



A benchmark analysis of frameworks for measuring climate resilience and adaptation



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01 — Problem statement and the role of MSMEs

Micro, small and medium enterprises (MSMEs) are key in supplying goods and services to the population in any part of the world. If engaged effectively, MSMEs, are uniquely capable of developing locally relevant, effective adaptation and resilience solutions, which can increase society's resilience to climate change.² However, most MSMEs may find measuring and communicating their contribution to climate adaptation and resilience projected/impact challenging.

At the same time, we are witnessing a growing plethora of indicator frameworks but inconsistency and complexity among them is driving difficulties with usability and comparability. Assessing the benefits associated with climate resilience and adaptation solutions is critical to inform an effective allocation of resources and capital. This assessment will accelerate the much-needed private sector investment into climate adaptation and resilience solutions while diverting resources and capital away from those solutions that do not positively contribute to climate adaptation and resilience.

There are many reasons for this predicament. **Firstly**, climate adaptation and resilience are complex, multifaceted concepts covering a range of hazard types, socioeconomic circumstances, and units of analysis.

Secondly, existing tools and metrics require substantial expertise and investment that are beyond the reach of most MSMEs, making it hard to document their impact on climate adaptation and resilience. **Thirdly**, climate change metrics are traditionally being developed for large corporations/projects and tend to be complicated or expensive to be used by MSMEs. **Fourthly**, MSMEs may operate in niche markets or regions, limiting their visibility compared to large enterprises with global reach.

It is important to highlight that early-stage companies confront even more formidable hurdles than MSMEs as they:

- » Lack a substantial track record of sustainability initiatives and climate resilience actions;
- » Introduce innovative and disruptive solutions that may be challenging to explain to a broader audience;
- » Lack a large customer base and market presence,
- » Must iterate solutions rapidly and be prepared to operate without revenue for substantial periods.

On the other hand, early-stage companies may be in a better position than MSMEs because they are inherently more agile and adaptable, are

²On the other hand, MSMEs are also affected by extreme weather events and the slow onset of changes to the climate, such as heat waves, drought, and water scarcity.

accustomed to taking risks, have ambitious goals to scale their solutions, and frequently collaborate with other innovative organizations, universities, research institutions, and non-profits.

The impact investor community and entrepreneur support organizations (ESOs) also need help understanding, using, and deploying metrics for climate adaptation and resilience cost-effectively. In the next section, we will delve deeper into the relevance of climate resilience and adaptation measurement for investors.

Against this background, the CIFAR Alliance Metrics and Measurement Working Group (WG) was created with impetus from the United Nations Industrial Development Organisation (UNIDO) and BFA Global (membership listed in Annex 1).³ In this paper, the WG identifies 10 principles for measuring resilience and adaptation based on a review of thirty⁴ different measurement frameworks (listed in Annex 2).⁵

³The WG brings together expertise and experience from various stakeholders, including investors and fund managers; enablers organizations; standard setters, academia, consultancies, and accelerators.

⁴A synthesis of these documents can be accessed via a request to r.jawahar@unido.org and mdelrio@bfaglobal.com.

⁵We identified the frameworks under analysis mainly through WG members' suggestions and online research related to sustainability reporting, climate action in business, and resilience measurement.

02 — Relevance to investors

There is growing private finance and investor demand for not only projects with positive outcomes for climate resilience and adaptation but also those that can lead financing away from activities that undermine climate resilience and lead to maladaptation. Making clear which private investments and financial flows are Paris-aligned regarding adaptation and climate resilience is integral to achieving the climate commitments.

Financial institutions that link investment strategy to sound metrics for climate adaptation and resilience can also enhance their resilience to climate risks while improving their investment performance. Climate mitigation, by contrast, seems to be well understood as an investment opportunity. As of now, despite ample good intentions, investors bemoan a lack of clarity around measuring the impact of climate adaptation and resilience investments, which would greatly help to structure and develop such crucial projects. Investors' misperceptions and uncertainties related to physical climate risks could de-prioritize the need for climate adaptation and resilience in investment selection and portfolio management.

Our special case - investors seeking to understand the risks and opportunities for investing in SMEs providing services that advance in climate resilience and adaptation in low-resource settings

- is not alone. The GARI survey results show that the same results resonate with a much broader class of investors (institutional investors, insurance companies, pension funds, and other asset managers). Compared with 2016, 2022 GARI survey⁶ results showed a higher sense of importance for physical and transition risk and a big jump in concern around regulatory risk, with an increase to 80% (from just 53% in 2016) rating it very important. In addition, most respondents in both 2022 and 2016 were already screening for physical, transition, regulatory, reputation, and liability risks.

The landscape of frameworks below presents diverse options for investors. On one end of the spectrum are frameworks explicitly involving investors in their development and implementation - like the Adaptation Solutions Taxonomy (ASAP) and SME Climate Disclosure Framework by CDP and the SME Climate Hub. These frameworks provide clear and detailed categories and metrics that facilitate sustainability reporting, enabling investors to make informed decisions and manage climate risks effectively. Another example is the Climate Risk Toolkit by Vivid Economics, which offers a granular analysis of an investor's exposure to climate risks. The granularity and bespoke scenario modeling are powerful tools for investors interested in thorough due diligence.

⁶GARI Paper on the State of Climate Adaptation and Resilience Investment GARI FINAL 11-05-22.pdf (wsimg.com)

Conversely, some frameworks can unlock a favorable environment for investor participation. Similarly, the Benefit Cost Calculator by FEMA and J-SRAT allows for quantitative analyses of a project's climate risks and benefits, which could be indispensable for investors in their cost-benefit analysis. Moreover, frameworks actively seek to align investments with multilateral development banks and other financial institutions – like the GEF Strategy for Climate Change Adaptation in the 2022-2026 period or the Adaptation Performance Measurement Framework by the Green Climate Fund (GCF).

By qualitative data gathered through interviews with a selection of investors from our working group as well as analyzing the frameworks assessed, we have discerned several salient themes that MSMEs should explicate to resonate with investment criteria. The magnitude of the climate resilience issue under consideration is of prime concern. Investors exhibit a pronounced interest in comprehending the specific impediments that vulnerable demographic cohorts or target groups encounter in adapting to climate change. The question is whether the problem is systemic or whether the MSE effectively addresses discrete obstacles, such as financial constraints or informational deficits. Moreover, a quantitative evaluation of the market size is imperative. Investors seek empirical evidence of customer engagement and momentum and emphasize whether the enterprise's theory of change has been substantiated, even on a preliminary basis.

About the enterprise's value proposition, differentiation is a key determinant for investment. Investors scrutinize whether a prototype or pilot program can substantiate the enterprise's claims, serving as a tangible proof of concept. Equally pivotal is the enterprise's strategic approach to market scalability. Long-term viability is a concern, but the capacity for adaptive flexibility in the face of evolving climate risks is equally important. If the solution exacerbates existing climate vulnerabilities, sufficient mitigative measures must be demonstrably in place. Additionally, the status of strategic partnerships can significantly augur an MSME's value proposition. Such collaborative ventures not only provide the benefit of complementary skill sets but also extend the reach and potential impact of the MSME's climate resilience solutions.

03 — Ten key patterns

We identified ten common patterns that indicate a comprehensive approach to measuring climate resilience and adaptation, encompassing social impact, environmental conditions, financial considerations, risk management, and governance mechanisms.

01 Understand the impact on end-users



Outcome assessments predominantly focus on the beneficiaries, quantifying either the number of individuals positively affected or the capabilities enhanced by the project. Many frameworks, including the Race to Resilience Metrics Framework (R2R) and Adaptation Fund (AF), incorporate metrics related to the number of individuals, communities, or companies that benefit directly or indirectly from their initiatives. Metrics such as the number of individuals, companies, countries, or cities with increased resilience and the number of beneficiaries (direct and indirect) disaggregated by gender and youth indicate a strong focus on quantifying social and community impact.

Capabilities are perceived differently according to relevance and vary by geography, socioeconomic status, gender, and cultural norms. Some frameworks analyze the responses (those that either help to prevent or reduce the exposure to a shock or stress, help prepare for an anticipated shock or stress, or help to act when shocks and stresses occur.) by which the target population uses their capabilities to deal with identified shocks and stresses. Once these responses have been identified, the capabilities needed to elicit them are being selected. Across the literature, Absorptive and/or adaptive capacities have been identified to be measured.

02 Cater to traditional and non-traditional industries



Agriculture has the most comprehensive coverage across various frameworks, including GEF, AF, ASAP, 60 Decibels, and others. Water Resources Management, Waste Management, Land, Infrastructure, and Built Environment closely follow this. The wide applicability of multiple frameworks to these sectors aligns well with the commonly acknowledged priority areas closely related to climate resilience and adaptation. This extensive coverage affirms the critical need for interventions in these sectors, offering organizations a rich array

of frameworks for more effective program implementation and evaluation. Interestingly, the scope of some frameworks extends beyond traditional sectors like agriculture to incorporate non-traditional sectors such as tourism, manufacturing, and education. This broadening of focus reflects a nuanced understanding of the interconnected challenges posed by climate change, thereby offering a more holistic approach to economic development and climate resilience.

03 Quantify financial resource allocation



Several frameworks, like Race to Resilience (R2R) and Land Use Finance Impact Hub, include metrics related to financial resource allocation, such as “Amount of USD funding allocated for initiative activities” or “Number of farmers trained in, and technology transferred for, best management

practices in sustainable agriculture/forest protection.” This pattern signifies the importance of economic considerations in evaluating the effectiveness and reach of climate initiatives.

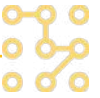
04 Use qualitative and quantitative metrics to assess



The complementarity or divergence of qualitative and quantitative assessments is a recurring theme. While some frameworks, such as the Waterfront Edge Design Guidelines (WEDG), are largely qualitative, others, like the Climate Risk Toolkit by Vivid Economics, provide a more quantitative approach. The criteria for determining success can range from quantitative metrics and score-based evaluations, as seen in frameworks like WEDG and Benefit Cost Analysis (BCA), to more qualitative, context-specific indicators. Many frameworks employ ex-ante (pre-event) and ex-post (post-

event) evaluations. For instance, the Race to Resilience Metrics Framework uses ex-ante analysis capabilities to assess the need and subsequently carries out ex-post measurement of resilience outcomes. This illustrates the significance of a temporal perspective in evaluating resilience and adaptation. However, impact evaluation methods must ideally account for conditions with and without intervention, moving beyond a mere ‘before and after’ comparison.

05 Put a spotlight on coordination and governance aspects



Some frameworks, including the Green Climate Fund (GCF) and Adaptation Fund (AF), and the Global Environment Facility (GEF) feature metrics concerning institutional arrangements and governance mechanisms. Metrics like “Number and level of effective coordination mechanisms” and

“Use of climate information products/services in decision-making in climate-sensitive sectors” demonstrate the significance of robust governance structures in implementing and sustaining climate adaptation and resilience initiatives.

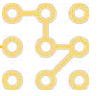
06 Adhere to a results framework to understand success



In most cases, the success of a project or solution focused on climate resilience or adaptation hinges on adherence to a results framework established at the outset of the intervention. Notable multilateral climate finance institutions, such as the Global Environment Facility (GEF), Green Climate Fund (GCF), and Adaptation Fund (AF), evaluate projects based on this approach both at the beginning

and during mid-term and terminal evaluations. An independent third-party agency typically performs these evaluations to scrutinize the implementation of planned program activities and assess the attainment of set objectives. Following these evaluations, the funding agencies may implement additional verification procedures.

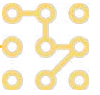
07 Assess long-term impact



Although the landscape review acknowledges that climate resilience and adaptation benefits often materialize beyond the project's duration, more evidence should be found regarding effective measurement practices to capture this long-term impact. Recurrent Monitoring Surveys (RMS) have been suggested as a viable option to be paired with impact evaluations to address this gap.

This combination aims to shed light on the short-term effects of interventions, thereby facilitating adaptive management and informing broader impact evaluations that guide long-term policy and programmatic changes. Most assessed literature employs a blend of estimated and actual data inputs.

08 Provide flexible metrics to accommodate different needs



Certain frameworks provide more room for maneuvering. SME Climate Disclosure Framework, GEF Programming Strategy, and the Adaptation Metrics Mapping and Evaluation Framework (AMME) offer the flexibility to adjust the core modules to suit specific needs. Moreover, sector specificity and the need for specialized expertise are crucial considerations. For example, the Repository of Adaptation Indicators by GIZ provides

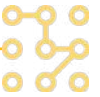
sector-specific guidelines. At the same time, frameworks like the SME Climate Disclosure Framework are tailored to small and medium-sized enterprises' unique needs and limitations. Frameworks like the Adaptation Solutions Taxonomy (ASAP), Climate Risk Toolkit by Vivid Economics, and ACT Adaptation Methodology stand out for their low data requirements and flexibility, making them more amenable to various organizations.

09 Introduce novel methods to collect information



Surveys remain the gold standard, spanning a variety of formats such as field surveys, online questionnaires, and mobile voice-based inquiries. However, online and phone interviews also play a significant role, particularly for more qualitative data. Participatory community consultations, like the Lean Data Methodology, aim at delving deep into local livelihoods and

copied mechanisms. Innovative data sources like machine learning, artificial intelligence, and remote sensing are gaining traction for their capacity to enrich granularity. Jupiter Intelligence is a case in point, offering a continually updated physical risk model informed by satellite and sensor data.



Frameworks like the GIZ’s Repository of Adaptation Indicators and the GEF Programming Strategy specifically incorporate environmental factors such as annual temperature fluctuations, sea-level elevation, and the frequency of hot days. These metrics aim to evaluate the efficacy of initiatives aimed at climate resilience by tracking real-world climatic variables. Considerations such as identifying physical climate hazards, their severity, likelihood, and spatial relevance to the targeted project or solution are considered alongside Time Horizon and Representative Concentration Pathways (RCPs). This information is largely derived from secondary sources like World Bank Country Climate Risk Profiles or USAID’s regional and country-specific climate risk profiles. The complexity of identifying vulnerabilities and exposure to risks is worth noting as it requires a

multidisciplinary approach that combines climate science, socio-economic analysis, risk modeling, and scenario planning. It also demands ongoing refinement as our understanding of climate systems and their impacts evolves.⁷ Within these evaluations, commonly employed physical risk scenarios include Representative Concentration Pathways (RCPs) as outlined in IPCC reports. Metrics about risk management and safeguarding assets are frequently found in frameworks like ASAP, which highlights metrics like “Value of assets covered” and “Gross Incurred Claim.” Similarly, the Adaptation Fund (AF) employs metrics focused on early warning systems and the geographical scope to protect physical and financial assets from climate-related hazards.

Measurement approach patterns



⁷The IPCC defines climate risk as a function of i) climate hazard, ii) vulnerability and iii) exposure. From that perspective, assessing climate adaptation impact is about evaluating the potential reduction of the climate risk, or keeping that risk low for resilience.

04 — Way forward

With the contribution of this Working Group, we have advanced the grasp of the practices of measuring climate adaptation and resilience through this landscape review and interaction. We aim to consider this working paper as an initial step, refining the collective understanding around assessing MSMEs' climate resilience and adaptation impact. We have extracted insights to inform an ideal impact framework and look forward to working with interested parties to pursue this work.

However, the preceding analysis seeks practical examples of how such measurements are taken and reported. Each framework aspect is best illustrated with fully realized and implemented examples. We aspire to produce a set of such case studies that will present such practical examples in their natural setting: metrics that are disclosed and well documented; their authors intend to measure climate resilience and adaptation in quantitative terms; and that are considered meaningful by other stakeholders such as investors. We must aim to replace the generic language such as “capabilities” and “shocks” essential to our discussion at an abstract level into practice with specific, concrete terms at the time of measurement. Rather than infer general patterns or principles, we will see what has worked in practice.

That case study series is under development as of this writing. Each case study will briefly discuss the findings, the program or investment studied, the content of the metrics, and why those metrics are relevant to specific stakeholders interested in climate adaptation and resilience. These case studies will be available through the CIFAR Alliance communication channels. **By disseminating the best work, we can ensure that whichever standards coalesce reflect that work.**

Annex 1. Working group members*

Name	Affiliation	Name	Affiliation
Tom Adams	60 dB	Denise Engel	GIZ
Alejandra Revueltas	Adobe Capital	Annelena Fuchs	GIZ
Mallory St. Claire	Aspen Network of Development Alternatives (ANDE)	Liz McGuinness	Accion
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Abe Tarapani	Atlas AI	Aurélie Espérandieu	McKinsey
Ben Mazzotta	BFA Global	David Woods	NZGIF
Marco del Rio	BFA Global	Thaven Naidoo	PFAN
Chiara Trabacchi	BII	Floor Overbeeke	Technoserve
Laura Lahti	Camco	Shruti Sharma	UNCDF
Marco Billi	CR2	Juanita Silva	UNFCCC
Roxana Bórquez	CR2	Marcia Toledo	UNFCCC
Lori Collins	GARI	Rashmi Jawahar	UNIDO
Jason Spensley	GEF	Patrick Nussbaumer	UNIDO
Rachael Barza	Vivid Economics	Shreyansh Chandak	Village Capital

*The WG gathered four times in 2022. It hasn't convened again during 2023.

Annex 2. Documents reviewed

Type of document	Name and Author
Frameworks, standards, metrics and tools	60 Decibels' Farmer Resilience Methodology [60 Decibels]
	Adaptation Metrics Mapping and Evaluation Framework (AMME)
	Climate Insurance-Linked Resilient Infrastructure Financing (CILRIF) [UNCDF]
	Framing Paper on Climate Resilient Finance and Investment [OECD]
	Global Reporting Initiative (GRI) Standards [The Global Reporting Initiative]
	IRIS+ [Global Impact Investing Network]
	[International Platform on Adaptation Metrics, IPAM]
	Marrakech Partnership for Global Climate Action [United Nations Climate Change, UNFCCC]

Type of document	Name and Author
Frameworks, standards, metrics and tools	Measuring Financial Health: Concepts and Considerations [UN Secretary-General's Special Advocate for Inclusive Finance for Development, UNSGSA]
	Mitigation and Adaptation Performance Measurement Framework [Green Climate Fund, GCF]
	Race to Resilience Metrics Framework [Race to Resilience]
	Resilience Measurement Practical Guidance Note Series: An Overview [USAID]
	SME Climate Disclosure Framework [CDP and SME Climate Hub]
	Waterfront Edge Design Guidelines (WEDG) [Waterfront Alliance]
Metrics and tools	ARIS Agriculture Resilience Investment Screening [Acumen Resilient Agriculture Fund]
	Benefit Cost Analysis [The Federal Emergency Management Agency, FEMA]
	Climate Change Fund [The Global Environment Facility, GEF]
	Climate Risk Toolkit [Vivid Economics]
	GEF Programming Strategy for Least Developed Countries Fund and Special
	Jamaica-Systemic Resilience Assessment Tool (J-SRAT) [Coalition for Climate Resilient Investment, CCRI]
	Methodologies for Reporting Adaptation Fund Core Impact Indicators [Adaptation Fund, AF]
	Repository of Adaptation Indicators [GIZ]
	The ASAP Adaptation Solutions Taxonomy [ASAP Initiative]
Papers, studies, and investment theses	Assessing Low Carbon Transition (ACT) Adaptation Methodology [ADEME]
	Catalysing Climate Finance for Low carbon Agriculture Enterprises [Shell Foundation]
	Investment Brief: The opportunity in Digital Finance for climate resilience [Catalyst Fund- BFA Global]
	Study on the involvement of Private sector in Financing Climate Adaptation Actions [Atkins COWI]
	Private Markets for Climate Resilience [IDB and NDF Landuse Finance Impact Hub]
	Resilient Futures Thesis [Mercy Corps Ventures]
	Working towards a Resilient Investment Framework [IIGCC]



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