other hand, financial institutions that deliver policy-based lending or sector-wide lending may not find this to be an appropriate or meaningful approach because the financing interventions may be more diffuse and wide-ranging, meaning that it may be more appropriate to use climate resilience metrics that focus on the quality of project design and implementation. The remainder of this section provides a number of examples of climate resilience metrics resulting from applying a variety of methodologies and tools used by different types of financial institutions. These climate resilience metrics have been divided into different types, linking them with the proposed common climate resilience metrics framework presented in Figure 1 and Table 1.

Input-Level Metrics: MDB/IDFC Adaptation Finance Tracking

In 2012, the Joint MDB Climate Finance Group (2019, Annex B) adopted a methodology to track climate change adaptation finance. Subsequently, Common Principles for Climate Change Adaptation Finance Tracking (Joint MDB Climate Finance Group and IDFC, 2015) were adopted by both MDBs and IDFC members. This approach focuses on reporting adaptation finance as an input to the project and reports as an input-level metric the amount of financing within a project that is committed to addressing climate vulnerabilities and building climate resilience. This input may be reported at the asset or the system level, depending on the focus of the project.

This methodology captures the volume and distribution of the costs of addressing climate change vulnerabilities using a context and location-specific approach (see Box 5 for an example). It entails using three steps to determine whether a project (or part of a project) can be counted as adaptation finance:

1. Set out the context of risks, vulnerabilities, and impacts related to climate variability and climate change.
2. State the intent to address the identified risks, vulnerabilities, and impacts in project documentation.
3. Demonstrate a direct link between the identified risks, vulnerabilities, and impacts and the financed activities.

While the MDB/IDFC adaptation finance tracking methodology has helped to standardize the accounting of adaptation finance flows across MDBs and IDFC members, it has certain limitations, including:

- It does not capture beneficial activities that may cost little or nothing (such as siting a project away from the anticipated climate-related risk) or even have negative costs (such as regulatory reform with large positive financial or economic benefits).
- It fails to capture the bidirectional nature of adaptation and development interlinkages that emphasize the benefits of development actions for adaptive capacity.

Other types of climate resilience metrics could therefore be used to complement this methodology by assessing the impact of adaptation finance on strengthening adaptive capacity, reducing climate-related vulnerability, and reducing exposure to climate risks. They could also help demonstrate the benefits of adaptation finance in informing development planning considering climate risks and strengthening the resilience of development impacts in the face of increasing physical climate risks.

Box 5. Input-Level: MDB/IDFC Adaptation Finance Tracking

The 2018 Joint MDB Climate Finance Report includes an example of an MDB project in the education sector. The project entails an upgrade to a country's secondary education system that includes measures to strengthen the ability of education sector assets to withstand climate change impacts such as extreme weather events. The total project cost was US$2,017 million, which included an MDB loan of US$510 million. The incremental cost of climate change adaptation was determined using a proportional approach and, as a result, the climate resilience measures incorporated within the project design were estimated to cost US$25.3 million.

In this way, the US$25.3 million in adaptation finance reported for this project was an input, which is an example of how input-level metrics can be used to report information about climate resilience financing activities.

Output Level Metrics:
Asian Development Bank: Climate Resilience of Urban Infrastructure

In 2014, the Asian Development Bank approved the Coastal Towns Environmental Infrastructure Project, which aimed to strengthen climate resilience in small towns in 11 of the 19 coastal districts of Bangladesh. The districts were selected due to their high levels of vulnerability—exposure to sea, high levels of salinity intrusion, lack of protective embankments, limited access to cyclone shelters, lack of drainage infrastructure, and over extraction of groundwater—as identified in the government's Coastal Development Strategy (2006) and the Strategic Program for Climate Resilience. The project considered climate resilience output indicators at the asset level as described in Box 6.

Box 6. Output Level: The Asian Development Bank's Coastal Towns Environmental Infrastructure Project

The Coastal Towns Environmental Infrastructure Project of Bangladesh used a sector lending modality to support investments in a phased manner. The project included a performance-based allocation approach, with investments linked to improved governance criteria, including climate-resilient and participation processes. Each town was able to access two stages of investment on fulfilling performance criteria. Stage 1 (priority) investments were those that directly contributed to strengthening climate resilience and fulfilling gaps in basic services: drainage, water supply, sanitation, cyclone shelters, emergency roads, and solid waste management.

The project's outputs included:

- improved climate-resilient municipal infrastructure with indicators on "79 kilometers of new and improved drains constructed",
- "21 cyclone shelters constructed with separate and safe facilities for women", and
- strengthened institutional capacity, governance, and awareness with indicators for "participatory climate-proofed urban master plans approved" and "climate-proofed infrastructure design standards published."

For this particular project, the approach used was to develop climate resilience output metrics at the asset level. Further, by introducing a performance-based allocation approach, the project was able to support not only resilient infrastructure but also risk-sensitive governance processes that were crucial for the longer-term sustainability of the infrastructure assets.

Outcome Level:
European Bank for Reconstruction and Development
Climate Resilience Benefit Approach

In 2018, on a pilot basis, the European Bank for Reconstruction and Development adopted a climate resilience benefit approach as part of its Green Economy Transition (EBRD, 2018), which reports climate resilience benefits as an outcome based on system-level metrics. This entails reporting the system adjustments delivered by the project—such as reduced water consumption or reduced downtime due to extreme weather disruption—taking into account the wider economic value of those benefits to society and the economy. This approach does not attempt to quantify the *quality* of project design

but instead takes a binary approach in that the three steps of the joint MDB adaptation finance tracking methodology must be adequately applied in order for climate resilience benefits to be reported (see **Box 7** for examples).

Box 7. Outcome Level:
European Bank for Reconstruction and Development's Climate Resilience Benefit Approach

A water infrastructure project in a Central Asian country that is projected to experience worsening water stress because of climate change is one example of the application of this approach. In response to this physical climate risk, the project was designed to reduce water losses and is estimated to deliver annual water savings of 2,887,515 meters cubed per year compared to the pre-project baseline (physical outcome). Using a shadow water price that reflects the full economic value of the water saved, the savings can also be expressed as a climate resilience benefit of €1.44 million per year (valorized outcome).

Another example is a road improvement project in a South-Eastern European country that is projected to experience more frequent and severe extreme weather events, such as floods and landslides, that may disrupt transport. In response, the project was designed to protect vulnerable road sections from such climate-related hazards. The estimated result is 2.3 days per year of avoided road network disruption and increased road lifespan of 5 years compared to the pre-project baseline (physical outcomes). These savings can also be expressed as a combined economic value of €1.7 million per year (valorized outcome).

This approach to using climate resilience metrics is well suited to the European Bank for Reconstruction and Development's business model, which is largely based on commercially oriented project financing targeted at predominantly private sector clients. Meaning the Bank provides dedicated project financing for specific businesses, facilities, infrastructure assets, and city authorities. In this context, it is appropriate to use climate resilience metrics that express the expected climate resilience outcomes of financing for assets and facilities that are generally location-specific, with fairly well-defined project boundaries. Expressing these outcomes in valorized terms is also important for engaging with private sector clients on the financial and economic rationale for climate resilience, thus leveraging greater private sector action on building climate resilience.

Hybrid Output/Outcome Level Tool and Metrics: KfW's Framework for Assessing Climate Resilience Outputs and Outcomes

KfW Development Bank is using project-level climate resilience indicators at the output or outcome level for all projects with climate change adaptation as a principal or significant objective (following the rationale of the OECD Development Assistance Committee Rio Markers for Climate). Projects with climate change adaptation as a principal objective are required to have a resilience indicator at the outcome level; if adaptation is not the principal but still a significant objective, at least an output level resilience indicator has to be used. In 2016, in order to facilitate, and to some extent standardize, the use of resilience indicators, an internal guidance was introduced (currently written only in German). This guidance provides examples of climate resilience output and outcome indicators for project types particularly relevant for KfW's financing activities (Table 2).

Table 2. Project Types for which KfW's Internal Guidance Provides Examples of Project-Level Resilience Outcome and Output Indicators

Sector / Field of Activity	Project Type
Agriculture and rural development	• Irrigation • Soil and water conservation • Climate-smart agriculture • Agricultural insurance • Climate-resilient rural infrastructure
Natural resources management and biodiversity	• Ecosystem-based adaptation • Integrated water resources management
Water supply and sanitation	• Improvement of drinking water availability • Protection of water supply and sanitation systems against extreme weather events • Improvement of surface and urban stormwater drainage • Water loss reduction in water supply systems • Hydro-meteorological monitoring
Flood protection and disaster risk management	• Dykes and dams for coastal protection • Urban flood protection • Climate-resilient urban infrastructure • Resilient housing and shelters • Early warning systems
Climate risk insurance	• Climate risk insurance at country level • Climate risk insurance at individual level

The indicator guidance helps project developers in a very practical and easy-to-use way to define resilience indicators for many relevant project types. The Resilience Indicator Guidance is currently being updated and will be translated into English and discussed with IDFC partners in the near future.

Hybrid Approach (Asset and System Level): The WBG's Resilience Transparency Rating System

The WBG is currently developing a Resilience Transparency Rating System that operates at two levels, one focusing on the resilience of projects and the other on the resilience achieved through projects. As acceptable levels of risk are context-specific, the rating system does not impose specific dimensions or absolute thresholds to evaluate project performance or residual risks. Instead, the rating system measures the quality of the inclusion of climate-related risks in the economic and financial assessment, encouraging the design of more climate-resilient projects and the disclosure of the actions implemented to reduce risks when relevant and valid across contexts. To assess the resilience *of* projects, climate resilience metrics can be used in the sector-specific methodologies to express the *quality of project design* encompassing diagnostics, inputs, and activities. For resilience *through* projects, a hybrid approach can be used, combining elements of both *quality of project design* and *outcomes* in terms of improved climate resilience of the wider system in which the project is located. Further details are provided in Box 8.

Box 8. Quality of Project Design (Plus Outcome): Example of the WBG's Resilience Rating System

Though work is currently ongoing to determine precisely how ratings will be applied to projects across sectors, the following example demonstrates one potential application.

A new development in a coastal city is potentially exposed to sea level rise and storm surges. The project designers incorporate in their design and operations the best available information about climate risks that are material to the project and that will occur during relevant timeframes. Depending on the breadth and depth of how the information is incorporated, which is reflected in the project design, operations, and consequently the financial and environmental and social risk analysis, the project obtains a score that ranges from R to A+ on a 5-point scale (R, C, B, A, A+). In this case, as the project designers evaluated multiple climate models across multiple time horizons and climate scenarios and determined the expected damage or value-at-risk due to climate change, the project would receive an A rating. However, since the project also includes monitoring local sea level and coastal erosion over time, a forecasting system for storm surge events, and tracking flood damage to critical infrastructure and disruptions to coastal transportation systems, the project is rated A+.

The rating aims to ensure that decision-makers (e.g., investors, government officials, and teams from the WBG) are aware of the risks associated with the projects and can make an informed decision about whether the project is still desirable (i.e., whether the expected benefits exceed the risks that the project creates or is exposed to). This approach suits the WBG's business operations because the rating system does not require the strict use of specific metrics to design and evaluate projects. Rather the approach encourages using context-specific metrics where feasible to complement the other decision-making processes at the WBG.

Hybrid-Commercial Financing (Diagnostic, Output, or Outcome Levels): TCFD Recommendations on Climate-Related Financial Disclosures

As the goals of the Paris Agreement can only be met through a much broader mobilization of the wider financial system in support of climate goals, including climate resilience, it is also necessary to consider how climate resilience metrics can support the orientation of private financing flows toward building climate resilience. In 2017, the Financial Stability Board's Task Force on Climate-Related Financial Disclosures (TCFD) issued a set of recommendations for the disclosure of climate-related risks and opportunities by financial institutions and corporation in relation to both low-carbon transition and the physical impacts of climate change (EBRD and GCA, 2018). In the context of the proposed climate resilience metrics framework, the assessment and disclosure of physical climate risks may be regarded as being at the diagnostic level, whereas the disclosure of opportunities achieved through building climate resilience into financing operations may be regarded as being at the output or outcome level. In both cases these are restricted to the asset level because the TCFD, being a private sector initiative, is primarily concerned with private goods and the impact of physical climate (both negative and positive) on commercial considerations. Box 9 provides some examples of how the climate resilience metrics framework could be applied in this context.

TCFD recommendations, alongside related emerging regulatory frameworks such as the recommendation of the Network for Greening the Financial System (NGFS, 2019) and of the EU Sustainable Finance Action Plan on reporting climate-related information (EC, 2019), call for the disclosure of specific and, wherever possible, quantitative information about climate-related risks and opportunities in financing operations in order to internalize decision-relevant climate information in financing decisions and financing flows. In relation to physical climate and climate resilience, this requires the use of metrics that explicitly articulate the risk and reward associated with physical climate factors at the level of individual financing decisions, such as projects, investments, or other financing instruments.

Box 9. Using Climate Resilience Metrics in Climate-Related Financial Disclosures

TCFD recommendations call for calculating and disclosing risks and opportunities associated with physical climate change impacts (as well as with the low-carbon transition).

Physical climate risks may be expressed at the diagnostic level. For example, the United Nations Environment Programme Finance Initiative's TCFD banking industry pilot (UNEP-FI and Acclimatise, 2018) describes how the probability of default, a standard credit risk metric, of certain items (e.g., investments, assets, and firms) in a financial institution's portfolio could be adjusted in light of information about their exposure to physical climate risks.

Opportunities associated with physical climate (i.e., climate resilience opportunities) can be expressed as outputs or outcomes of financing activities, such as the financial benefits derived from effectively managing existing physical climate risks to assets or operations, from effectively anticipating emerging physical climate risks, or from exploiting future market shifts driven by changing climate conditions.

Conclusions and Next Steps

MDBs and IDFC members have an important role in innovation on climate resilience metrics in financing operations. It is clear that climate resilience metrics are crucial in meeting the climate resilience goals of the Paris Agreement and for scaling up both the volume and the effectiveness of financing flows from a broad range of sources in support of its climate resilience goals. MDBs and IDFC members have an important role to play in innovating and piloting approaches to using climate resilience metrics in financing operations that may be relevant and provide valuable lessons for a much wider range of financial institutions, including commercial financial institutions whose engagement is essential for achieving the transformative shift in private financing flows that is needed to achieve the goals of the Paris Agreement. In order to deliver this innovation, MDBs and IDFC members need to go beyond their existing processes for tracking adaptation finance flows and develop and test complementary approaches to express the quality and results of their financing operations in terms of their contribution to climate resilience goals. This is a necessary component of the MDB/IDFC action on Paris Agreement alignment, for example as part of building block 2 of the emerging Joint MDB Paris Agreement Alignment Approach.

Mobilizing diverse types of financing for climate resilience requires a diverse set of climate resilience metrics. The financing needs of the Paris Agreement's climate resilience goal are very diverse. The agreement requires a large-scale mobilization of a wide array of different types of financing, ranging from traditional development financing (such as highly concessional financing to protect vulnerable populations in the least developed countries), to scaled-up financing for climate-resilient infrastructure delivered through project and/or blended financing, to a massive mobilization of private financing from financial markets, which is indispensable for shifting climate resilience financing from the billions to the trillions. This diverse range of financing sources and modalities requires a correspondingly diverse approach to climate resilience metrics, as different types of metrics are suited to different types of financing.

The climate resilience metrics framework provides a common language that can be used across a diverse range of financing operations. This paper presents a climate resilience metrics framework with a high-level structure that provides coherence and consistency across the diverse range of climate resilience metrics that will be needed by different types of financial institutions to inform different types of financing flows. The framework can be used as a common language for climate resilience metrics across different and varied financial institutions and financing operations. For example, this common language would enable different parties to understand whether the climate resilience contribution of a given financing operation (project) is being expressed in terms of the *quality* of the project's design or its expected *results*, thus whether its climate resilience aspects are being assessed at

the *diagnostic*, *input*, or *outcome* level. This can facilitate a greater degree of comparability across a necessarily diverse and varied range of financing operations and modalities.

Different types of financing operations are suited to different approaches to climate resilience metrics. Within this common framework and language, the use of climate resilience metrics can be tailored to suit the needs of different types of financing operations. For example, financing operations that focus on policy-based lending to least developed countries in order to provide concessional financial support to key public institutions or vulnerable sectors may be better suited to using climate metrics that focus on assessing the *quality* of the design of such interventions, perhaps taking into account the *diagnostics* and *inputs* that went into their preparation and delivery. Alternatively, financing operations that focus on building the climate resilience of specific infrastructure assets or commercial facilities may be more suited to using climate resilience metrics that focus on the specific *results* in the form of *outputs* or *outcomes* that the financing delivers or is expected to deliver. Commercial financing activities may require the explicit articulation of the financial risk and reward associated with physical climate factors in investments operations, for example by focusing on *diagnostics* and expected *results*, either as *outputs* or as *outcomes*. In all of these cases, the common language provides a framework for coherence and comprehension across different financial institutions.

MDBs and IDFC members will continue to develop their own specific climate resilience metrics systems using the common language set out in this framework. The framework provides valuable, high-level guidance for MDBs and IDFC members as they continue to shape their individual and institution-specific climate resilience metrics systems. There is a mounting body of experience across MDBs and IDFC members in developing and applying such metrics. Along these lines, various MDBs among them EIB, IDB and others, are adopting a climate risk management system to reduce physical climate risks in funded projects. The EIB climate risk management system for example is a business process fully embedded in the EIB project cycle. The system allows to estimate and report the initial climate risk of a proposed investment loan. It also provides a qualitative estimate of the *residual physical climate risk* of each EIB investment loan as output metric after adaptation measures have been integrated in the project. It allows estimating the overall cumulative residual climate risk in EIB investment loan portfolio and could aid disclosure of physical climate risk. This approach to using residual physical climate risk as an output metric is well suited to the European Investment Bank's business model because of the diversity of its investments in terms of geography, sector and type of client. It also enhances opportunities for dialogue with public and private sector clients on the need to address physical risks based on evidence and reported risks, thus making a strong case for building climate resilience in investments as a sound financial practice.

Approaches that provide information about the quality and results of adaptation financing activities vary within institutions as a result of the different business models of MDBs and IDFC members. Climate resilience metrics can serve as a way of more systematically documenting climate resilience efforts and identifying successful examples. In doing so, climate resilience metrics can also help identify opportunities for further climate resilience support. Dedicated institutional processes are necessary to enable the development and deployment of climate resilience metrics that are tailored to different business models. In turn, this requires significant institutional commitment to capacity building that can support project teams in identifying adequate metrics. A major challenge is aggregating project-level climate resilience metrics with metrics that can capture systemic climate resilience, including at the sector and national levels. This is compounded by the lack of methodologies to assess climate resilience baselines and limited efforts in defining long-term climate resilience targets at the sector and national levels. Measuring progress toward climate resilience goals in line with the Paris Agreement will require the development of benchmarks and pathways against which progress can be measured at an aggregated level.

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