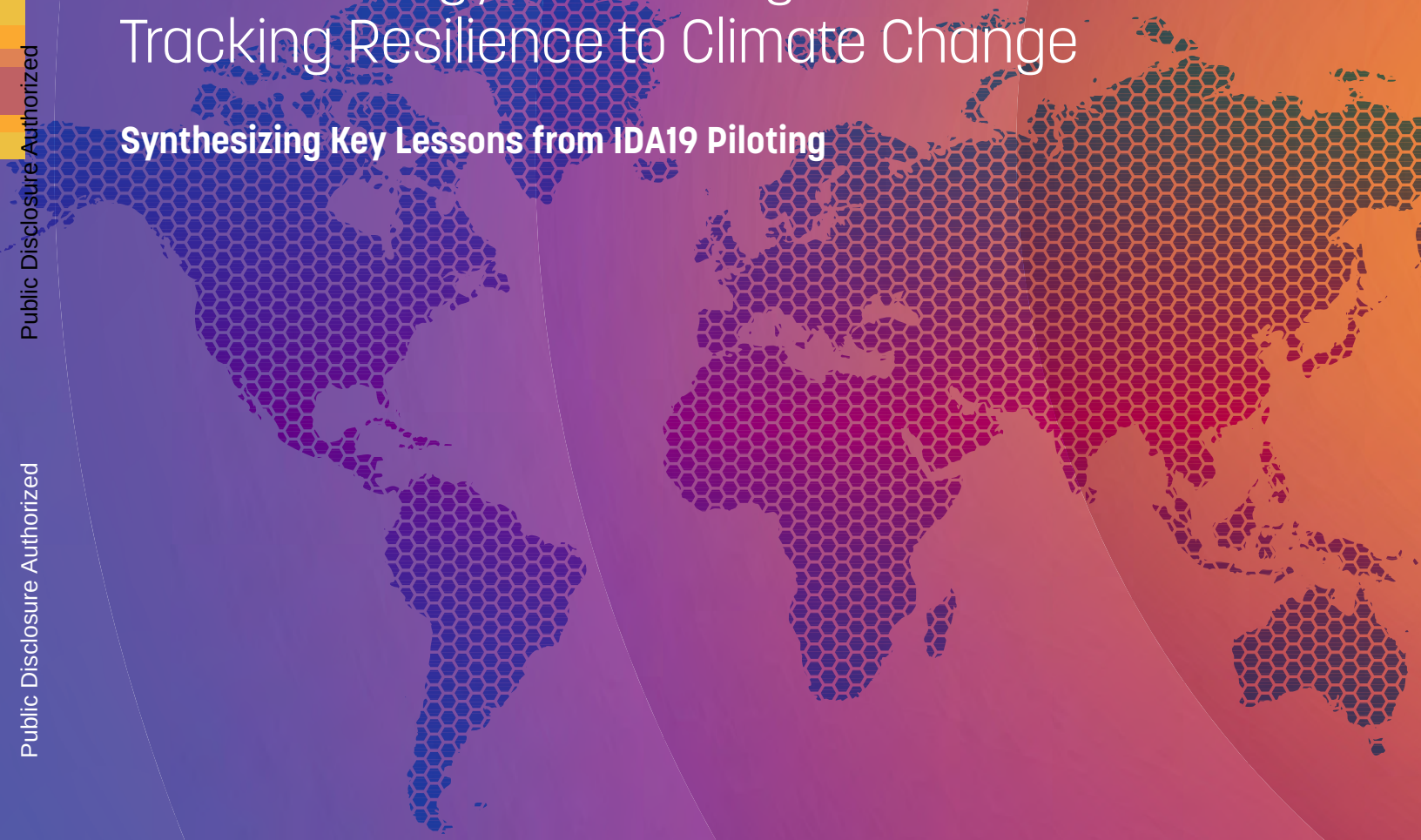
RESILIENCE RATING SYSTEM

A Methodology for Building and Tracking Resilience to Climate Change

Synthesizing Key Lessons from IDA19 Piloting



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Acknowledgments

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Summary

In response to the growing recognition that measuring *inputs*, such as climate finance, is not enough to capture the *impacts* of investments, the World Bank Group developed the Resilience Rating System (RRS).[1] Developed over a two-year, multisectoral consultative process through close collaboration with internal and external actors, the RRS methodology aims to guide investment decisions and improve climate resilience in project design and outcomes. The methodology report is publicly available.[2]

The RRS evaluates and rates investment projects from C to A+, based on their resilience attributes in two complementary dimensions. The *resilience of* rating considers a project's design, reflecting the confidence that it will achieve its expected objectives and maximize development benefits in the face of climate and disaster risks. The *resilience through* rating considers a project's outcomes and reflects its contribution to improving climate resilience in the broader community, sector and systems, and to driving transformational adaptation. Combining the two dimension ratings provides an overall project rating, from CC to A+A+.

Projects with an A rating in the *resilience of* dimension incorporate climate and disaster risk stress testing to the project against plausible disaster and climate scenarios.[3] This helps provide evidence that the economic viability of the project is not threatened by current and future climate risks. The Risk Stress Test (RiST) tool, developed to support these estimates, is publicly available.[4]

The RRS does not impose uniform performance standards on all projects, because appropriate levels of resilience are project- and context-specific; nor does it intend to replace a project's economic and financial analysis (EFA) or engineering analysis. Instead, it complements existing project appraisal procedures by ensuring that the EFA or engineering analysis—which remain the key tools for determining a project's physical viability and economical and financial desirability—properly capture current and future disaster and climate risks. Further, the RRS focuses on assessing how climate risks affect project viability and desirability.

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[1] World Bank. 2021. 'What You Need to Know About the Climate Change Resilience Rating System.' Feature story, January 25. https://www.worldbank.org/en/news/feature/2021/01/25/what-you-need-to-know-about-the-climate-change-resilience-rating-system.

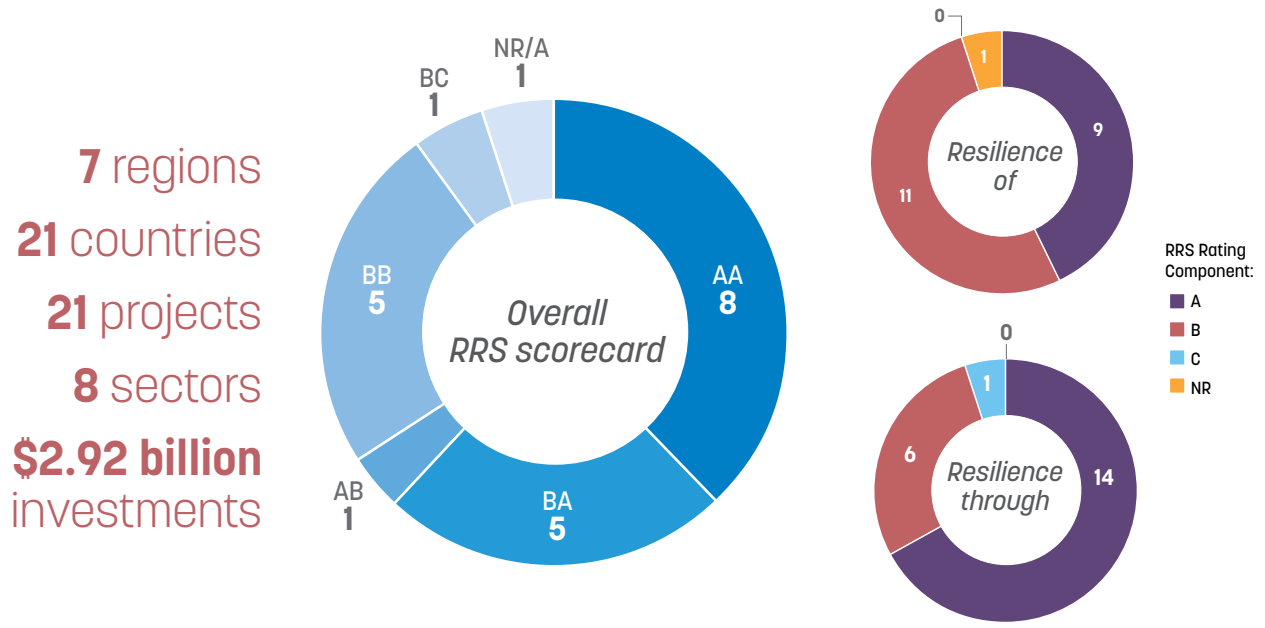
[2] World Bank Group. 2021. *Resilience Rating System: A Methodology for Building and Tracking Resilience to Climate Change.* Washington, DC: World Bank. http://hdl.handle.net/10986/35039.

[3] World Bank. 2021. 'Is Your Project Robust to the Impacts of Climate Change and Disasters?' Feature story, August 12. https://www.worldbank.org/en/news/feature/2021/08/12/is-your-project-robust-to-the-impacts-of-climate-change-and-disasters.

[4] https://www.worldbank.org/en/topic/climatechange/brief/risk-stress-test-tool. Based on an Excel spreadsheet, the RiST is being transformed into an online tool to enhance the analytical features and better connect with climate data.

Over the last two years, a World Bank team piloted the RRS on 21 investment projects financed under the 19th Replenishment of International Development Association (IDA19) across 21 countries. These pilot projects, with a total investment of $2.92 billion, were in multiple sectors: energy, transport, urban, human development (health, education, social protection, and jobs), agriculture, water, and environment. Figure ES1 presents the overall RRS ratings of the IDA19 pilot projects.

Figure ES1. RRS scorecard for IDA19 pilots: overall ratings and breakdown by dimension



Note: the numbers in the figures represent the count of projects receiving a certain rating.

Capturing resilience impacts is a valuable complement to input metrics to measure the *quality* and *expected outcomes* of investments. Both RRS dimensions are important, to encourage investments to achieve the best outcomes and contribute to building wider resilience for beneficiaries. The RRS piloting makes it clear that a project's broader climate resilience contributions are not always captured by climate co-benefits, and that resilience impacts are not proportionate to the amount of climate finance invested. For example, 10 percent of the investment in a World Bank water supply project in Dili, Timor is for institutional strengthening and preparing a disaster risk management program. But these components will contribute to system resilience impacts beyond the project's immediate boundaries, as it mainstreams disaster risk management and climate change adaptation considerations into strategic, operational, and investment plans in the sector.

As a guidance and reporting tool, the RRS allows project developers and investors to shift public and private investments toward more resilient projects and programs. Using the guidance will help them design and label their projects in a way that attracts more financing. By translating complex and project-specific information into simple ratings, the RRS allows decision-makers, investors, and project developers to evaluate projects and thus prioritize and incentivize more resilient projects, helping redirect private investment flows toward more resilience.

To support its corporate commitment to develop new climate results metrics and meet the increasing demand for more and better adaptation and resilience, the World Bank continues to apply RRS to IDA20 and other World Bank operations and is working with external stakeholders to develop and refine resilience metrics, data, and tools. The goal is twofold: to strengthen operational capacity to systematically integrate adaptation and resilience in project development; and to work with external partners, private sector actors, standard-setting bodies, and credit rating agencies to advance the development of rating systems and standards to drive public and private investments towards climate resilience and scale up proven lessons across sectors and countries.

Box ES1. Summary of lessons learned from piloting the RRS

1. **Capturing resilience impacts is a valuable complement to input metrics.** RRS pilots make it clear resilience outcomes are not proportionate to the amount of climate finance invested. A broader definition of what constitutes climate adaptation and resilience allows project teams to tell more comprehensive stories about resilience building and helps development projects operations strive for more and better impacts from its investments and interventions.
2. **Timing, flexibility, and good communication are crucial for successful RRS applications.** Applying the RRS methodology early in the project design and development stage increases success in RRS pilots, drives project teams to obtain the highest rating possible, and embeds adaptation and resilience considerations into the project design and monitoring and evaluation (M&E) plan, allowing teams to track results.
3. **A generalized methodology is required, with sector-specific spin-offs.** While the RRS and RiST tool provide the overall and consistent framework for evaluating and tracking projects' resilience performance, more detailed sector-specific guidance and activity-level information are required to increase the useability and consistency of RRS application.
4. **Climate expertise is necessary for embedding climate adaptation into project design.** The RRS team facilitated access to climate change specialists, scientists and economists, which helped pilot projects embed climate and disaster resilience considerations into project preparation, enabling them to get the highest possible rating.
5. **Project decision-making requires robust climate and disaster risk data and analytical tools that can manage and communicate uncertainty.** Applying the RiST tool ensures a project's cost-benefit analysis identifies plausible climate and disaster risks and impacts, considers potential adaptation and resilience measures to address these risks, and ensures the project is viable and can deliver its intended development goals in the face of climate change and uncertainty of its impacts.
6. **Robust climate risk stress testing needs a quality baseline economic analysis.** It is important to: improve the EFA baseline quality, develop some standardization across sector and activity types where appropriate, and ensure that EFAs are prepared upfront and in an integrated manner with technical experts, to influence and optimize project design conditions.

1.

Introduction

Climate change and weather-related natural disasters increasingly pose serious threats to human well-being and the health of the planet. Among other manifestations, drought, floods, heavy precipitation, increased temperatures, and extreme climate events place a heavy burden on the capacity of people, assets, institutions, and services to cope with—and recover from—shocks and adapt to change. Climate change and disasters disproportionately affect poor and vulnerable countries and communities and could reverse decades of development gains by pushing as many as 132 million people into poverty by 2030[5] and causing 216 million people to migrate internally by 2050.[6]

Resilience is the capacity to prepare for these types of disruption, recover from shocks, and grow from a disruptive experience.[7] *Climate adaptation* aims to enhance adaptive capacity, strengthen resilience, and reduce vulnerability; and boosting resilience and adaptation is both urgent and integral to sustainable development and poverty reduction. Investing in resilience and adaptation helps safeguard past development gains, accelerate poverty reduction, and ensure long-term sustainable development, increasing people's and communities' resilience to natural disasters and a changing climate. As such, successful adaptation and successful development go hand in hand.[8]

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[5] Jafino, B, Walsh, B, Rozenberg, J and Hallegatte, S. 2020. *Revised Estimates of the Impact of Climate Change on Extreme Poverty by 2030.* Washington, DC: World Bank. http://hdl.handle.net/10986/34555.

[6] Clement, V, Rigaud, K, de Sherbinin, A, Jones, B, Adamo, S, Schewe, J, Sadiq, N and Shabahat, E. 2021. *Groundswell Part 2: Acting on Internal Climate Migration*. Washington, DC: World Bank. http://hdl.handle.net/10986/36248.

[7] Adapted from the Intergovernmental Panel on Climate Change (IPCC) definition of resilience. IPCC, 2012: Summary for Policymakers. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 1-19.

[8] Adaptation was brought to the fore under the United Nations Framework Convention on Climate Change, with the adoption of the Paris Agreement in 2015. Aiming to strengthen the global climate change response by increasing the ability of all to adapt to adverse impacts of climate change, the agreement defines a global goal on adaptation and requires all Parties to engage in adaptation planning and implementation, and provide information related to climate change impacts and adaptation.

Public and private actors alike are increasingly developing climate risk screening and resilience metrics and measurement frameworks to identify climate risks and evaluate resilience performance and the impacts of investments and policy interventions at international, national, and subnational levels. With varied objectives, approaches, scopes, and outputs, these burgeoning efforts range from reporting on climate adaptation finance to disclosing climate risks, evaluating the resilience performance of portfolios and systems, and measuring progress toward adaptation objectives. This includes developing metrics, disclosure standards, and labels that assess the resilience attributes of investment activities (for example, for infrastructure development) to ensure investment decisions consider climate risks and to mobilize capital toward resilient investment. Achieving resilience at system, country, and global levels requires all investment decisions to be resilient to current and future climate risks, and all investments to contribute to broader resilience building and transformative change.

In the context of the global climate change adaptation landscape, the World Bank Group has developed the Resilience Rating System (RRS). This methodology and set of resilience metrics, developed through an extensive consultation process, aims to help decision-makers and project developers integrate climate resilience considerations into their investments.[9]

This paper highlights experiences from piloting the RRS in 21 World Bank investment projects during fiscal years 2021 and 2022 (FY21 and FY22). It captures and shares lessons learned and consequent revisions to the original RRS methodology through a transparent and iterative process that aims to facilitate continued development and improvement of resilience rating methods. This, in turn, will help planners and practitioners—whether from governments, the private sector, credit rating agencies, development organizations, or multilateral development banks (MDBs)—mainstream climate resilience in project development and investment decisions.

The paper is organized as follows: Section 2 describes the RRS methodology; Section 3 presents the results of applying RRS to 21 pilot projects; Section 4 synthesizes the key lessons learned, illustrated with experiences from selected pilots; Section 5 summarizes the revisions to the original RRS methodology that resulted from the piloting experience; Section 6 explores the usefulness of the RRS beyond World Bank operations; and Section 7 discusses next steps for applying RRS to the broader community.

[9] World Bank Group. 2021. *Resilience Rating System: A Methodology for Building and Tracking Resilience to Climate Change*. Washington, DC: World Bank. http://hdl.handle.net/10986/35039.

2.

WHAT IS THE RRS?

In response to the growing recognition that measuring *inputs*, such as climate finance, is not enough to capture the *impacts* of investments, the World Bank Group developed the RRS to guide investment decisions and improve climate resilience in project design and outcomes (Box 1). Published in February 2021, the RRS methodology[10] was developed over a two-year, multisectoral consultative process that involved close collaboration with internal and external actors across multiple sectors and institutions. This extensive engagement and consultation within and outside of the World Bank Group aimed to make the RRS methodology relevant and applicable to a wide range of operations and project activities, from human and sustainable development to infrastructure, and equitable growth, finance and institutions projects. The team then piloted the system across 21 IDA projects in select operations during FY21 and FY22, revising and updating the methodology (Figure 5) as a result of the findings and feedback received. Although developed and piloted within the World Bank, the tool can be used by all private and public sector project developers.

The RRS evaluates and measures a project's resilience attributes along two complementary dimensions:

- *Resilience of* a project's design, which rates the confidence that expected development objectives and investment outcomes will be achieved, based on whether a project has considered climate and disaster risks in its design; and
- *Resilience through* a project's outcomes, which rates its contribution to increasing climate resilience in the broader community, sector, and system, and to driving transformational adaptation.

Combining the two dimension ratings provides an overall project rating, from CC to A+A+. To achieve an A rating in both dimensions, projects must demonstrate that they are designed to be resilient and economically viable in the face of current and future climate and disaster risks (*resilience of*) and that they improve resilience beyond their own boundaries, with impacts beyond direct outputs through improved institutions, policies, incentives, technolo-

[10] RRS approach did not lead to project selection; rather, it was applied to existing World Bank projects that were addressing identified risks and vulnerabilities in the sectors and locations they work in.

Box 1. Advancing the adaptation and resilience agenda

Developed as part of its 19th Replenishment of International Development Association (IDA19) policy commitments, the RRS methodology brings together the World Bank Group's corporate commitments on adaptation—climate and disaster risk screening, climate (adaptation) co-benefits, and climate (adaptation) indicators—under one umbrella. Building on the World Bank's climate and disaster risk screening commitment, which mandates that all projects be screened for short- and long-term climate and disaster risks, it offers guidance on conducting deeper risk assessments and provides qualitative and quantitative estimates for levels of climate risk. It goes beyond Paris alignment by encouraging users to integrate appropriate adaptation measures to support the *resilience of* project design and strengthen *resilience through* project outcomes for investments that follow the three steps outlined in the MDBs' *Joint Methodology for Tracking Climate Change Adaptation Finance*.[a] Finally, it encourages the use of climate indicators to measure outputs or outcomes of adaptation interventions and monitor and track the progress of climate results.

The RRS builds on existing commitments and advances a corporate mandate to use new metrics to better capture climate adaptation and resilience. As well as delivering close to 49 percent in adaptation climate finance in FY22 (an input metric quantifying the share of World Bank lending that contributes to climate change response), the World Bank has made progress toward using additional metrics to further incentivize effective climate adaptation actions and better capture climate impacts. Developing resilience metrics to increase incentives for more effective climate adaptation actions and piloting these in 21 IDA19 operations was a policy commitment under the IDA19 package.[b] The IDA20 Results Measurement System[c] increases this ambition, encouraging at least 10 IDA operations to achieve an **AA** rating, and the World Bank *Group Climate Change Action Plan 2021–25*[d] identifies the RRS as an important way of measuring the resilience of operations to physical climate shocks.

The RRS is an ex ante metric with incentives for including climate indicators for continuous monitoring and tracking, and the World Bank is increasingly focused on measuring results and outcomes. The bank has updated its institutional vision and focus to "create a world free of poverty on a livable planet" and is developing an integrated climate results framework as part of a broader effort to support this vision and strengthen an outcome orientation to measure, report and monitor its climate action.[e] The RRS methodology and its applications a inform the development of resilience metrics in this framework.

[a] https://thedocs.worldbank.org/en/doc/20cd787e947dbf44598741469538a4ab-0020012022/original/20220242-mdbs-joint-methodology-climate-change-adaptation-finance-en.pdf.

[b] IDA. 2020. *Additions to IDA Resources: Nineteenth Replenishment IDA19: Ten Years to 2030: Growth, People, Resilience*. Report from the Executive Directors of the International Development Association to the Board of Governors. https://documents1.worldbank.org/curated/en/459531582153485508/pdf/Additions-to-IDA-Resources-Nineteenth-Replenishment-Ten-Years-to-2030-Growth-People-Resilience.pdf.

[c] World Bank Group. 2021. *The IDA20 Results Measurement System*. Washington, DC: World Bank Group. http://documents.worldbank.org/curated/en/498181625066308834/The-IDA20-Results-Measurement-System.

[d] World Bank Group. 2021. *World Bank Group Climate Change Action Plan 2021–2025: Supporting Green, Resilient, and Inclusive Development*. Washinton, DC: World Bank. http://hdl.handle.net/10986/35799.

[e] World Bank. 2023. "Remarks by World Bank Group President Ajay Banga at the 2023 Annual Meetings Plenary." Speeches and transcripts, October 13. https://www.worldbank.org/en/news/speech/2023/10/13/remarks-by-world-bank-group-president-ajay-banga-at-the-2023-annual-meetings-plenary.

gies, or capacities (*resilience through*). Figure 5 in section 5 provides an overview of the rating criteria.

To help projects achieve an A rating in the resilience *of* dimension, the RRS team developed an accompanying methodology and the Excel-based Risk Stress Testing (RiST) tool[11] for climate and disaster risk stress testing in project economic and financial analysis (EFA). A relatively simple but novel approach to integrating climate considerations into project EFAs, they help ensure projects are economically viable

[11] https://www.worldbank.org/en/topic/climatechange/brief/risk-stress-test-tool.

in the face of current and future impacts of climate change and climate extremes and can deliver intended outcomes while accounting for climate uncertainty. By making visible the costs and benefits of projected climate change impacts and resilience options, the RiST tool helps support robust decision-making and can aid negotiations around allocating resources for resilience-building measures. The RiST tool complements other World Bank tools, such as the hydrometeorological risk stress test tool for water projects, and supports stress testing.

In summary, the RRS is both a methodology to support better project design and a rating or label to monitor and report the quality by which a project design considers adaptation and resilience. Using the RRS:

- Provides a standardized methodology for evaluating a project's resilience attributes;
- Informs decision-makers, investors, and other stakeholders on the resilience of projects and investments, translating complex project design details—such as climate models, engineering design, and EFA—into a simple rating;
- Creates incentives for more widespread and effective climate adaptation through enhanced transparency and simpler disclosure;
- Informs project developers on ways to manage risk and improve project quality, while allowing for flexibility in sectors and countries;
- Ensures that the EFA—which remains the key tool for determining a project's economical and financial viability and desirability—properly captures disaster and climate risks; and
- Identifies best practices to allow proven lessons on resilience to be scaled up across sectors and countries.

Box 2. RRS knowledge products: a timeline

January 2021: A feature story and interview with World Bank Climate Change Lead Economist Stéphane Hallegatte that highlights the history behind the RRS and the problem it is trying to resolve.

- World Bank. January 25, 2021. "What You Need to Know About the Climate Change Resilience Rating System". Feature story. https://www.worldbank.org/en/news/feature/2021/01/25/what-you-need-to-know-about-the-climate-change-resilience-rating-system.

February 2021: The original RRS methodology.

- World Bank Group. 2021. *Resilience Rating System: A Methodology for Building and Tracking Resilience to Climate Change*. Washington, DC: World Bank. http://hdl.handle.net/10986/35039.

June 2021: A guidance note that advises on how to add a stress test for climate change and natural disasters to the economic analysis of a project, with accompanying excel-based RiST tool and tutorial videos. This report and package provide support to help teams get an A rating for *resilience of* their project.

- Hallegatte, S, Anjum, R, Avner, P, Shariq, A, Winglee, M and Knudsen, C. 2021. *Integrating Climate Change and Natural Disasters in the Economic Analysis of Projects: A Disaster and Climate Risk Stress Test Methodology.* Washington, DC: World Bank. http://hdl.handle.net/10986/35751.
- World Bank. June 20, 2021. "Risk Stress Test Tool" (introduction and tutorial videos). https://www.worldbank.org/en/topic/climatechange/brief/risk-stress-test-tool.

August 2021: A feature story that highlights the risk stress testing methodology and tool.

- World Bank. August 12, 2021. "Is Your Project Robust to the Impacts of Climate Change and Disasters?" Feature story. https://www.worldbank.org/en/news/feature/2021/08/12/is-your-project-robust-to-the-impacts-of-climate-change-and-disasters

Because appropriate levels of resilience are context-specific, the RRS does not impose uniform performance standards on all projects or compare project resilience with alternative baseline projects. Instead, it focuses on how climate risks affect project viability and desirability. A comparison with a less resilient baseline project would be easy to manipulate and depend on

arbitrary assumptions about the other project. For example, assessing how much a well-designed bridge improves resilience requires ad hoc assumptions about the performance of a poorly designed bridge. The RRS, on the other hand, would focus on whether the resilience of the well-designed bridge makes it a viable and desirable project.[12]

[12] This is distinguished from the climate and disaster risk stress test that the project economic analysis is performed by comparing 'with' and 'without' project scenarios.

3.

PILOTING THE RRS

The team piloted the RRS on 21 IDA19 investment projects as part of the IDA19 policy commitment to improve monitoring and reporting on adaptation and resilience. The purpose of the piloting was threefold: first, to test and refine the methodology; second, to support the development of the additional data and tools necessary for its implementation; and third, to systematically integrate adaptation and resilience considerations into the design of the pilot projects. This was to ensure that projects maximize development benefits in the face of climate risks and help improve climate outcomes, where possible.

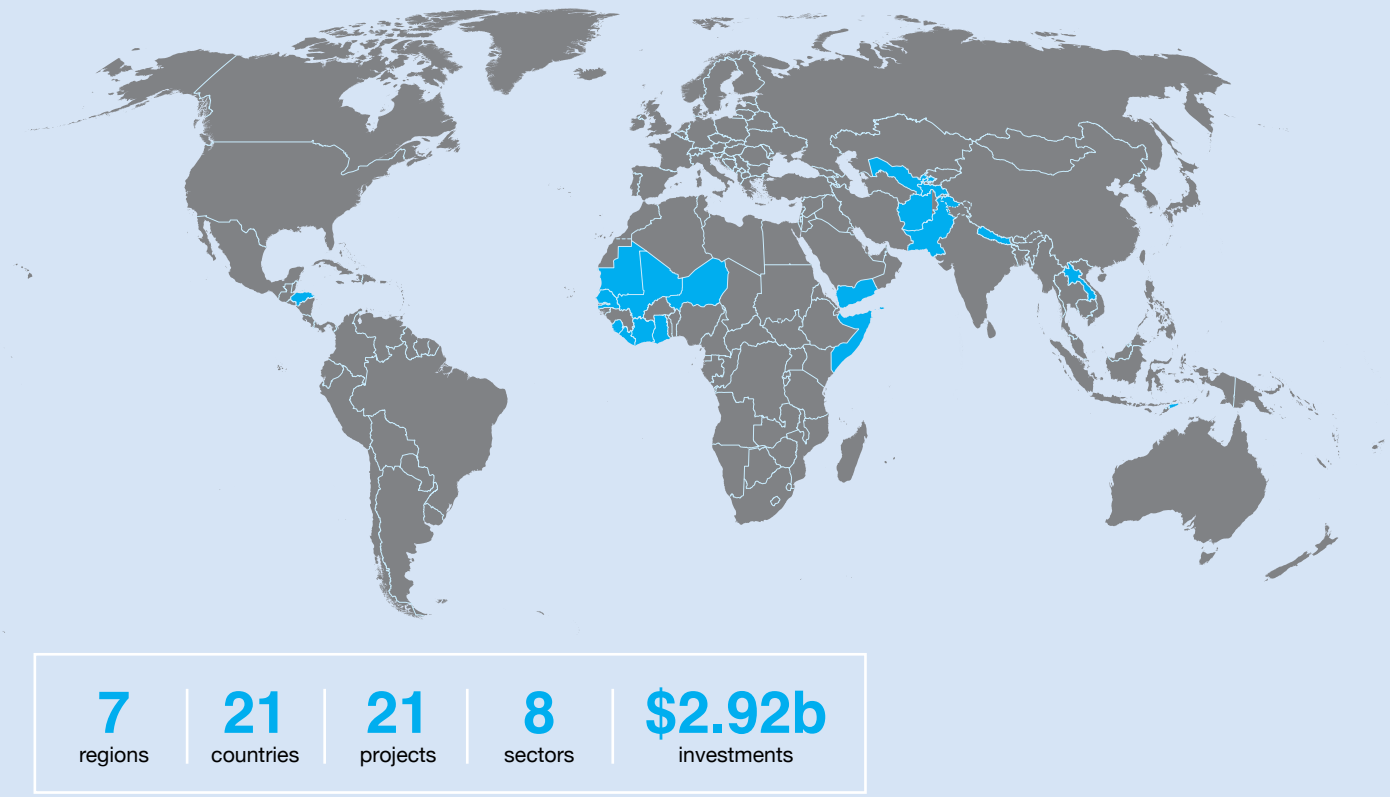
Overview

Throughout 2021 and 2022, the RRS team applied the methodology to 21 IDA19 projects in 21 countries, across eight sectors and seven regions (figure 1 and table 1) in a broad range of sectors, with activities aimed at creating the physical and social infrastructure necessary to reduce poverty and create sustainable development. Where possible, the RRS team targeted pilot projects that were in the early phases of development, providing the opportunity to support and influence project design early on. It is important to note that there may have been some sample bias in the project selection, as many already had strong resilience-building objectives.

Most of the project teams had an embedded climate change specialist and climate economist to support the RRS application throughout the project preparation phase. While project development objectives were already established at the time of engagement, the climate experts were able to help teams think through:

- Climate and disaster risks that could impact project operations (including sourcing and translating complex climate projections);
- Adaptation measures that could strengthen project viability;
- Areas to further strengthen and incorporate climate resilience-building activities; and
- Opportunities for integrating climate adaptation indicators into project results frameworks to better track climate impacts.

Figure 1. RRS pilot countries and sectors (2021–22)



As well as directly supporting the project teams, the RRS team maintained frequent communication and coordination with sectoral focal points, who acted as climate champions. As well as helping fast-track the RRS implementation, which resulted in stronger buy-in and better engagement from projects, the focal points generated and exchanged sector-specific technical knowledge and linked RRS methodology efforts with other initiatives on climate resilience.

The RRS team's engagement with and support to the pilot project teams in FY21 and FY22 had a budget of approximately $500,000. Compared to the $2.92 billion in total project investments, the cost of providing high-quality technical climate expertise with new frontier science was marginally small; but it had significant and impactful returns.[13]

[13] Although costs varied depending on the components and complexity of a project, they were more significant when a stress test was carried out. Costs will go down due to data and tool development, scaling up and ongoing learning.

Table 1. RRS IDA19 pilot projects (FY 2021/22)

Country/ies	Project name	RRS rating
AGRICULTURE AND FOOD		
Gambia, The	Gambia Inclusive and Resilient Agricultural Value Chain Development Project (GIRAV)	BA
Honduras	Innovation for Rural Competitiveness Project - COMRURAL III	BA
Pakistan	Punjab Resilient and Inclusive Agriculture Transformation	AA
ENERGY AND EXTRACTIVES		
Liberia	Liberia Electricity Sector Strengthening and Access Project (LESSAP)	BC
Somalia	Somali Electricity Sector Recovery Project	AB
Côte d'Ivoire, Mali, Niger, Mauritania, Senegal	Regional Electricity Access and Battery Energy Storage Technology (BEST) Project	AA
ENVIRONMENT, NATURAL RESOURCES, AND THE BLUE ECONOMY		
Lao PDR	Lao Landscapes and Livelihoods Project	BA
Tajikistan	RESILAND CA+ Program: Tajikistan Resilient Landscape Restoration Project	AA
Uzbekistan	RESILAND CA+ Program: Uzbekistan Resilient Landscapes Restoration Project	AA
HEALTH, NUTRITION, AND POPULATION		
Niger	Niger, Improving Women's and Girls' Access to Improved Health and Nutrition Services in the Priority Areas Project (LAFIA-IYALI)	BB
SOCIAL PROTECTION AND JOBS		
Afghanistan	Early Warning, Early Finance and Early Action Project	NR/A
Sierra Leone	Productive Social Safety Nets and Youth Employment	BB
TRANSPORT		
Nepal	Accelerating Transport and Trade Connectivity in Eastern South Asia – Nepal Phase 1 Project	AA
Yemen, Rep.	Emergency Lifeline Connectivity Project	BB
URBAN, RESILIENCE, DISASTER MANAGEMENT, AND LAND		
Grenada	Grenada Resilience Improvement Project	AA
Niger	Niger Integrated Urban Development and Multi-sectoral Resilience Project	AA
Pakistan	Sindh Resilience Project Additional Financing	BA
Tonga	Tonga Safe and Resilient Schools Project	BB
WATER		
Ghana	Ghana AF for Greater Accra Metropolitan Area Sanitation and Water Project	BB
Niger	Niger Integrated Water Security Platform Project (Niger-IWSP Project)	AA
Timor-Leste	Dili Water Supply Project	BA

Notes: See Appendix A for more details on each project. *NR* = not rated. In situations where projects could be exposed to climate change and disaster risks, but insufficient information, data, or tools are available to assess these risks, they receive an NR rating for the resilience of dimension.

Breakdown of results

Thirty-eight (38) percent of the pilots—one energy, one agriculture, two resilient landscape, two urban resilience, one transport, and one water project—received an **AA** rating (figure 2). Scoring **A** in both *resilience of* and *resilience through* the project means that they have a resilient design and show resilience in expected performance, given identified climate risks, and will contribute to building wider resilience for beneficiaries. Five projects received a **BA** rating; one project was rated **AB**; five projects received a **BB** rating; one project was rated **BC**; and one project was rated **NR/A**, with **NR** for *resilience of* and **A** in *resilience through*.

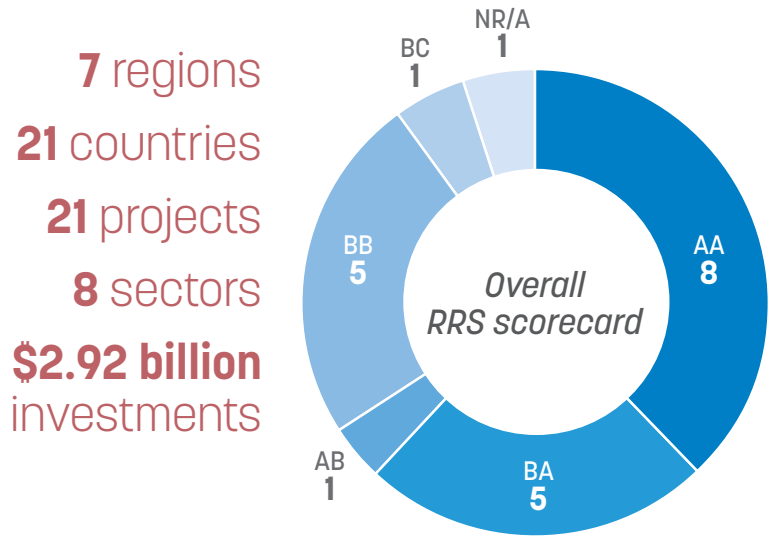
Breaking down the ratings into the two dimensions (figure 3) shows that 43 percent of projects (9 out of 21 projects) were rated **A** for *resilience of*, and 67 percent (14 projects) were rated **A** rating for *resilience through*. While there may have been some selection bias in terms of nominating pilots that already included resilience objectives, it is encouraging that more than half of the pilot projects demonstrate strong climate impacts, strengthening resilience that transcends boundaries beyond their direct outputs and timescales. In fact, the piloting process demonstrated that incorporating **A-**rated *resilience through* activities often required little climate input finance and could easily be integrated as a small (often soft) element of overall project design.

Achieving an **A** rating in the *resilience of* dimension proved to be a much more complex and larger undertaking—in terms of time, resources, and data—for the teams. Specifically, incorporating climate risk stress testing was more challenging for several reasons (discussed in section 4). These included: the timing of project EFA preparation, as these are often conducted in the later project appraisal stage, leaving little time for stress testing, which is both time and resource-intensive; limited climate projection and climate impact data; varying levels of both quality and detail in the baseline EFA; and varying ability to integrate such information with the RiST tool.

All but one pilot project had an overall rating of **BB** or higher. The only project that received a **C** rating for *resilience through* was too advanced in the preparation phase to be supported with additional climate expertise.

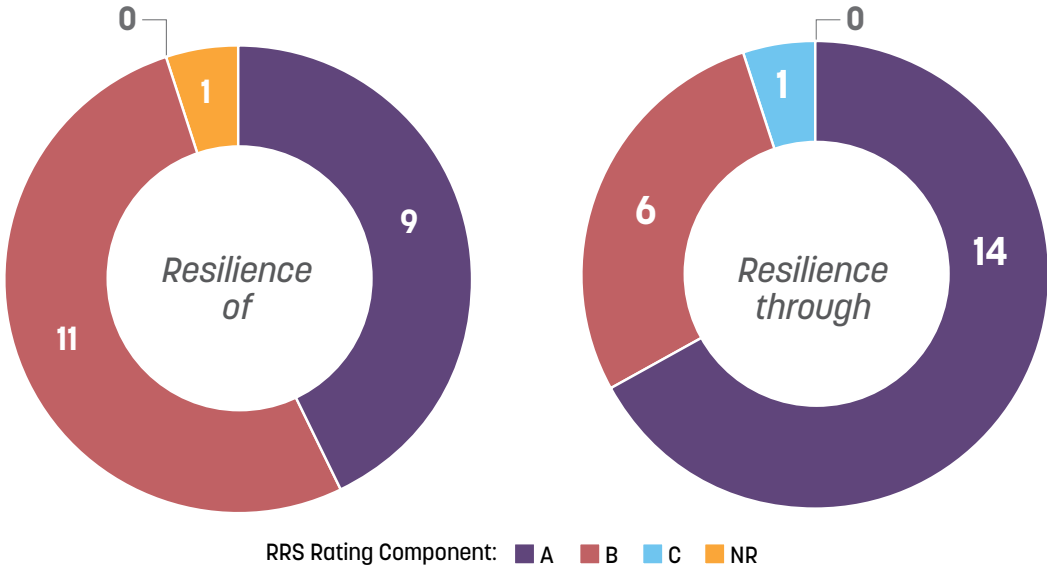
The ability to aggregate RRS rating results demonstrates the value of the simple rating system to both evaluate and rate proj-

Figure 2. RRS results of IDA19 pilot projects



Note: the numbers in the figures represent the count of projects receiving a certain rating.

Figure 3. Breakdown of pilot project resilience ratings, by dimension



Note: the numbers in the figures represent the count of projects receiving a certain rating.

ects' resilience performance and track, aggregate and report projects' resilience performance of projects across sectors and with varying component, climate risks, and geography, at portfolio, sector, and country levels.

Applying RRS in fragile and conflict-affected settings

Conflict and climate change both present immense challenges for poverty reduction, and these are exacerbated when they overlap. Climate change can create major strains on society, especially in fragile settings where governments have limited resources to manage crises and help the population adapt. The poorest and most vulnerable communities feel the impacts of climate change most intensely, especially those living in fragile and conflict-affected settings (FCS). As a result, it is even more important that resource-scarce countries prioritize investments that are truly designed to withstand the impacts of climate change while also explicitly contributing to peace and building the resilience of people and communities in fragile settings. The RRS is designed to do exactly this. Unlike many of the tools the financial industry is developing on exposure to climate hazards—which can miss opportunities to incentivize resilience investments in vulnerable countries or communities—the RRS incentivizes both good design and resilience building.

The World Bank has successfully applied the RRS methodology in FCS. Eight of the pilot projects were in FCS countries: Afghanistan, Côte d'Ivoire, Mali, Mauritania, Niger, the Republic of Yemen, Senegal, Somalia, and Timor-Leste. This shows that there is demand for the RRS framework to strengthen adaptation and resilience considerations—and improve their integration—in FCS projects. It also highlights that the RRS can be applied to a diverse set of countries with vast and varying underlying causes of climate vulnerability. Notably, the RRS pilot in the Republic of Yemen was an emergency transport and connectivity project, highlighting that the RRS approach can be impactful even in projects that are prepared with rapid and urgent timelines

4.

LESSONS LEARNED FROM PILOTING THE RRS

The RRS pilots in FY21 and FY22 provided initial insights into its feasibility and impacts across a range of sectors and regions. Supporting 21 projects with a minimal budget, the small RRS team yielded positive impacts on project outcomes and built knowledge and capacity for mainstreaming climate resilience considerations in project development. The simplicity of the RRS metric—and its ability to compare and aggregate project resilience attributes across investments and sectors—makes it a tangible, easy-to-understand approach for evaluating the resilience performance and quality of individual investments and investment portfolios.

The experiences and key lessons outlined here have relevance for all development and investments. The goals of sharing these lessons are twofold: to facilitate further improvements and ongoing development of World Bank resilience rating metrics and their applications; and to encourage others to develop resilience metrics that enable more and better adaptation and build resilience. The RRS team distilled the key lessons outlined here from desktop research, as well as interviews with and feedback from their own team members, project team members, and sector focal points. The desktop research consisted of document analysis of project appraisal documents, climate risk screening reports, RRS methodology, technical guidance documents, World Bank internal reports, and other climate-relevant publications such as Intergovernmental Panel on Climate Change reports.

LESSON 1

Capturing resilience impacts is a valuable complement to input metrics

As a novel approach that considers resilience impacts and outcomes, the RRS methodology is a valuable complement to adaptation climate co-benefits. The MDBs' *Joint Methodology for Tracking Climate Change Adaptation Finance*[14] captures the finance directed at adaptation activities that are carried out in response to experienced and anticipated climate change impacts, measuring the volume of additional finance for adaptation and resilience activities in MDB projects. But, although an important metric for measuring progress and support for adaptation and resilience, volume of climate adaptation finance provides an incomplete picture of effectiveness for—and impacts on—resilience building.

The RRS pilots make it increasingly clear that resilience impacts and outcomes are not proportionally dependent on the amount of climate finance invested or the climate co-benefits measured. For example, World Bank investment operations are often made up of more than one activity, coupling physical infrastructure development with soft infrastructure, such as institutional capacity building or service delivery. The pilots show that some activities—especially those that address and build systemwide resilience through institutional systems—can have minimal costs compared to the overall financing of the operation. In fact, such impactful activities can be such a small proportion of overall financing that they are not captured as an integral element of a project development objective. But they can make significant contributions toward resilience-building and result in an A rating for *resilience through* the project. Although they capture the financial inputs that support adaptation, the adaptation finance or climate co-benefit approaches may be biased toward more costly projects, especially physical infrastructure-heavy projects, where the finance numbers are much larger. But they do not always adequately recognize the high-quality impacts of low-, zero-, or negative-cost project activities, which build resilience.

The RRS methodology expands existing metrics and provides a broader evaluation of resilience outcomes that adaptation finance or climate co-benefits metrics do not always capture. The RRS measures the resilience of a project's design, its expected performance given identified climate risks, and its contribution to building wider resilience for beneficiaries. To achieve an A rating in the *resilience of* dimension, a project needs to demonstrate its economic viability and robustness for achieving expected project outcomes in the face of current and potential future climate change and climate extremes. With the *resilience through* dimension, the metric framework goes further, evaluating a project's contribution to broader resilience building. To achieve an A rating for the *resilience through* dimension, a project must demonstrate that it influences resilience or adaptation beyond its direct outputs and timescale, to reduce or remove obstacles and underlying causes of vulnerability and build resilience.

Resilience performance can vary across sectors and domains, with one dimension more prominent in certain sectors, depending on the project's scope. For example, human development and social inclusion projects—such as those in the health, education, jobs, and social protection sectors—are likely contribute more to

[14] https://thedocs.worldbank.org/en/doc/20cd787e947dbf44598741469538a4ab-0020012022/original/20220242-mdbs-joint-methodology-climate-change-adaptation-finance-en.pdf.

building *resilience through* the project. This dimension of the RRS captures how a project builds resilience for communities, households, and populations, increasing their ability to build their adaptive capacity to be more resilient to future shocks. So, as work focused on adaptive social protection systems will score well on the *resilience through* dimension, for human development sectors, the *resilience through* rating offers an opportunity to measure resilience outcomes more comprehensively than through climate finance-based climate co-benefits alone.

The RRS complements the tracking of adaptation co-benefits, which measures the *quantity* of adaptation finance, by offering a method to measure a project's *quality* and expected outcomes from an adaptation or resilience perspective. The pilots show that the RRS captures a project's broader climate resilience contributions, which are not always captured by climate co-benefits. Having a broader definition of what constitutes climate adaptation and resilience allows teams to tell more comprehensive stories about resilience building and helps organizations strive for more and better impacts from their investments and interventions. The RRS also incentivizes the use of climate indicators, which help projects monitor and track their detailed climate results by measuring outputs or outcomes of adaptation interventions.

LESSON 1

Pilot Project Box 1. Dili Water Supply Project

Sector: Water
Country: Timor-Leste (East Asia and Pacific Region)
Project code: P176687
RRS rating: BA

The Dili Water Supply Project shows how a project with relatively lower climate co-benefits can ensure that its design strives to be resilient to future extremes, while also building transboundary resilience. With a total investment of $125.5 million, it aims to increase access to safe drinking water and improve the operational performance of the water utility in Dili, a small geographic area in Timor Leste with complex climatic conditions, such as precipitation trends that differ drastically from even the neighboring island. The project, estimated to have 22 percent climate co-benefits, received a **BA** rating.

The RRS team engaged closely with and supported the project team, processing high-resolution historical climate data for Dili, estimating seasonal precipitation patterns and changes in return periods under future climate change, and evaluating climate impacts on the project cost-benefit analysis. This climate information served as a direct input into the project engineering analysis and design considerations, and showed that the project is economically viable, even when considering the impacts of heavy precipitation and drought on service delivery. With 10 percent of the investment going to institutional strengthening, the project has a system resilience impact beyond its immediate boundaries, as it strengthens institutional capacity and provides incentives to improve the sustainability and resilience of the water supply infrastructure financed under the project. By preparing and implementing a disaster management and resilience program, it strengthens the government's capacity to manage disaster and climate-related risks and mainstream disaster risk management and climate change adaptation considerations into strategic, operational, and investment plans. The project also undertook a water resources assessment to identify and evaluate long-term supply alternatives to traditional water sources in the Comoro Basin—including groundwater, artificial recharge and seasonal storage, and alternative non-groundwater sources—to meet demands in a changing climate. Although they constitute a small proportion of the overall project finance, these activities are crucial to longer-term sustainability and resilience building.

LESSON 1

Applying the RRS methodology helps project teams think more comprehensively about integrating climate change during the project development phase. Even when projects did not get an A rating, using the methodology provided gave teams a clear and objective method for assessing climate risk, developing resilience measures at a granular level, integrating climate monitoring and evaluation (M&E), and emphasizing climate change actions into their investments. The RRS process sets a minimum standard for disclosing climate risk while also improving the quality of projects, including during implementation.

At the same time, it is important to balance the complexity of a metric with the right incentives. And while both dimensions of the RRS—*resilience of* and *resilience through*—are useful for capturing distinct types of activity, there can be some confusion around how to classify different activities in these dimensions. For the uptake of this methodology to be successful, it must be accompanied by objective, standard guidance that applies across sectors (see lesson 3). This will also help ensure the application of ratings is not subjective across sectors and assessors.

While the RRS has some limitations as a metric—for example, it does not provide specific project results or outcomes—its simplicity and applicability across sectors makes it a good decision-making and portfolio monitoring tool, both in terms of a project's viability in the face of climate and disaster impacts and its broader resilience impacts. The RRS aims to transform very complex project design information, which often requires deep engineering knowledge, into a simple rating that decision-makers, policy makers, and investors can use to select projects, even if they do not have deep climate and disaster technical expertise. In this sense, the RRS provides a foundational step in the move toward capturing resilience impacts.

Evaluating climate risks in the earliest stages of project development and incorporating appropriate adaptation and resilience options in the project design phase leads to the most cost-effective resilience measures that typically only marginally increase project investment costs. Considering climate risks and adaptation in the early stages of project development and appraisal will give teams the time they need to consider alternatives and select the best and most cost-effective option.

Applying the RRS methodology early during design and development, when teams are screening for climate risk, increases the chances of successful RRS pilots, drives teams to obtain the highest possible rating, and embeds adaptation and resilience considerations into project M&E plans, allowing result tracking. One of the most significant impacts of applying the RRS methodology is that it encourages teams to consider alternative adaptation options when they identify climate risks. The assessment and thought process of arriving at an ideal adaptation solution is important for building resilience in a project's design. On the other hand, involving the RRS method at a late stage of the project—after design decisions are made or the project EFA is complete—fails to maximize its potential for flagging climate risks and resilience considerations.

Embedding the RRS method early in the project preparation cycle is not without its challenges. Climate risk stress testing is a time-intensive exercise that requires in-depth assessment of climate data, research on climate impacts, and back-and-forth communication with project economists, but project teams often work under a tight timeline, with limited resources. In some of the pilots, the project teams had held decision meetings before the RRS team started working with them, and it was too late to incorporate any meaningful updates. It was particularly difficult to embed climate risks into project EFAs in a timely manner, as these had often been prepared quickly in the late stages of the

LESSON 2

Timing, flexibility, and good communication are crucial for successful RRS applications

Box 3. RRS pilot success stories

Responding to real-time demand for support during the project preparation stage, the RRS team was able to integrate climate and disaster risk information and embed climate resilience into project appraisals and designs, adding significant value to the following projects:

- **Productive Social Safety Nets and Youth Employment in Sierra Leone** (pilot project box 4), which integrated climate resilience measures in public works based on poor households' exposure to climate risks and interlinkages between climate and food security;
- **Grenada Resilience Improvement Project,** a critical infrastructure project that included capacity building and institutional strengthening to boost the country's climate resilience capacity;
- **Emergency Lifeline Connectivity Project in the Republic of Yemen,** an emergency transport connectivity project that explicitly integrated building resilience to climate and disaster risks in its development objective and built-in related adaptation components;
- **Niger Integrated Urban Development and Multi-sectoral Resilience Project** (pilot project box 5), an urban resilience project that expanded the analysis to consider potential impacts from extreme heat, which had previously been neglected; and
- **Regional Electricity Access and BEST Project in Côte d'Ivoire, Mali, Mauritania, Niger, and Senegal,** an energy project in which the analysis considered options for construction materials and site selection to reduce the risk of system failure from extreme heat and wildfire.

LESSON 2

project appraisal stage, just before the decision review (see lesson 6).

The more successful RRS and RiST applications involved pilots that had strong project teams with supportive leadership, where there was good and effective communication between the RRS team, the project team leader, and all team members. RRS application was more impactful in the teams where engineers, economists, climate specialists and other technical experts cross-coordinated in their findings, which in turn, led to optimized project design.

Flexibility is also crucial. The RRS team employed an open and flexible approach from the start, tailoring support to meet unique project objectives while respecting sectoral priorities. Piloting a new methodology through the constraints of a global pandemic was not easy, but the team continued its mission by employing the values of diplomacy, respect, and flexible timelines in the face of uncertainty, mitigating risks through frequent communication with project teams and aligning the RRS application process with project deadlines and milestones. For example, in a project that has already been approved by the board, the team decided to pilot the RiST tool retroactively, to ensure learning could continue. In some cases, the RiST findings informed the project during implementation or before detailed design had taken place, and in others, where pilot operations had been postponed or delayed, or operations had to change their approach in response to changing country environments and situational complexities, the team was able to identify new pilot projects.

Designed to apply to all sectors, the generalized RRS methodology and metrics allow for consistency and tracking across multiple investments, comparing and aggregating resilience performance across projects, activities, and portfolios to evaluate their overall quality and performance. It is also benchmarked against the development of the World Bank Group's Paris Alignment methodology to ensure RRS encourages more and better adaptation and resilience efforts and outcomes.

Due to the multidimensional nature of resilience, refinements of the RRS and RiST methodologies and applications need to take stock of lessons learned from the pilot phase to incorporate different thought processes and approaches for climate risks, stress testing, and resilience measurements in different sectors and contexts. This reinforces the need to develop sector-specific guidance for RRS and tailor climate risk stress testing to sector needs, building in flexibility to reflect RRS applications in different sectors and projects with varying levels of complexity and risk.

It is therefore important to develop the methodology within a consistent RRS framework that addresses sector-specific features. Although both RRS dimensions are important for telling resilience stories, the pilots show that some projects operate largely in one dimension. For example, in the case of human development projects with no physical assets, teams expressed concerns that the RRS rating for *resilience of* a project can be arbitrary and unfair and could bias ratings toward infrastructure-heavy projects. At the same time, not all projects will aim to build *resilience through* their activities. Such is the case, for example, with projects that address emergency needs in pandemic or conflict situations.

LESSON 3

Having a generalized methodology, with sector-specific spin-offs, ensures consistency and easy tracking

Pilot Project Box 2. Early Warning, Early Finance and Early Action Project

Sector: Social protection and jobs
Country: Afghanistan (South Asia Region)
Project code: P173387
RRS rating: NR/A

This project disburses cash transfers and cash-for-work payments, based on incidence of drought and identified through early warning systems. Its development objective is "to increase the food and nutrition security of the most vulnerable households living in drought-prone rural areas and to build systems for early warning and response with pre-arranged financing." Investments financed through the project include:

- Strengthening drought early warning decision support, improving hydrometeorological services, and increasing community resilience;
- Establishing a shock-responsive delivery mechanism to build resilience;
- Establishing procedures for early financing to support pre-agreed early actions and rapid responses; and
- Monitoring and evaluating project implementation and strengthening institutions.

The project received 100 percent climate change adaptation co-benefits, as its primary objective is to support climate adaptation to increasing drought conditions. It got an **A** rating for *resilience through* the project, as it influences resilience beyond its direct outputs and timescale and reduces underlying causes of vulnerability. But it has no physical assets, and at the time of the piloting, the data and tools available within the RRS and RiST environment did not allow for "stress testing" on soft investments. As a result, it received an **NR** rating for resilience of the project—a clear indication of the need to pilot and develop tools for soft investments.

LESSON 3

So, for projects where the scope is limited to a single dimension, the methodology has been expanded to explicitly include a not applicable (**NA**) rating. In situations where projects could be exposed to climate change and disaster risks, but not enough information, data, or tools are available to assess these risks, they receive an **NR** rating for the *resilience of* dimension. These two categories allow assessors to capture the contribution of projects that may only operate within a single RRS dimension. Despite this, all projects can benefit from being screened for the *resilience of* dimension. This is the current practice in the World Bank with climate and disaster risk screening even without conducting a stress test, especially for follow-on projects where a country system has a full stress test and/or the project's activities have been screened previously. The RRS team will develop more guidance and clarification in sectoral applications to address the applicability of NA and NR.

More sector-specific guidance is required for RRS implementation. While the RRS and RiST tool provide an overall framework for the approach, more detailed, sector-specific, activity-level data and information would increase the useability and consistency of RRS application. Several World Bank sectoral teams have developed their own guidance, methodologies and tools—either on their own initiative or as a result of the RRS partnership—for incorporating climate risk and resilience considerations in project appraisal and design with different stages of application in sectoral operations (box 4). In such cases, the main task for the RRS team is to understand the differences between the RRS methodology and the sectoral assessment and metrics and promote consistency through discussion with the sectoral focal points. Following a review of the tools and approaches outlined in box 4, the RRS team has determined that these are consistent with the RiST principles, and if the sectoral teams are committed to applying them in their project appraisal processes, they can yield an **A** rating for the *resilience of* dimension. This includes multi-phased programmatic operations of which project components will be decided at a later stage of project design.

Some focal points expressed concern that, as their sectoral methodology for climate risk analysis is more rigorous than required in the RRS, projects in other sectors could receive an **A** rating without undergoing the same level of scrutiny. Acknowledging that some teams go the extra mile, one of the RRS's main goals at its current stage of development is to ensure that all projects meet the same baseline criteria. Once projects across all sectors better incorporate climate resilience considerations, it will be possible to further develop metrics to rate and reward even better projects. Where teams and sectors are only just starting to consider climate risks and resilience measures in their project design and practice, RRS team support—in the form of climate data, the RiST tool, and communications on RRS methodology and ratings—provides an important toolkit to help them develop their climate capacity and embed climate considerations in their operations.

LESSON 3

Box 4. Sector-specific guidance for incorporating climate risk and resilience considerations in project appraisal and design

Agriculture sector

During the RRS piloting process, the World Bank collaborated with the Food and Agriculture Organization of the United Nations (FAO) to identify available data sources and literature for assessing the impacts of climate change and extreme events on agricultural production and prices. This collaboration between FAO economists, who were familiar with the literature on climate impacts on agricultural production, and a World Bank climate economist, who was familiar with climate risk stress testing, led to the fastest RiST application to date, with stress testing completed in two weeks. As a result of this pilot, FAO developed a guidance note for improving RRS in the agriculture sector. Further work is needed on the impacts of climate change on downstream activities such as transportation, processing, distribution, and consumption.

- FAO. 2022. *Recommendations on Improving the Resilience Rating System (RRS) in the Agriculture Sector.*

Energy sector

The World Bank has developed sector-specific resources for scaling up climate adaptation action across its energy sector operations. These include guidance documentation on how to integrate climate resilience measures into the design of energy systems, with studies in Benin, Cabo Verde, and the Democratic Republic of Congo on building the climate resilience of their energy infrastructure, and a technical note on steps and considerations for incorporating climate and disaster risk and resilience design measures in power project EFAs, which has similar steps to RiST. The Regional Electricity Access and BEST Project pilot in Côte d'Ivoire, Mali, Mauritania, Niger, Senegal developed a technical guidance note for the West African energy sector on how to incorporate climate and disaster risks into energy sector project EFAs and how to manage uncertainty in climate projections when planning investments that span longer periods of time.

- Schweikert, A, Ramstein, C and Nicolas, C. 2022. *Powering through the Storm: Climate Resilience for Energy Systems*. Washington, DC: World Bank. http://hdl.handle.net/10986/37999
- ESMAP. 2022. *Economic Analysis of Power Projects: Integration of Climate Change and Disaster Resilience.* Washington, DC: World Bank. http://documents.worldbank.org/curated/en/099220012152219955/P1661220fe68eb082081bf04c6a2c6cb97e.

Environment sector (forests)

Developed as part of the World Bank's Building Climate Resilience in Landscapes approach and in coordination with the International Finance Corporation, the climate resilience tool for forestry projects incorporates hazard exposure assessments using climate scenario data for the project area and conducts an impact assessment on the project EFA. Applied during project preparation and implementation, it supports the selection of suitable species variations and site locations, given that risks and resilience measures can be very site-specific, and has unique features, including mitigation actions and costs. The RRS team provided feedback and engaged in productive discussions with the sector focal points while the tool was under development.

- World Bank. 2021. *Resilience Tool for Forestry Projects.*

Social protection and jobs sector

Piloting the RRS in non-infrastructure sectors has also proven fruitful. For example, working with the Productive Social Safety Nets and Youth Employment Project in Sierra Leone (pilot project box 4) led to exploratory conversations with specialist economists on how best to incorporate climate risk stress testing in this sector. This is an area of innovation and further development for the RRS methodology.

Transport sector

The Nepal Regional Transport Program applied the RRS methodology to a major highway project and tested the feasibility of applying it to geophysical hazards, such as earthquakes. There is opportunity to continue the collaboration and integrate climate and disaster risk stress testing directly into the planned upgrade of the *Highway Development and Management Model*, which is the standardized economic analysis tool for the sector. Developed by the World Bank, the HDM model helps in planning

Box 4. (cont.)

and prioritizing road construction and rehabilitation projects by evaluating economic viability and optimizing resource allocation

Water sector

Considering natural climate variances and disaster planning has long been an integral part of the design process for water utility planners and engineers. To address the uncertainty surrounding future climate conditions and impacts, the World Bank has developed extensive guidance, data, and tools that evaluate climate risks and resilience design and support decision-making under deep uncertainty for water projects. These include:

- Bonzanigo, L, Rozenberg, J, Felter, G, Lempert, R and Reed, P. 2018. *Building the Resilience of WSS Utilities to Climate Change and Other Threats: A Road Map.* Washington, DC: World Bank. http://documents.worldbank.org/curated/en/425871546231664745/Building-the-Resilience-of-WSS-Utilities-to-Climate-Change-and-Other-Threats-A-Road-Map.
- Ray, P and Brown, C. 2015. *Confronting Climate Uncertainty in Water Resources Planning and Project Design: The Decision Tree Framework*. Washington, DC: World Bank. http://hdl.handle.net/10986/22544.
- World Bank. 2020. *Resilient Water Infrastructure Design Brief*. Washington, DC: World Bank. http://hdl.handle.net/10986/34448

LESSON 3

Applying RiST in non-infrastructure sectors is an area that requires further development. Some World Bank teams have their own sectoral approaches and methodologies for integrating climate shocks. For example, the Climate and Health Vulnerability Assessment tool integrates climate stress testing into economic analysis at the aggregate (country) level, and has a methodology for estimating climate change impacts on health endpoints that could be useful at project level; and the Social Protection Stress Test tool brings together social protection, disaster risk management, and climate change adaptation sectors to leverage their respective contributions in reducing household vulnerability and building household resilience. As well as coordinating and collaborating with these sector teams to ensure that the RRS methodology and RiST tool are suitable for evaluating—or can be meaningfully applied or adapted to evaluate—the effects of climate change and disasters in health and other human development projects, the RRS team is looking to expand the next round of piloting to more human development investment projects and those in the equitable growth, finance, and institutions sector.

Although the RRS team continues to work to expand the scope of RiST and develop approaches to stress test climate risks in more sectors, it is important to note that RRS—particularly applying climate stress testing through RiST—is currently only suited to investment projects and not to those financed through program-for-results or development policy financing. Assessing how to apply RRS to these project types is another area of future work.

The RRS pilots have highlighted how expertise in climate science, adaptation and resilience, and climate economics are necessary for effective project development support. The RRS team comprises climate change specialists, climate scientists, and climate economists with broad sectoral expertise, experience, and knowledge of climate science, impacts, and economics, corporate commitments, and operations. This has allowed the RRS team to engage with World Bank Group teams across a variety of sectors and regions to develop and socialize the standards for the RRS methodology.

The RRS team helped curate climate data, conduct or deepen climate risk identification and assessments, and think through adaptation options, while supporting a focus on climate M&E through indicators to ensure the regular monitoring and tracking of progress. On request, RRS team members also joined certain project missions to support client dialogue on climate adaptation and resilience. One of the primary objectives of piloting the RRS methodology in operations was to help projects embed climate and disaster resilience considerations, enabling them to get the best possible rating. The RRS team facilitated access to climate economists and scientists, enhancing capacities and therefore enabling more effective implementation of the RRS methodology and faster application of the RiST tool.

The team's ability to communicate and build trust enabled constructive discussions that helped project teams improve their assessments and outcomes and enabled some to stress test climate risks in their EFA to achieve an A rating in the *resilience of* dimension. The main takeaway from personalized support during piloting was realizing that, far from being an "add-on", climate adaptation needs to be systematically embedded within project design to achieve the greatest impact of development objectives.

Throughout the RRS development and piloting processes, sectoral World Bank teams appreciated the high technical integrity of the RRS team, who drew on a wide range of literature on climate impacts and new frontier science. Both in its written

LESSON 4

Climate expertise is necessary for systematically embedding climate adaptation into project design

Pilot Project Box 3. Gambia Inclusive and Resilient Agricultural Value Chain Development Project

Sector: Agriculture and food
Country: The Gambia (Africa West Region)
Project code: P173070
RRS rating: BA

The RRS team was asked to join a virtual mission with The Gambian government, which was very interested in the RRS methodology and strengthening this project's resilience across both dimensions: *resilience of* and *resilience through* the project. The project team welcomed support on climate and disaster risk data, designing resilience measures, and climate indicators; and having a climate specialist involved in client interactions and engaging with the project team enhanced the integration of climate considerations in project design. Although it was not possible to complete climate stress testing through the RiST tool, its initial application helped improve the quality of the project's baseline EFA. After testing the tool in this pilot, the RRS team was able to further refine and simplify RiST, streamlining it for future applications. The RRS team communicated clearly with the project team as it identified areas for improvement to enhance consideration of climate risks and vulnerability or to clarify assumptions made in the EFA.

LESSON 4

work and when communicating with other teams and external partners, the RRS team was explicit about the uncertainties around climate modeling and data limitations. Where teams or country coordinators had sector-specific questions, having an experienced sectoral climate specialist clarify the RRS objectives and explain how the RRS methodology is applied to projects proved an effective way of securing buy-in for the methodology and process.

The RRS team's support increased the ambitions of the pilot projects around integrating climate change, without placing additional burden on the project teams. But this piloting model relied heavily on the World Bank Climate Change Group's resources and individualized target support. To mainstream climate change and improve operations and development outcomes, the World Bank Group is building more climate expertise and capacity in regions and strengthening its ability to provide climate support—for example, through trainings on climate data, such as the Climate Change Knowledge Portal (CCKP),[15] and adaptation and resilience analytical tools, and by decentralizing Climate Change Group staff to provide climate expertise to other teams.

It is worth noting that sectoral and regional climate champions played crucial roles as "translators", supporting RRS with their technical understanding of climate issues and sector-specific concerns and priorities. They also helped make connections with sectoral methods and tools, streamline the RRS application process, and secure new pilot projects when needed.

Pilot Project Box 4. Productive Social Safety Nets and Youth Employment

Sector: Social protection and jobs
Country: Sierra Leone (Africa West Region)
Project code: P176789
RRS rating: BB

The RRS methodology influenced the climate-resilient design of this project, which was approved with 27 percent climate co-benefits. With support from climate experts on the RRS team, the project team strengthened the project design against climate and disaster risks by: integrating climate resilience measures into public works; prioritizing business plans that strengthen urban resilience; and including activities to disseminate information, host events, and deliver trainings on climate change. It also included a detailed analysis of poor households' exposure to climate risks and interlinkages between climate change and food security as a climate annex in the project documentation. The RRS team is exploring with sectoral economists how to best incorporate climate risk stress testing in social protection and jobs projects. This is an area of innovation and further development for the RRS methodology.

[15] https://climateknowledgeportal.worldbank.org/.

Climate science, data, and analytics have played a central role in RRS ratings and supporting sectoral World Bank teams to evaluate climate and disaster risks and incorporate climate resilience considerations in projects. The RRS team has developed and shared climate risk overviews using the best available climate data and projections for countries or project areas, such as the CCKP and ThinkHazard!.[16] In several projects (including the one outlined in pilot project box 5), such climate risk information led teams to expand their consideration of climate risk factors in project development and design.

Whether the RRS makes a project more resilient depends on the quality of data used. Within the World Bank project preparation cycle, RRS ratings are expected to be applied ex ante at the board approval stage, and as such, the rating will depend on the quality of analysis performed during project preparation and documented in the project appraisal documents. A project's design can only be as good as the assumptions it is based on; so, any new infrastructure or investments will only be as robust as the risks it has foreseen for the relevant timescales. Uncertainty is a given when it comes to climate futures, but data limitations exacerbate this problem.

The RRS team found great variation in the climate and disaster risk screening and climate risk assessments across the pilots, indicating that the quality of risk screening also varies greatly across World Bank projects. This may be due to a lack of climate change capacity, or of climate data and scenarios at project-relevant scale, with many project appraisals using country-level climate risks.[17] The RRS team provided multiple sources of climate and disaster

LESSON 5

Project decision-making requires robust climate and disaster risk data and analytical tools that communicate uncertainty

Pilot Project Box 5. Niger Integrated Urban Development and Multi-sectoral Resilience Project

Sector: Urban, resilience, and land
Country: Niger (Africa West Region)
Project code: P175857
RRS rating: AA

With the development objective to "increase resilience to floods and improve urban management and access to basic services in selected municipalities in Niger", this project largely finances municipal infrastructure and flood risk reduction infrastructure, including nature-based solutions. Given this focus on flooding, the project team's primary concern was to incorporate climate risks such as increasing rainfall into the project design. But the RRS team's detailed country climate risk and vulnerability overview showed that extreme heat is also a key climate hazard in Niger's urban areas, which could impact the effectiveness and sustainability of some of the proposed flood risk reduction measures, particularly nature-based solutions. As a result, extreme heat was included as a key climate hazard to consider during the detailed design of the flood protection works.

The impact of this RRS engagement expanded beyond the pilot to an urban development analytical and advisory project in Sierra Leone. Following a request from the project team leader for more granular, location- and sector-relevant climate information that connects with future climate change scenarios to support climate risk assessments, the RRS team developed a similar climate risk overview with enhanced information on climate extremes. This suggests enhanced understanding and proactive considerations of multiple climate risks at the onset of a new project.

[16] https://climateknowledgeportal.worldbank.org/; https://www.thinkhazard.org/en/.

[17] This is further complicated by some projects did selecting project sites until a later stage.

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data and information, and supported other teams' capacity to produce, interpret, and act on information. Although the availability of climate data was a key challenge in some pilots, particularly in small island development states (SIDS), these projects have made progress, with support from the RRS team and further data development (box 5). This shows promise for future RRS and RiST applications.

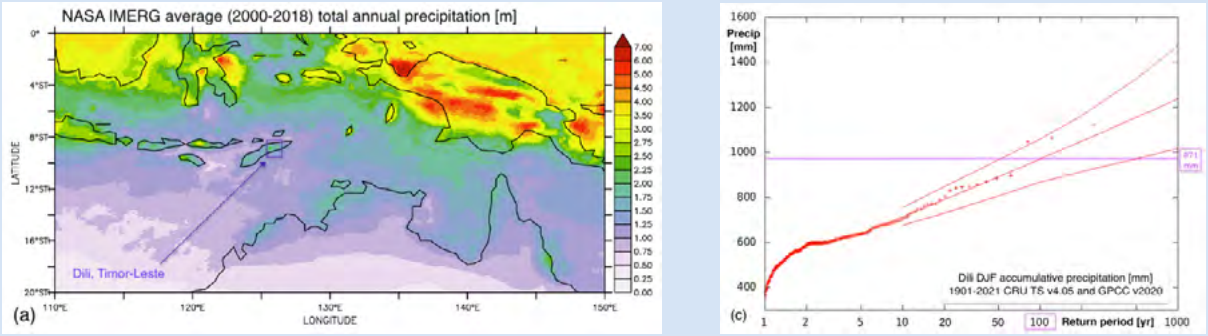
Given the uncertain nature of future socioeconomic development and climate system responses, the requirement for explicitly considering uncertainty is an important feature in both the RRS rating criteria and climate risk stress testing. Assessing the *resilience of* a project requires alternative climate scenarios for each rating, from C to A. Likewise, incorporating a range of climate futures and potential impacts, using

Box 5. Data challenges for SIDS

Given the limited scientific and monitoring capacity of many low- and middle-income countries, historical climate data are not always available in a project area. This challenge is particularly acute in SIDS, where climate vulnerability is high and both climate risk assessments and the effectiveness of resilience-building interventions are constrained by a lack of data. Projections of future climate change and climate extremes for SIDS are also lacking or face limitations when downscaling from global climate models. Several pilot projects were implemented in SIDS—including Grenada, Timor-Leste, and Tonga—and the RRS team faced significant challenges obtaining reliable climate data to undertake climate risk stress testing for these projects.

Despite these challenges, the RRS successfully advanced climate data and scientific support to such projects. For example, for the Dili Water Supply Project (pilot project box 1), the RRS team worked with a climate scientist at the University of Oxford to process high-resolution historical observational precipitation data to inform annual and seasonal precipitation profiles for Dili, and estimates of future changes in heavy precipitation events and droughts, considering climate change scenarios (figure 4). This information was then used for a more detailed engineering study to ensure robustness of project design.

Figure 4. Historical precipitation data and future estimates for Dili



a) Annual precipitation (2000–18)

b) Precipitation estimates, by return period

Meanwhile, the CCKP—a key source of climatology and future projection information used by the RRS team—is advancing rapidly with downscaled data products, expanding information on future scenarios and return periods of climate extremes to support RRS and RiST applications.

a simplified approach of decision-making under deep uncertainty to facilitate the inclusion of climate uncertainty, is a key component of RiST. The RiST application ensures a project's cost-benefit analysis identifies plausible climate and disaster risks and impacts, considers potential adaptation and resilience measures to address these risks, and ensures the project is viable and can deliver its intended development goals in the face of the uncertainty of climate change and its impacts.

The pilots revealed the need to further refine the RiST tool, including through a more automated, user-friendly interface that can more readily and effectively facilitate a dialogue with project teams and better incorporate climate resilience in project design.

The RRS team has since streamlined and simplified several features of the RiST tool to facilitate analysis, and is developing a prototype online tool that helps automate some steps in the analysis—such as climate data and scenarios and climate impacts ("damage functions") with sufficient resolutions—and enhance data analytics capability, such as uncertainty analysis and characterization. Given the feedback from users and the increasing interest in climate risk stress testing, an online tool can facilitate learning, data development, and connecting with other tools. With an approach that is scalable and easier to implement, the uptake of climate risk stress testing both within and outside of the World Bank is likely to increase.

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Robust climate risk stress testing requires a quality baseline economic analysi

An EFA helps inform decisions about project selection and design in three ways. First, it identifies where scarce resources can have the most impact. Second, it ensures appropriate fiscal impact and financial viability. And third, it ensures benefits are accessible for the poor or other targeted beneficiaries. All World Bank investment operations are required to carry out an EFA to inform decision-making on undertaking a project. In an increasingly complex decision-making environment with competing needs for limited resources, climate risk-informed project investment decisions require renewed attention on EFA quality and role in decision-making.

Applying the RRS offers an opportunity to further strengthen EFAs by ensuring projects remain robust to the impacts of climate change and disasters. For several of the pilots that undertook a climate risk stress test, the analysis showed that the benefits of investing in resilience measures significantly outweigh the small incremental cost of such investment. Achieving an A rating for the *resilience of* dimension requires the project EFA to be stress tested for climate and disaster risks. The RiST methodology provides a relatively simple, yet novel, approach for connecting project EFAs with climate and disaster information, climate and disaster impact estimates, and uncertainty considerations. But applying the RiST tool requires a robust baseline EFA.

The pilot EFAs varied widely in their underlying approach and overall quality. While different sectors are bound to approach EFAs differently, there was a lack of consistency and comparability, even within the same sector and investment activity type. This lack of standardized approach and outputs within and across sectors led to challenges in applying the RiST tool. In some cases, the underlying assumptions and methods for calculating costs and benefits were unclear or the reported cost and benefit information was not sufficiently disaggregated to connect with climate impacts, making it difficult to incorporate climate risk stress testing. In others, the availability of data and information for stress testing was a challenge, as some EFAs did not contain comprehensive information upfront. To more readily apply the RiST tool, there is a need to raise awareness of the minimum data and information requirements in the baseline EFA.

Some EFAs were conducted in a disconnected way, and their timing made it difficult to incorporate climate and disaster risk considerations so they would have a meaningful impact on project design. Many were developed and shared with the RRS team in the later project appraisal stage—that is, after project design was completed—leaving little time to carry out and complete climate risk stress testing to inform project decisions. In some cases, the project economist completed the EFA almost in a silo, without properly connecting with the wider project team. This approach raises questions around the effectiveness of the EFA (and RiST) as a tool to modify, tweak, and improve project design. The pilots show that, to influence and optimize project design conditions, there is a need to improve the quality of baseline EFAs (box 6), standardize across sector/activity types where appropriate, and ensure EFAs are prepared upfront and with all relevant technical experts.

Box 6. The importance of high-quality baseline EFAs

"The main purpose of project economic analysis is to help design and select projects that contribute to the welfare of a country. Economic analysis is most useful when used early in the project cycle, to catch bad projects and bad project components."[a]

The Independent Evaluation Group's study of cost-benefit analyses in World Bank projects from the 1970s to the early 2000s finds the percentage of projects justified by cost-benefit analysis has been declining for several decades, owing to a decline in adherence to standards.[b] Many cost-benefit analyses fail to pay attention to fundamental analytical issues, such as the public sector rationale or comparing projects against alternatives; and because they are usually prepared after the decision to proceed with the project has been made, they are of limited use for decision-making.

The RRS team identified issues—including errors in estimates and assumptions—in several of the pilot EFAs, and these were addressed, improving the analyses. In some cases, applying the RiST tool helped identify flaws and errors in the EFAs, improving the quality of project appraisal beyond climate risk and resilience analysis.

[a] World Bank. 1998. *Handbook on Economic Analysis of Investment Operations*. Washington DC: World Bank Group. http://documents.worldbank.org/curated/en/749061468740206498/Handbook-on-economic-analysis-of-investment-operations.

[b] Independent Evaluation Group. 2010. *Cost-benefit Analysis in World Bank Projects*. Washington DC: World Bank. http://hdl.handle.net/10986/2561.

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For agriculture sector pilots, the RRS team worked closely with FAO, which carried out the RiST application. This resulted in the following recommendations to create EFA standards for agricultural projects and best practices, which can be applied more broadly:

- Adopt FAO's flexible, appropriate, structured and transparent (FAST) standard[18] for building the EFA model;
- Clearly document input assumptions, such as yield or productivity, area of production, commodity prices, and changes over time;
- Disaggregate the categories of costs and benefits linked to agricultural activities—for example, by crop, capital costs, operating costs, production, upstream vs. downstream benefits;
- Disaggregate nonmonetary values—such as the value of greenhouse gas sequestration—from financial benefits;
- Present "with" and "without" project scenarios instead of aggregated calculations; and
- Define and present optimistic and pessimistic project scenarios in the analysis.

Early results from the pilots demonstrated that incorporating a climate and disaster risk stress test is far from straightforward, and as a result, achieving an A rating for *resilience of* a project requires significant effort in terms of both time and technical capacity. Conducting climate risk stress testing was the most resource-intensive step in applying the RRS, and teams did not always have the time and technical capacity to carry out RiST analysis. Connecting the project EFA with RiST is not always straightforward either, given the different methodologies and practices available for conducting EFAs and the RiST tool's need for transparent and disaggregated information on project costs and benefits.

[18] FAO. 2022. *Food and Agriculture for Sustainable Transformation Initiative – FAST.* https://www.fao.org/documents/card/en?details=cc2186en.

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The different units of analysis and lack of empirical information on climate impacts for some project activities make applying RiST more challenging, preventing some projects from achieving an A rating for the *resilience of* dimension. And, as already discussed under lesson 5, the RiST application requires a quality baseline EFA.

Despite these challenges, several pilots successfully integrated climate and disaster risks into their EFAs, and the outcomes of these analyses helped shape project design or raise awareness on the potential for climate and disaster risks to threaten the project's overall robustness. For example, the RiST application findings for the Regional Electricity Access and BEST Project in five West African countries demonstrated the implications of choosing different construction materials and selecting the right sites to reduce the risk of system failure from extreme heat and wildfire. In the transport connectivity project in Nepal, stress testing demonstrated and gave confidence that, despite being situated in a highly vulnerable area, the project remained robust to climate and disaster impacts because it integrated robust adaptation and resilience measures into its design. It also demonstrated that spending approximately 3 percent of project costs on climate resilience measures would create substantial savings in terms of potential economic and financial losses in the event of extreme flooding in high-impact scenarios.

To mainstream climate risk stress testing within the World Bank system, it will need to become an integral part of the EFA and project appraisal process, with project economists integrating climate impacts as part of their sensitivity analysis. As well as developing climate data and the RiST tool, the RRS team is working with World Bank sectoral focal points to identify opportunities to incorporate climate and disaster risk analysis in existing sectoral models and tools—for example, in the transport sector's project assessment model, HDM5. The extent to which stress testing is applied will depend on investment size and type and the proportionality of climate risks. For example, a small rural road need not undergo the same level of rigorous, costly, and time-intensive resilient design and stress testing as a large hydropower dam. At the same time, it will not be in the scope of all projects to address all the risks posed by climate change and disasters. As such, teams will need to prioritize the risks to address and the extent to which they address them, focusing their efforts on the hazards that pose the most risk to the project development outcomes. The RRS team will review developing more nuanced guidance and criteria for rating projects that consider the level of risk and magnitude of impacts to the project.

To date, the RiST tool has largely focused on assets and infrastructure. As outlined in lesson 3, this presents a challenge when applying it to other types of investment project, such as those relating to cash transfers and jobs (pilot project box 4), which will have a different way of estimating costs and benefits. Ongoing and planned activities to address this include:

- Systematically reviewing World Bank and sectoral guidance and tools for EFA and considering climate and disaster risk;
- Evaluating opportunities for considering climate and disaster risks in current sectoral approaches and linking with RiST tool use; and
- Developing sectoral guidance and the RiST tool to help teams integrate climate and disaster risk considerations in their projects' design and assessment.

5.

SUMMARY OF REVISIONS TO RRS METHODOLOGY

Building on the lessons learned from the IDA19 piloting, the RRS team has refined and revised the original methodology (Figure 5), addressing issues experienced during the pilot phase, and with the intention of simplifying the assessment, standardizing application across multiple sectors, and providing the best incentives.

Details of the RRS methodology and considerations for each rating are presented in the RRS methodology (World Bank 2021). Significant revisions include:

- Clarifying the **NR** and **NA** ratings to make room for operations that primarily operate in one dimension, lack the necessary data or information for a risk assessment to be conducted, or do not report on their development outcomes—so, for example, projects with no physical components do not need to be rated for the *resilience of* dimension;
- Bundling all risk screening-related requirements under the **C** rating for the *resilience of* dimension, simplifying the assessment of climate and disaster risks that affect a project;
- Adopting adaptation measures across the **B** rating for both dimensions to ensure congruence and standardization, and decoupling the climate co-benefit metric from the **B** rating for *resilience through;*
- Including results monitoring as a mandatory requirement for an **A** rating in both *resilience of* and *resilience through* dimensions, so that higher ratings emphasize, among other project attributes, a solid M&E system to provide confidence that a resilience-related project will deliver on its intended outcomes and results;
- Introducing "transcending boundaries" as a requirement for an **A** rating for *resilience through,* to reflect projects that build systems-level resilience beyond their own boundaries and timescales; and
- Positioning a transformational project as an **A+** rating for *resilience through*, with a revised definition of transformation as, "a project that sets the wider system on a resilient development pathway by fundamentally altering the current system and having a transformational impact."

The RRS team will continue to work with World Bank sectoral teams to review and refine the methodology to ensure it captures both best practice and best practical applicability in different contexts.

Figure 5. An overview of RRS methodology

Resilience *of* a project

C Project developers report identified threats based on a qualitative estimate of climate/disaster risk. The main goal is for project developers to understand the project's short and long-term exposure to climate change and disasters, as well as the potential impacts of this exposure, and to prioritize which risks need to be addressed through the project's design.

B The project addresses its vulnerabilities to climate/disaster risks by including appropriate adaptation measures to make the project more resilient and reduce its residual risk, such that it can still achieve its main development objectives.

A The project incorporates a climate and disaster risk stress test that considers a range of climate and disaster impacts (for example, in its EFA or other project appraisal analysis) and ensures that, after risk reduction measures are included, residual risks do not make the project economically or financially unviable or unable to achieve its intended development outcomes for any likely or probable climate scenarios. The project also monitors and tracks the progress of activities building resilience of the project via at least one climate adaptation indicator.

+ The project conducts a more systematic exploration of the risks to the project and undertakes contingent planning in case of unexpected situations that were not considered in the project design. Projects can be rated A+ or B+ if they include the appropriate criteria for contingency planning.

NR The project is possibly exposed to climate change and disaster risks, but no information is available, or the risks are unmanageable and threaten the project's economic viability.

NA The project is not exposed to climate change risks in a material way, or a resilience rating is not relevant, based on the nature of project activities or types of outcome.

Resilience *through* a project

C In most circumstances, resilience to climate change is enhanced by good development, with higher and more stable incomes, lower poverty, better access to infrastructure and financial services, and stronger social protection and health care systems. Projects with development benefits are assigned a **C** rating.

B The project addresses vulnerabilities posed by climate/disaster risks to the surrounding system/beneficiaries/assets by including appropriate adaptation measures that build resilience through the project.

A The project influences adaptation and resilience beyond its immediate boundaries, outputs and timescale by removing or significantly reducing the underlying causes of vulnerability, barriers for adaptation and resilience, and building resilience. It also monitors and tracks the progress of activities building *resilience through* the project via at least one climate adaptation indicator.

+ The project sets the wider system on a resilient development pathway by fundamentally altering the current system and having a transformational impact.

NR The project does not report on its contribution to development, growth, poverty reduction, or resilience.

6.

APPLYING RRS BEYOND WORLD BANK OPERATIONS

The RRS was conceived and developed as a rating system that could be used not just within the World Bank Group but by governments, private sector actors, development partners, and others to evaluate investments and development projects. When developing the system, the RRS team consulted and included several external stakeholders and institutions, such as private sector actors and other MDBs. Many partners continue to express interest in further understanding and applying the RRS methodology, and the RRS method development has inspired external actors—such as the Climate Bonds Initiative—to develop their own resilience guidance. The team also worked closely with FAO's Economic and Policy Analysis of Climate Change team to tailor the risk stress testing methodology to specific sectors.

With increasing demand and efforts around resilience evaluation among external stakeholders, the RRS team has supported outreach, engagement, and dialogue with several partners. This includes sharing the RRS and climate risk stress testing methodologies and lessons learned from the pilots at events—such as a workshop organized by Brazil's Ministry of Economy, a masterclass organized by the Global Center on Adaptation, the Arab Conference for Cooperation on Climate Change, the World Resources Institute Adaptation and Resilience Mainstreaming Program's course on adaptation finance, and the International Renewable Energy Agency's Adaptation Metrics Working Group—and offering technical assistance to the city of Ekurhuleni through the Cities Support Program led by the government of South Africa.[19] These external engagements have spurred others to adopt similar approaches. For example, the Brazilian Ministry of Economy has developed guidance for incorporating climate risks in the economic analysis of infrastructure projects that followed the climate and disaster risk stress test methodology, and the RRS team has supported European and Central Asian countries to mainstream climate risk screening and climate-informed economic analysis for public investment management. RRS is also contributing to the development of a resilience classification

[19] Avner, P, Shariq, A, Shoaib, A and Koh, I. 2023. "Integrating Disaster and Climate Risks into Capital Project Appraisal- Application to Projects and Programs in the Ekurhuleni Metropolitan Municipality South Africa." Washington, DC: World Bank.

system led by the Climate Bond Initiative to spur adaptation and resilience finance.

Helping to cement the World Bank's role as innovator and thought leader in climate adaptation and resilience, the RRS has the potential to become a standard and contribute to measuring and tracking the adaptation and resilience performance of investments, development projects, and sectoral and national policies, as well as global progress on adaptation. The World Bank will continue to engage with external partners and stakeholders to advance the development of resilience assessment metrics and encourage consistency between the RRS method and the standards and resilience metrics they develop.

7.

MOVING FORWARD

Within and outside the World Bank, there is increasing interest in—and demand for—better metrics to evaluate the impacts and outcomes of development activities and mobilize private finance to support climate adaptation and resilience. In response to these needs, the RRS team is focused on several streams of work, which include: a second round of RRS applications with IDA20 operations; updating the methodology and developing sectoral guidance; developing the web-based RiST tool; using RRS foundational work and insights from testing to develop metrics that can be linked with results-based adaptation finance; and dissemination, outreach and external engagement.

With the first round of pilot projects under IDA19 outlined in this paper, the RRS team was able to demonstrate that the methodology and rating system can be useful for further integrating adaptation in the World Bank portfolio and to help track the ambition of World Bank projects. The team will continue to support sectoral World Bank teams to apply the methodology and integrate resilience measures in select operations nominated by regions. At minimum, under IDA20, there is a commitment to achieve at least 10 projects with an **AA** rating over the FY23–25 period.

The goal is not to move the entire World Bank portfolio toward an **AA** rating, as doing so could exclude necessary development projects that do not focus on transformational climate adaptation impacts. Rather, it is to accurately reflect and communicate the degree of resilience building embedded in our projects and where appropriate, seek opportunities to further embed activities that build systemwide resilience. Regional and sectoral counterparts have indicated strong interest in and requests for applying RRS to IDA20 projects. Doing so will further strengthen capacity to systematically consider adaptation and resilience in project design, provide a baseline, and track the quality of adaptation and resilience building across the World Bank portfolio.

The RRS team will also strive to align the World Bank's adaptation and resilience methodologies and corporate commitments—for example, on climate and disaster risk screening, Paris-aligned adaptation, and climate indicators—and its emerging Integrated Climate Results Framework, to streamline assessment and reporting for World Bank teams and support the evo-

lution toward measuring the impacts and outcomes of World Bank operations. The team will undertake deeper work with sectoral teams, particularly to adapt the RRS methodology for human development projects and explore opportunities for results-based financing and policy lending. To disseminate knowledge and share lessons learned, the RRS team aims to present and discuss the revised methodology, case studies, and EFA improvements that integrate climate and disaster risk considerations with World Bank staff.

The RRS team will continue to revise and update the methodology, based on feedback and lessons learned, ensuring a consistent and standardized approach across sectors, while supporting the development of sector-specific guidance where necessary. Specifically, the team will focus on identifying and sourcing relevant sector-specific climate projection and impact data to better integrate them into RRS and RiST, improving their usability, and link with other sectoral tools—such as the World Bank's hydroclimatic stress test tool—to provide the best information to encourage and support adaptation in projects. The team will also continue to develop relevant data, tools, and approaches to make the RRS more widely applicable. Working with internal counterparts and the scientific community, it is leading an effort to build a web-based RiST tool that can facilitate access to climate data, risk thresholds and scenarios—for example, through CCKP—climate risk stress testing, and analytics.

Other activities include a systematic review of World Bank and sectoral guidance and tools for EFAs and identify opportunities to better incorporate climate and disaster risks for climate-informed project economic analysis early in project preparation. Meanwhile, the review evaluates opportunities for incorporating such risks into current approaches, linking them with the RiST tool, developing further sectoral guidance, and tailoring the RiST tool to support the integration of climate and disaster risk considerations into project designs and assessments for different sectors.

Finally, given the immense interest and need for metrics to monitor and track the resilience attributes of investment activities and drive investments toward more resilient projects, the RRS team will continue to engage with internal and external partners—including research institutes, think tanks, private sector actors, standard-setting bodies, and credit rating agencies—to advance the development of methodologies, rating systems, metrics, and standards for evaluating and labeling the resilience attributes of investment projects. The team will also continue to link these with metrics at different scales, such as country-level adaptation and resilience readiness diagnostics, to inform progress toward the global goal on adaptation and support the scaling up of adaptation finance.

Appendix A.

Full list of IDA19 pilot projects

Country/ies	Project number	Approval fiscal year	Financing	Project name	RRS rating	Notes on engagement
AGRICULTURE AND FOOD						
Gambia, The	P173070	FY22	$40 million	Gambia Inclusive and Resilient Agricultural Value Chain Development Project (GIRAV)	BA	The RRS team provided feedback on the project appraisal documents (PADs), including: strengthening the vulnerability context and using climate indices as part of the narrative, and suggesting both additional climate adaptation and mitigation measures to include in the project design, and options for climate indicators that could be included in the results framework. The team also engaged in virtual missions for this project, provided feedback on enhancing climate considerations, and drafted inputs for the project document. Due to the operation's complexity, limited information on assumptions used for the EFA, and short timeline to board approval, the RiST was not finalized for this project. The RRS team continued to engage with FAO and the World Bank's agriculture and food team to compile climate and disaster risk data and developed a case study on this project as part of an ongoing sectoral RIST note.
Honduras	P174328	FY21	$100 million	Innovation for Rural Competitiveness Project - COMRURAL III	BA	The project team adopted and incorporated almost all the RRS team suggestions on strengthening climate considerations as part of project design. The RRS team's initial feedback on the PAD included strengthening the vulnerability context and using climate indices as part of the narrative, adding climate adaptation and mitigation measures to the project design, and including options for climate indicators in the results framework. For the RiST analysis, the project had a set of subcomponents that posed challenges for integration into the RiST tool. The EFA had been based on "possible" incremental net revenue flow from potential subproject implementation. Selected subprojects for the analysis were operations financed under COMRURAL II. Although the RRS and FAO teams worked to incorporate climate considerations in the EFA, the short turnaround time for project approval and the complexity of the EFA made it impossible to complete the analysis before board approval.

Country/ies	Project number	Approval fiscal year	Financing	Project name	RRS rating	Notes on engagement
Pakistan	P176786	FY23[20]	$200 million	Punjab Resilient and Inclusive Agriculture Transformation	AA	The RRS team provided feedback on the PAD, including a detailed, subnational vulnerability context and how to strengthen climate considerations and indicators in project design. With the support from FAO economists, this project was able to complete its RiST analysis.
ENERGY AND EXTRACTIVES						
Liberia	P173416	FY21	$59 million	Liberia Electricity Sector Strengthening and Access Project (LESSAP)	BC	The RRS team was not able to engage in this project as the piloting started when the project was very close to board approval stage, so it was rated retroactively.
Somalia	P173088	FY22	$150 million	Somali Electricity Sector Recovery Project	AB	Climate risk stress testing for this project was included in the EFA, so the RRS team did not apply the RiST. With support from the RRS team, the project team included a detailed climate annex outlining climate risks and potential adaptation options.
Côte d'Ivoire, Mali, Mauritania, Niger, Senegal	P167569	FY21	$465 million	Regional Electricity Access and Battery Energy Storage Technology (BEST) Project	AA	With RRS team support, the project team included a detailed climate annex outlining climate risks and potential adaptation options. Although the RiST analysis was finalized with active engagement from the project team, there was not enough time to include it in the final PAD.
ENVIRONMENT, NATURAL RESOURCES, AND THE BLUE ECONOMY						
Lao PDR	P170559	FY21	$34 million	Lao Landscapes and Livelihoods Project	BA	The World bank environment focal points took a proactive approach, with ownership over the resilience rating and stress testing process. They created and are piloting an approach to build climate resilience in landscapes projects, with a stress-testing tool that is similar to RiST.
Tajikistan	P171524	FY22	$45 million	RESILAND CA+ Program: Tajikistan Resilient Landscape Restoration Project	AA	The stress-testing tool developed by the environmental focal points was applied to this project, resulting in an A rating for *resilience of* the project.
Uzbekistan	P174135	FY22	$142 million	RESILAND CA+ Program: Uzbekistan Resilient Landscapes Restoration Project	AA	The stress-testing tool developed by the environmental focal points was applied to this project, resulting in an A rating for *resilience of* the project.

[20] The Pakistan Panjab Punjab Resilient and Inclusive Agriculture Transformation Project was originally a FY22 project but its approval was deferred to FY23 due to bunching at the end of FY22.

Country/ies	Project number	Approval fiscal year	Financing	Project name	RRS rating	Notes on engagement
HEALTH, NUTRITION, AND POPULATION						
Niger	P171767	FY22	$100 million	Niger, Improving Women's and Girls' Access to Improved Health and Nutrition Services in the Priority Areas Project (LAFIA-IYALI)	BB	The RRS team provided comments on the PAD, targeted toward enhancing resilience. Although the team started to apply the RiST, this was paused to explore working with the Johns Hopkins Bloomberg School of Public Health on incorporating climate considerations in the Lives Saved Tool (www.livessavedtool.org/). This is an area for future exploration with the World Bank health team.
SOCIAL PROTECTION AND JOBS						
Afghanistan	P173387	FY21	$97.5 million	Early Warning, Early Finance and Early Action Project	NR/A	The project had no physical assets and the available data and tools within the RRS and RiST environments do not allow for "stress testing" on soft investments. The project therefore received an NR rating in the *resilience of* dimension. Developing the tools needed to pilot RRS for soft investments is an area for future work.
Sierra Leone	P176789	FY22	$40 million	Productive Social Safety Nets and Youth Employment	BB	The project team incorporated the RRS team's feedback into the project design and PAD and developed a detailed climate annex. RRS engagement helped to further strengthen and integrate climate resilience measures in public works, prioritizing business plans that strengthen urban resilience, disseminating information about climate change, and hosting climate-related events and trainings. The PAD annex further highlighted poor households' exposure to climate risks and interlinkages between climate change and food security. For RiST, the RRS team held exploratory conversations with World Bank social protection and jobs economists on how to best incorporate stress testing in projects in this sector. This is an area of further development for RRS.
TRANSPORT						
Nepal	P177902	FY22	$275 million	Accelerating Transport and Trade Connectivity in Eastern South Asia – Nepal Phase 1 Project	AA	The RRS team provided detailed climate data to the project team, which described the climate vulnerability context for the project area using the latest CCKP data. The team also applied the RiST to this project, which was rated A for both dimensions.
Yemen, Rep.	P177053	FY22	$50 million	Emergency Lifeline Connectivity Project	BB	The RRS team provided feedback on the PAD, including suggestions on how the project team could strengthen the climate vulnerability context, and highlighted measures to build the climate resilience of project beneficiaries. Although the RRS team started stress testing, this was not completed before the project went to board for approval.
URBAN, RESILIENCE, DISASTER MANAGEMENT, AND LAND						
Grenada	P175720	FY22	$15 million	Grenada Resilience Improvement Project	AA	The project team conducted stress testing using Monte Carlo simulations. The RRS team shared climate data and scenarios to provide additional support to the stress testing.

Country/ies	Project number	Approval fiscal year	Financing	Project name	RRS rating	Notes on engagement
Niger	P175857	FY22	$250 million	Niger Integrated Urban Development and Multi-sectoral Resilience Project	AA	The RRS team provided written feedback on the project's PAD, including a detailed climate vulnerability context, which helped inform project design. As a result, the project team added extreme heat as a key climate risk consideration in urban infrastructure improvements, climate resilience investment planning and implementation, and risk assessments. The RRS team also completed a RiST analysis for this project.
Pakistan	P173087	FY21	$200 million	Sindh Resilience Project Additional Financing	BA	This project became a pilot too late in the project cycle for the RRS team to be able assist in a significant manner.
Tonga	P174434	FY22	$15 million	Tonga Safe and Resilient Schools Project	BB	The project was board-approved, and additional funding was prepared due to a recent volcanic eruption in Tonga. The RRS team provided comments and feedback on project design, strengthening the vulnerability context, and identifying possible climate-resilient design options. The team also explored ways to overcome challenges in data availability and identify additional and innovative climate data sources for future RiST implementation.
WATER						
Ghana	P171620	FY21	$125 million	Ghana Additional Financing for Greater Accra Metropolitan Area Sanitation and Water Project	BB	This project joined the pilot too late in the project cycle for the RRS team to be able assist in a significant manner. Approved in September 2020, the project was rated retroactively.
Niger	P174414	FY22	$400 million	Niger Integrated Water Security Platform Project (Niger-IWSP Project)	AA	The RRS team made comments on the PAD to influence project design and completed the RiST analysis for this project, which received an A rating in both dimensions.
Timor-Leste	P176687	FY22	$121 million	Dili Water Supply Project	BA	The RRS team closely supported the project team, processing high-resolution historical climate data for Dili, estimating seasonal precipitation patterns and changes in return periods under future climate change, and evaluating climate impacts on the project cost-benefit analysis. This climate information served as direct input into the project engineering analysis and design considerations, and showed that the project was economically viable, even when considering the impacts of heavy precipitation and drought on service delivery. The RRS team also provided comments to various iterations of the project documents, including concept notes and draft Project Appraisal Document.

Acronyms & abbreviations

BEST	battery energy storage technology
CCKP	Climate Change Knowledge Portal
EFA	economic and financial analysis
FAO	Food and Agriculture Organization of the United Nations
FAST	Flexible, Appropriate, Structured and Transparent (FAO standard)
FCS	fragile and conflict-affected settings
FY	financial year
IDA19	19th Replenishment of International Development Association
IDA20	20th Replenishment of International Development Association
M&E	monitoring and evaluation
MDB	multilateral development bank
NA	not applicable
NR	not rated
PAD	project appraisal document
RiST	risk stress test (tool)
RRS	Resilience Rating System
SIDS	Small Island Developing States

All dollar ($) amounts are US dollars.