A Framework and Principles for Climate Resilience Metrics in Financing Operations

AFRICAN DEVELOPMENT BANK GROUP

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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 such 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 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 climate resilience metrics, together with a high-level framework for such metrics in financing operations, focusing mainly on MDB and IDFC operations but with wider applicability to other types of financial institutions. However, this paper does not attempt to provide a universal guide for climate resilience financing activities. Instead it focuses specifically on systems of measurement to define and report on the contribution of financing activities toward climate resilience objectives.

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

The **climate resilience metrics framework** is a flexible structure based on a logical model and results chain. It guides the development of climate resilience metrics for individual **assets** and **systems**, and for financing **portfolios**, on two levels:

1. **Quality of project design** (diagnostics, inputs, activities)
2. **Project results** (outputs, outcomes, impacts)

The framework is underpinned by common principles: four **core concepts** to develop climate resilience metrics and **functional characteristics** of those metrics. The four core concepts 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 building climate resilience,
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.**

Based on these core concepts and functional characteristics, the framework is a flexible structure centered on a results chain model that is derived from well-established good practices in project-level monitoring and evaluation. It enables projects to be assessed in terms of the *quality* of their design, their actual or expected *results*, or both. *Quality* of project design encompasses diagnostics, inputs, and activities, whereas results encompass outputs, outcomes, and impacts. This climate resilience metrics framework can be applied in different ways by distinct financial institutions, as demonstrated by examples from a number of MDBs and IDFC members as well as from commercial finance provided in this paper. 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 (EBRD) Climate Resilience Outcome 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 goals of the Paris Agreement requires a correspondingly diverse set of metrics that can be applied across a wide range of financing operations and modalities that contribute to building resilience to the impacts of climate change. The climate resilience metrics framework proposed in this paper provides a common language that can be used across a diverse range of financial institutions and financing operations, recognizing that varied financing operations require different approaches. 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 goals of the Paris Agreement.

Introduction

Despite considerable progress, the global response to climate change is yet to match the challenges. While climate mitigation is the ultimate imperative, carefully selected adaptation options specific to national contexts are equally important and will yield strong co-benefits to sustain development and reduce poverty. According to the Global Commission on Adaptation, investing US$1.8 trillion globally between 2020 and 2030 in early warning systems, climate-resilient infrastructure, improved dryland agriculture crop production, global mangrove protection, and investments to make water resources more resilient could generate US$7.1 trillion in total net benefits. The commission also argues that adaptation actions have a triple dividend:

1. Avoided losses
2. Positive economic benefits: reduced risks, increased productivity, and innovation
3. Social and environmental benefits

Achieving these adaptation benefits requires concerted effort at all levels. In particular, the risks societies and economies face need to be fully understood and reflected in the decisions of public and private actors. Governments need to improve how they make policy and investment decisions and how they implement solutions. The funds and resources necessary to accelerate adaptation need to be mobilized.

Climate resilience metrics will be key to assessing the extent to which adaptation financing activities and flows contribute to climate resilience and align 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. MDBs[1] and (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 systems to measure 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 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 inform decision-makers and create a stronger incentive for them to consider climate resilience in their resource allocation. More broadly, these metrics can enhance the features of good governance in support of resilience. For example, climate resilience is strengthened by multi-stakeholder governance and with the involvement of diverse stakeholders across public and private sectors and levels. Further, flexible metrics that allow inputs and outputs to be compared and evaluated can strengthen integrated decision-making.

1 The members of the Joint MDB Climate Finance Group are the African Development Bank (AfDB), the Asian Infrastructure Investment Bank (AIIB), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the Inter-American Development Bank Group (IDB and IDB Invest), the Islamic Development Bank (IsDB), and the World Bank Group (WBG).

2 IDFC members are listed at: **https://www.idfc.org/members/**.

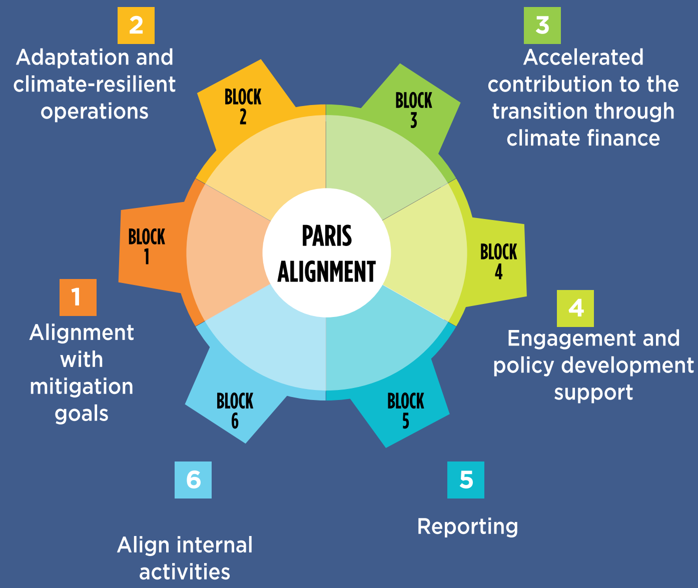
Increasing adaptation finance flows are leading to growing demand for information about their contribution to climate resilience goals. MDBs and IDFC members have successfully scaled up their adaptation finance commitments over the past decade, with MDBs delivering US$52.4 billion during 2011–2018 and 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.

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.

- **Maladaptation** is related to actions that may lead to increased *risk* of adverse climate-related outcomes, including through increased *GHG* emissions, increased *vulnerability* to climate change, or diminished *welfare*, now or in the future. Maladaptation is usually an unintended consequence.

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 (TCFD)[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 (NGFS)[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.

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**.

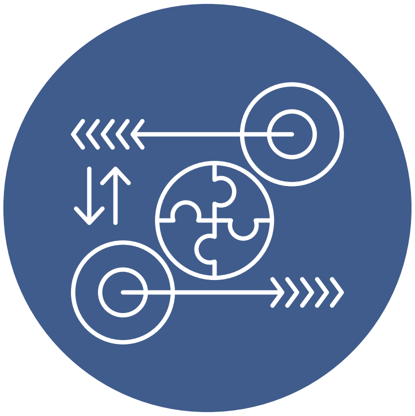
There is no one-size-fits-all set of metrics. Climate resilience metrics need to be context-specific and fit-for-purpose in order to accommodate the wide range of activities that can be measured at different stages of the life cycle (e.g., project, organization, sector, program, and system) and on different scales of action (e.g., local, national, transboundary, regional, and global), and that avoid maladaptation (i.e., activities that under certain circumstances may increase vulnerability instead of reducing it, such as an irrigation project in a target zone where water is definitively too scarce). 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 harmonize efforts to define common elements or principles of climate resilience metrics, provide guidance on their key characteristics, 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, focusing on systems of measurements. 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., ADB, AfDB, EIB, EBRD, IDB, KfW, and the WBG) that have 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.

Principles for Climate Resilience Metrics: Core concepts and functional characteristics

Over the past decade, international financial institutions (IFIs) have contributed to sustainable development and climate change. Lessons have been learned about defining and using climate resilience metrics as a way to monitor, track, and learn from a large variety of projects and programs covering many sectors, as well as different climate change impacts and geographical areas around the world. From this initial experience, a common framework has emerged, which can enhance harmonization among IFIs while building on the different types of metrics that can be used by MDBs and IDFC members. The common framework proposed in this paper can be seen as the semantic component of climate resilience metrics. This framework is underpinned by common principles that guide the development of metrics at the project or portfolio levels, with four core concepts for developing climate resilience metrics and functional characteristics of those metrics. These principles can be understood as the syntax component. .

A number of initial lessons have emerged from the experiences of IFIs in financing and preparing projects that contribute to climate resilience and adaptation to climate change.



Metrics can be used to assess, track, and incentivize the design and implementation of adaptation financing 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, which 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 metrics that properly reflect the climate resilience components of an investment can provide justification for counting that investment as adaptation financing. The common framework and the common principles (core concepts and functional characteristics) that are presented in this paper should guide the design and use of climate resilience metrics, recognizing that they can complement the tracking of 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 consider that a climate resilience 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 concepts and functional characteristics presented below.

The proposed common framework for climate resilience metrics is underpinned by four core concepts that reflect context specificity and diversity, variable and often long timescales, inherent uncertainties, and variable project boundaries as well as a set of functional characteristics (Box 4). The framework is explicitly project-level, as projects are the basic units by which MDBs and IDFC members deliver their adaptation financing.

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 (the quality of this assessment is also key to avoiding maladaptation decisions in the project design). 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 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 IFIs. 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. The capacity to cope with uncertainty reduces maladaptation risks at the same time.

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.

Box 4.

Summary of Functional 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.

These four core concepts and the related challenges 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.

Components of the common Climate Resilience Metrics Framework

The proposed climate resilience metrics framework mirrors a logical model and results chain and covers the quality of project design as well as project results. As displayed in Figure 1, the components of the framework can be divided into two steps or levels: (1) the *quality* of the project design and (2) project *results* for individual assets and systems and for financing portfolios as presented in Table 1. 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 measuring the 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). Some of the key aspects of the proposed common framework for climate resilience are as follows.

- 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 the asset, system, and portfolio 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. In addition, climate resilience metrics may be used and reported at the portfolio level, aggregating up from the project level.**

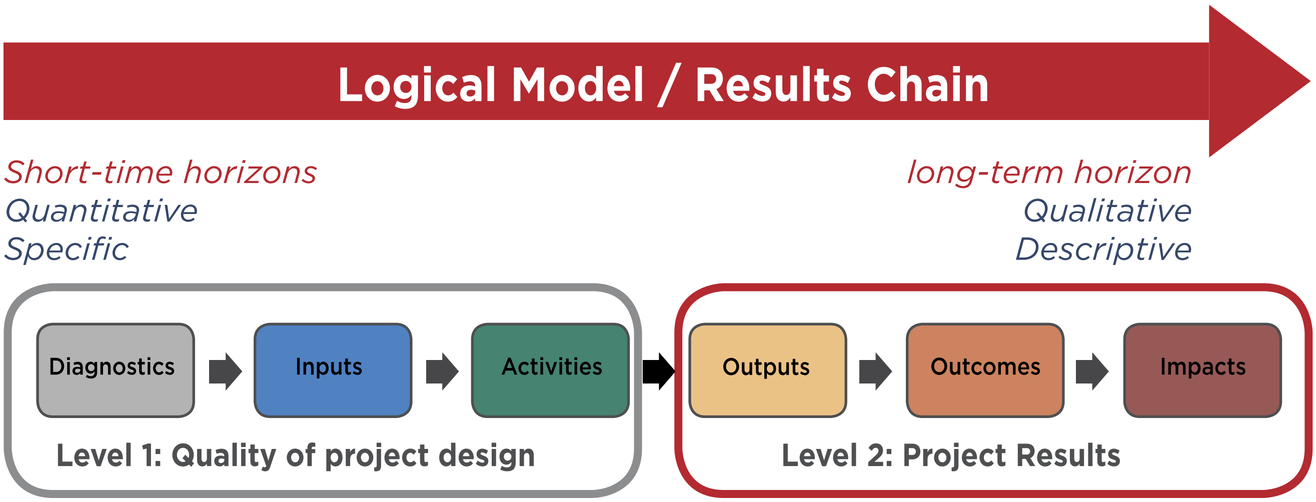


Figure 1. Logical Model and Results Chain

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		Asset	System	Portfolio
Level 1: Quality of Project Design	**Diagnostics**	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.	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	Analytical activities and information expressing how the portfolios of financial institutions are exposed to physical climate risks at an aggregate level.
	Inputs	Financial, human, and material resources that are committed as part of the project. For example, the incremental costs of climate-resilient measures.	As above but also covering inputs provided to improve the climate resilience of the associated wider system.	As above but aggregated up from the individual project level to the portfolio level.
	Inputs	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.	As above but also covering activities that aim to improve the climate resilience of the associated wider system.	As above but aggregated up from the individual project level to the portfolio level.
Level 2: Project Results	**Outputs**	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.	Same as above but going beyond the boundaries of the specific assets, activities, or entity being financed.	As above but aggregated up from the individual project level to the portfolio level.
	Outcomes	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.	Same as above but going beyond the boundaries of the specific assets, activities, or entity being financed.	As above but aggregated up from the individual project level to the portfolio level.
	Impacts	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 in come from climate-related hazards.	Same as above but going beyond the boundaries of the specific assets, activities, or entity be-ing financed.	As above but aggregated up from the individual project level to the portfolio level.

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 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 and the core concepts presented in the section "Principles for Climate Resilience Metrics: Core Concepts and Functional Characteristics."

All examples of climate resilience metrics presented in this section, as well as in Annex II, are summarized in Table 2. The table provides an overview of the different aspects of climate resilience that are being measured by financial institutions, illustrating also how well they complement each other.

Table 2. Overview of Aspects of Climate Resilience that Are Being Measured

Type of indicator	Indicator captures	Metric example
Quality of project design metrics at the project (asset) level	Physical climate risks in projects	Budget committed to resilience measures (input indicator) Early warning system implemented and operational (output indicator) Road section built with climate resilience measures (output indicators) Road and transport service along corridor linking two capitals resilient to climate change (outcome indicator)
Quality of project design and results at the project (asset) level	How effectively the project aligns with predefined climate change mainstreming objectives	Bronze rating (B) for the Smallholder Agricultural Productivity Enhancement Program for Sub-Saharan Africa (see IsDB example in Annex II)
Quality of project design metrics at the project (asset or system) level	The quality of the inclusion of climate-related risks in the economic and financial assessment and the disclosure of risk reduction measures implemented (as relevant)	Project score of A+
Input metric at the project or portfolio level	Volume and distribution of the costs of addressing climate change vulnerabilities	US$25.3 million in adaptation financing in an MDB education project
Output metric at the project (asset) level	Outputs that directly contribute to climate resilience	79 km of improved drains constructed 21 cyclone shelters constructed with separate and safe facilities for women
Output metric at the project and portfolio level	Residual physical climate risk of each investment loan and the overall cumulative residual climate risk in the EIB in-vestment loan portfolio	Residual climate risk of project's financed underground power transmission lines
Output and outcome metrics at the project (asset) level	Climate resilience outcome generated by the project activities	Rain gage stations installed and in operation in the project area (output indicator) Days per year with severe traffic restriction due to landslides in road sections (outcome indicator)

Level of results chain	Alignment with core concepts	Reference
Quality of project design/diagnos-tics, inputs, and activities and project results/ outputs and outcomes	Application of this tool involves identifying and evaluating location-specific (in this case the road corridor) physical climate risk (core concept 1) The physical climate risk is projected to manifest starting in 10 years (anticipatory) (core concept 2) compatible with the variable and often long timescales.	AfDB, Annex II
Quality of project design/diagnostics, inputs, and activities and project results/outputs and outcomes	Tool adapted to all specific con-texts with rating standards (core concept 1) Covers all levels of the results chain from design to post-evaluation (core concept 2).	IsDB, Annex II
Quality of project design/diagnostics, inputs, and activities The WBG system operates at two levels: (i) At the asset level, this system focu-ses on project resilience using Level 1 of the results chain by assessing the quality of project design (ii) At the system level, this system focuses on resilience through projects using Level 2 of the results chain to look at outcomes in terms of improved climate resilience of the wider system in which the project is located.	These levels require: • an assessment of context- and location-specific vulnerabilities (core concept 1); •consideration of variable and long-term temporal scales (core concept 2); and • a view on outputs and out-comes within the specific project boundary and beyond (core concept 4).	World Bank Group Section "Application of Climate Resilience Metrics"
Quality of project design/inputs	Assessment of context and location-specific vulnerabilities (core concept 1). Identification of relevant activities within the boundaries of the pro-ject (core concept 4).	MDB/IDFC Section: "Application of Climate Resilience Metrics"
Project results/outputs	Assessment of context and location-specific vulnerabilities (core concept 1).	ADB example Section: "Application of Climate Resilience Metrics"
Project results/outputs	Assessment of context and location-specific vul-nerabilities (core concept 1). The metric is derived from assessment of location- and sector-specific sensitivities to occurred and projected climate-related hazards over the economic life-time of the operation (core concepts 2 and 3). Adaptation opportunities within and outside the boundaries of the project (core concept 4).	EIB example Section: "Application of Climate Resilience Metrics"
Project results/outputs and outcomes	Assessment of context and location-specific vul-nerabilities (core concept 1). The outcome indicator is only meaningful toge-ther with information about whether relevant weather events occurred (core concept 2, com-patibility with variable timescales associated with climate change impacts, and core concept 3, ex-plicit understanding of the inherent uncertainties associated with future climate conditions). Identification of relevant activities within the boundaries of the pro-ject (core concept 4).	IDB, Annex II

Type of indicator	Indicator captures	Metric example
Output and outcome metrics at the project (asset) level	Climate resilience outputs and out-comes generated by the project activities	Expected additional water volume derived from water sources less affected by climate variability or change, such as surface water infiltration galleries and purification plants (output indicator) Percentage of households with sufficient drinking water during dry spells (outcome indicator)
Outcome metrics at the project (asset) level	Climate resilience outcome generated by the project activities: water savings in arid zones	Annual water savings of 9,500,000 m3 (physical outcome) expressed also as a climate resilience benefit of €4.25 million per year (valorized outcome)
Outcome metrics at the project (asset) level	Climate resilience outcome generated by the project activities	Estimated 2.3 days per year of avoided weather-related disruption to the relevant section of the road network 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 out-come)

Level of results chain	Alignment with core concepts	Reference
Project results/outputs and outcomes	Indicators are based on context-specific climate risk analyses, while examples reflect typical project types. They are widely compatible with uncertainties associ-ated with future climate change.	KfW Section: "Application of Climate Resilience Metrics"
Project results/outcomes	These outcomes were estimated on the basis of the project location being in an arid zone where future climate conditions will exacerbate water stress (core concept 1: context-specific approach). "Cubic meters of water saved in an arid zone will remain a relevant climate resilience metric in an uncertain climate change context (core concept 3: ability to cope with future uncertainty)."	AfDB Annex II
Project results/outcomes	These outcomes were estimated based on a project-specific analysis of the expected contribution of the project to building the climate resilience of the road network to projected extreme weather events (core concept 1: context-specific approach).	EBRD Section: "Application of Climate Resilience Metrics"

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, or at the portfolio level, aggregating up from the project level.

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.

MDB/IDFC Education System Upgrade

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 ADB 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 shel-ters, lack of drainage infrastructure, and over extraction of groundwater 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.

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**.**

Box 6.

ADB 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 im-proved 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."

European Investment Bank: Residual Physical Climate Risk

The European Investment Bank (EIB) estimates and reports on the residual physical climate risk of each investment loan as a qualitative output metric of the resilience of its investments and overall portfolio. The residual physical climate risk is defined as the risk that an investment loan may still be affected by climate change after adaptation measures have been incorporated. This estimate is carried out ex-ante before EIB financing is approved. The estimate range is low, medium, high, or unacceptable. A project will be rated with low residual physical climate risk if (i) the initial vulnerabilities identified for the project have been reduced through adaptation measures, (ii) the analysis of physical climate risk and possible adaptation solutions is carried out in accordance with EIB acceptable practice (currently the European Financing Institutions Working Group on Adaptation to Climate Change Guide), and (iii) the MDBs three steps for tracking adaptation finance are met.

In addition, this approach allows the *overall cumulative residual physical climate risk* in EIB investment loan portfolio to be estimated and could aid disclosure of physical climate risk. The metric supports an analysis of the sectors, geographies, and clients that may carry higher physical climate risks. This approach is well suited to the EIB's business model because of the diversity of its investments in terms of geography, sector, and type of client. Further, it is in line with EIB reporting requirements for financing in developing countries. This approach also enhances opportunities for dialog with public and private sector clients on the need to address physical climate risks based on evidence and reported risks, thus making a strong case for building climate resilience in investments as a sound financial practice.

This qualitative metric is one of the outputs of the EIB Climate Risk Assessment System, a business process adopted by the EIB in February 2019 to reduce physical climate risks in EIB-funded projects. The estimate of residual climate risk is produced through a process that encompasses an assessment of the initial physical climate risk associated with the project (before adaptation), as well as an assessment of the client's adaptive capacity and of the context of vulnerabilities. It is applied to investment loans in all sectors and geographies of EIB operation.

Box 7.

EIB Power Transmission Lines Project

An energy investment program in a European country includes the refurbishment of overhead power transmission lines. The initial physical climate risk of the investment was rated high because of the high risk of service disruption and structural damage caused to overhead power lines by increases in temperatures, heavy rains, and high winds in the project area. These climate-related hazards would result in reduced thermal efficiency and sagging to dangerous levels. The loss of permafrost due to increased temperature would also destabilize the grounds, meaning overhead power lines would not be viable in the project area. In response to these physical climate risks, the project was designed with underground transmission lines. The residual physical climate risk associated with the investment after adaptation measures were incorporated was estimated to be low. For illustrative purposes only, the climate resilience metric for this case could be *low residual climate risk of project's financed underground power transmission lines*. Eventually, applying this approach across all sectors of operations will allow an analysis of the overall climate resilience quality of EIB's portfolio to be performed. It will also help identify regions and sectors that carry higher physical climate risk, enabling dialog with clients and the documentation of adaptation solutions

Outcome-Level Metrics

European Bank for Reconstruction and Development: Climate Resilience Outcome Approach

In 2018, on a pilot basis, the EBRD adopted a climate resilience outcome 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 outcomes 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 outcomes to be reported.

This approach to using climate resilience metrics is well suited to the EBRD's business model, which is largely based on commercially oriented project financing targeted at predominantly private sector clients. This means that 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.

Box 8.

EBRD Water Infrastructure Project

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 valorized climate resilience outcome 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 valorized climate resilience outcome of €1.7 million per year (valorized outcome).

Hybrid Output/Outcome-Level Metrics

KfW's Framework for Assessing Climate Resilience Outputs and Outcomes

KfW Development Bank is using project-level climate resilience indicators at the outcome and/or output 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 3).

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.

Table 3. 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 ex-treme 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

Example for adaptation-related outcomes and outputs and respective indicators

- **Sector: Water supply and sanitation**
- **Project Type: Improvement of drinking water availability**

Typical Adaptation-Related Outcome	Examples of Outcome Indicators
• Reliable drinking water supply for target group during dry spells	• Percentage of households with sufficient drinking water during dry spells • Water supply cuts during hot summer months • Share of drinking water from sources less affected by drought (e.g., surface water infiltration and purification, and desalinization)

Typical Adaptation- Related Outputs	Examples of Output Indicators
• Functional surface water infiltration and purification system • Rainwater harvesting system in place • Functional desalinization plant • Water loss reduction measures in place • Demand management measures in place	• Expected additional water volume derived from infiltration galleries and purification plants • Expected additional water volume from rainwater harvesting • Expected additional water volume from desalinization • Percentage of rehabilitated and new pipe system • Percentage of households paying water tariffs that are socially acceptable and minimize water wastage

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 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. The approach also encourages projects to align with local and national adaptation strategies and priorities.

Box 9.

WBG Coastal City Project Rating

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 Approach from 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. This approach is highly suitable for application at the portfolio level. Financial institutions can analyze and report on physical climate risk exposure and climate resilience opportunities across their entire financing operations and aggregating up from the project level. Box 10 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 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 10.

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. Examples would be 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. 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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Annex I: Glossary of Terms

Activities is used in a variety of contexts.

- **Adaptation/resilience activities** refers to measures taken to ensure actual or anticipated physical climate risks to an asset, system, community, ecosystem, or business are managed.

- **Development activities** aare operations undertaken by MDBs or members of the IDFC with specific development objectives based on their respective mandates and internal procedures.

- **Financing activities** refers to operations of MDBs and members of the IDFC in accordance with their respective financing instruments and internal guidelines.

- **MDB Paris Alignment activities** refers to MDB operations aligned with the goals and objectives of the Paris Agreement.

- **Project activities** are the actions taken, work performed, and inputs mobilized to produce, implement, and deliver the project.

Adaptation finance is financing committed to advancing climate change adaptation and building climate resilience in line with existing MDB/IDFC terminology.

Adaptation finance tracking refers to tracking adaptation finance in line with the **MDB-IDFC Common Principles for Tracking Climate Change Adaptation Finance.**

Asset level (climate resilience) refers to the climate resilience of the specific assets and/or activities being financed, focusing mainly on climate resilience as a private good.

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.

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.

Climate resilience metrics are used to assess the quality and results of adaptation finance activities insofar as they contribute to the climate resilience goals of the Paris Agreement. In line with the principles set out in this joint MDB-IDFC technical paper, a climate resilience 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 and how it can be measured; and will be identified as a minimum by an analysis of related climate change risk.

Characteristics of climate resilience metrics refer to functional characteristics, such as the aim for climate resilience metrics to be useful for as many stakeholders involved in the project as possible, to be applicable to different lifecycle stages of the project, or to accommodate a diverse range of financing sources and modalities.

Community refers to people residing in a particular area or place who are affected by climate change in the same manner due to the common characteristics of the area or place where they live, the environmental resources they depend on, or the climate hazard they exposed to. The four core concepts underpinning the proposed framework for climate resilience metrics in this joint MDB-IDFC technical paper 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 building climate resilience, (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.

Diagnostics refers to the analytical activities and information generated to define the project-specific context of climate vulnerability and to identify and determine adaptation and resilience measures.

Impacts are the 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.

Infrastructure refers to a physical asset or digital platform created through a project financed by MDBs or members of the IDFC (e.g., a road, railroad, port, power transmission and distribution structures, water and sewerage systems, irrigation structures, health and education facilities) that helps the operation of a society or enterprise.

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.

Project life cycle refers to the project phases covering identification, preparation, appraisal, implementation, monitoring, and evaluation in line with the internal business process.

Maladaptation is actions that may lead to increased risk of adverse climate-related outcomes, including through increased GHG emissions, increased vulnerability to climate change, or diminished welfare, now or in the future. Maladaptation is usually an unintended consequence.

Measurement in the context of defining metrics for climate resilience, refers to performance indicators, which are qualitative or quantitative means of measuring climate resilience output or outcome of resilience/adaptation activities financed by MDBs or members of the IDFC.

Metric, in the context of this publication, is used as a catch-all term to capture indicators and/or measures that either qualitatively or quantitatively express the change in climate resilience due to specific project activities.

Outcomes aare the likely or achieved short- and medium-term effects of the project, responding to the project-specific context of climate vulnerability in order to build climate resilience. They may take the form of adjustments in physical, human, or environmental systems and associated economic benefits.

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.

Organization, in this paper, refers to a public or private entity, such as a business, a government department, or an international institution.

Project refers to a proposed or planned undertaking or operation financed by MDBs or members of the IDFC.

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.

Sector refers to an area of the economy (e.g., agriculture, education, energy, health, industry, or transport) or broad categories (e.g., public and private sector). Specific classifications can vary according to the internal system of a specific institution

System refers to the wider context (e.g., livelihood, transport and logistics, supply chain, value chain, information and communication, market, ecology) within which the assets and/or activities are located that will be affected and/or affect the extent to which project inputs will deliver outputs that generate outcomes and impacts within the project vulnerability context.

System level 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.

Annex II: Further Examples of the Application of Climate Resilience Metrics by MDBs and IDFC Members

Outcome-Level Metrics

French Development Agency (*Agence française de développement*, AFD) Climate Resilience Benefits in the Water Sector

In 2019, on a pilot basis, the AFD assessed the climate resilience contribution of water savings for projects in countries where water scarcity is significantly climate driven (e.g., arid regions of North Africa and South America). In that particular context, reducing the volume of water lost through physical leaks (outcome-level indicator) will improve climate resilience at the asset level (better water efficiency of the network) and at the system level (target zone heavily challenged by climate-related water scarcity, which will increase under future climate). In that context, water savings and avoided water losses are contributing to reducing the vulnerability of the asset and system to water scarcity. This outcome-level indicator is measured in cubic meters of water saved and this volume can be interpreted in terms of economic value using shadow prices to enable comparability or aggregation between projects. This pilot approach aims to increase the use of this specific indicator in water project monitoring and evaluation systems and to identify relevant climate resilience metrics (i.e., good practices) in current portfolios. However, although other water saving projects in AFD's water portfolio may deliver even higher quantitative water savings, they do not qualify for a climate resilience benefit calculation because they do not respond to water stress that is linked to climate change. This illustrates the need to consider context specificity when identifying relevant climate resilience metrics, which is one of the core concepts of the resilience metrics approach (#1) as per described in the guidelines. Moreover this outcome remains positive for climate resilience even under an uncertain future climate because the arid target zone is already under heavy water stress. This no-regret option thus matches with core concept #3 because even under an uncertain climate future, the place will remain arid and the outcome remains relevant for climate resilience.

Box 11.

AFD Reducing Water Losses and Calculating Economic Value

Three projects located in arid regions of North Africa and South America were designed to respond to increasing water scarcity driven by climate change. The projects aim to reduce water losses and to deliver annual water savings of 9,500,000 m3 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, this outcome was expressed as a climate resilience benefit of €4.25 million per year (valorized outcome). These projects target results that will deliver climate resilience co-benefits for their specific climate context.

This approach suits AFD's business operations because it builds on specific key performance outcome indicators already used by AFD's in monitoring and evaluating water projects (i.e., reducing losses in water networks). Therefore, to date, this pilot approach has not required additional analytical works, only secondary screening of project data (e.g., MDB-IDFC Common Principles for Adaptation Finance Tracking and sector-specific indicators). The approach is particularly relevant where water savings are sought for both environmental and profitability purposes. The climate resilience benefit calculation highlights that environment, profitability, and climate resilience can work together and reflects the project's contribution to the country's pathway to resilience, which is a relevant quality indicator for AFD's requirement to align with the Paris Agreement.

Hybrid Approach (Quality of Project Design Level, plus Outputs)

African Development Bank Climate Safeguards System

Since 2015, the AfDB has been implementing a Climate Safeguards System to manage climate-related risks. The system aligns with the AfDB project cycle and aims to identify and address physical climate risks in projects. The system operates at the investment level and uses metrics to express the quality of project design, encompassing diagnostics, inputs, and activities.

This approach suits AfDB's business operations because it aims to reduce potential high and intermediate climate-related risks to an overall residual risk of project outputs, also contributing to enhancing the resilience of project outcomes. The system addresses climate risk management in the core AfDB operational sectors: energy (generation and transmission), transport (road and rail), water supply and sanitation (including flood protection), agriculture (irrigation and cropping, livestock, forestry) and infrastructure (including buildings). The approach supports the development of an adaptation plan (encompassing an adaptation strategy, components, and activities) integrated into the design for each individual project. The effort employed is commensurate with the level of potential risk identified.

Box 12.

AfDB's Climate Safeguards System

An example of the AfDB approach to improving quality of project design is a transport project that involves road construction between the two capital cities of two countries along the coastal corridor of West Africa. The project includes upgrading a 30-kilometer section of a double carriageway 7 meters wide made of asphalt concrete pavement and with a 2-meter median.

The project team screened for climate risk using the Climate Safeguards System, an online interactive tool that uses qualitative data and a scorecard mechanism to rank the level of physical climate risk in three categories. The project was ranked as high risk, which triggered a full risk assessment. The full assessment involves identifying and evaluating physical climate risks and designing a risk management plan.

The major risks identified were sea level rise, coastal erosion, and flooding that affect the physical asset as well as transport and logistics in the transport corridor. The mitigation measures identified and implemented were constructing 28 groynes on 13 kilometers along the coast, refilling sand compartments and restoring coastal beaches, maintaining existing coastal infrastructure, setting up of an early warning system, developing a coastal area master plan, establishing a coastal protection management structure, and sensitizing coastal protection. The total cost associated with these activities was estimated at 40 percent of the project cost. As a result of the resilience measures, the 30-kilometer road and transport service along the corridor linking the two capital cities were made climate resilient.

Hybrid Approach (Quality of Project Design Plus Output/ Outcome)

IDB Disaster and Climate Change Risk Assessment Methodology

The IDB's current efforts to enhance climate resilience in Latin America and the Caribbean and to apply respective metrics center on its Disaster and Climate Change Risk Assessment (DCCRA) methodology as well as a conceptual Climate Resilience Framework. The DCCRA methodology facilitates the identification and assessment of disaster and climate change risks and resilience opportunities in all relevant projects during the identification, preparation, and implementation phases. The Climate Resilience Metrics Framework (CRMF) is currently being piloted to guide project teams in developing specific results indicators for different resilience capacities (e.g., absorptive, restorative, and related transformative capacities) at the project level.

These indicators are in line with the four concepts that underpin the Climate Resilience Metrics Framework described in this paper. The above metrics reflect:

- the specific contexts and circumstances of the described project in Ecuador (core concept 1: context-specific approach),
- they are temporally and spatially appropriate for this project (core concept 2: compatibility with the variable and often long timescales),
- they will allow the project to continually monitor hydro-climatic conditions during the project life cycle (core concept 3: ability to cope with the inherent uncertainties associated with future climate conditions), and
- they have been developed considering the boundaries of the project (core concept 4: ability to cope with challenges associated with determining the boundaries of climate resilience projects).

This approach suits the IDB's business operations because it builds on and the strengths of the current disaster risk screening process. Further, it guides project teams, executing agencies, technical experts, and external consulting and design firms in conducting disaster (including climate) risk assessments in relevant operations and developing appropriate climate resilience results indicators, ensuring added value to projects.

Box 13.

IDB DCCRA Methodology

One of the projects that is currently in preparation and that benefited from the DCCRA methodology is a transport sector project in Ecuador. The objective of the project is to improve connectivity between the Amazon regions of Ecuador and Peru by improving a road that had suffered damage and interruptions from flooding and landslides after intense rainfalls in the past. As a first step in incorporating disaster and climate change risk considerations into the project design, existing studies and local knowledge were gathered to assess what had already been done and what still needed to be addressed.

As a next step, a detailed quantitative risk assessment was conducted to quantify expected losses along the road and propose specific design considerations and risk reduction measures. In the project's results framework, the following output and outcome indicators (among others) related to climate resilience were included:

- » Days per year with severe traffic restriction due to landslides in the sections (outcome)
- » Rain gage stations installed and in operation in the project area (output)

Hybrid Approach (Quality of Project Design Plus Results [Outputs/Outcomes])

The Islamic Development Bank's Simplified Verification Tool

In 2019, the IsDB developed a simplified verification tool aims to evaluate how effectively physical climate considerations have been mainstreamed in projects at various phases of their implementation. This tool looks at elements of both quality of project design (activities and input) and results (output and outcomes). It is to be piloted by the IsDB starting in 2020.

Box 14.

IsDB Simplified Verification Tool

This tool uses a differentiated point-based approach to assess a pre-defined set of criteria related to objectives for mainstreaming climate change. The points-based system adopts past lessons, case studies, expert judgment, results of climate mainstreaming, and patterns and trends to determine the weight of a given variable against the overall weight of the project phase. The tool verifies climate risk and co-benefits across the project cycle in phases covering (i) programming and country planning; (ii) project or program appraisal; (iii) project supervision and portfolio management; and (iv) evaluation. It also allows for mainstreaming efforts in each project phase to be assessed prior to the completion of the project. In terms of coverage and scope, it is tailored to cover all IsDB sectors. The simplified verification tool consists of 16 differently weighted variables based on their level of importance to climate risk and co-benefit mainstreaming objectives defined by the tool developer and users

A Framework and Principles for

Climate Resilience Metrics

in Financing Operations