Maximizing the impact of climate solutions with evidence

Climate change is a defining policy challenge of the 21st century. The need for sustainable solutions that reduce emissions and support community resilience is more vital than ever. As domestic and international actors coordinate to mobilize resources for tackling the global climate challenge and the inequities it exacerbates, **Mathematica can help**.

We strive to bring forth the reliable and precise evidence required to measure impact of climate policies, maximize investments, and improve public well-being. Applying our cross-sector expertise, we identify opportunities for climate solutions—engaging interested government, philanthropic, academic, and private-sector entities in more than 60 countries; partnering locally; and building capacity to ensure those solutions are contextualized, adopted, and sustained.

Mathematica is a globally recognized leader and trusted partner in conducting rigorous high-quality research. We bring objectivity, excellence, and flexibility to the measurement of well-being outcomes and resilience, particularly among communities that are more vulnerable to the impacts of short-term climate shocks and long-term stresses. Mathematica works across many sectors that are key to addressing climate change's impact in an equitable manner, such as **urban planning**, **water**, and **education**. Below, we highlight our expertise in three key sectors:

Climate and Agriculture. This sector contributes to global greenhouse gas (GHG) emissions but is also an essential source of rural livelihoods that are threatened by climate change. To support climate-resilient agriculture, we evaluate the impact of climate adaptation interventions, rigorously measure farmer resilience, and have prototyped a resilience platform to support locally led adaptation. To identify solutions that also reduce GHG emissions from agriculture, we develop decision support tools that incorporate climate data in forward-looking scenario analyses.

Climate and Health. Historically marginalized communities that often bear the least responsibility for contributing to climate change are disproportionately exposed to its health impacts. At the same time, the health sector contributes significantly to GHG emissions. With innovations that use advanced analytics and dynamic visualizations, we show the relationships between exposure, sensitivity, and capacity, and identify who is most at risk for climate-related health issues. This helps clients understand conditions that should trigger emergency warnings and helps communities and health systems bolster climate resilience and health equity. We also provide policy and planning support to assist health systems in lowering the health risks they often generate while improving equity and sustainability.

Climate and Energy. Access to sustainable energy enhances economic opportunity, increases green jobs, reduces GHG emissions, and increases resilience to climate change. To support sustainable energy development, we conduct political economy analyses of financial and regulatory landscapes, cost-benefit analyses, case studies, and sustainability assessments. We evaluate energy sector programs to assess the effects of increased power generation from renewable energy sources and incentives for households and businesses to adopt electricity solutions, regulatory reform, and institutional capacity building efforts.

Our climate offerings

Mathematica leverages reliable, high-quality data and innovative tools to conduct comprehensive analyses of climate policy and programs. We then employ rigorous methodology for on-the-ground monitoring and evaluation of policy and program implementation. We make our findings accessible and useable through dashboards, visualizations, and more to support decision making. When delivering our work, we strive for sustainable solutions, taking care to invest in understanding the context in which we are operating and building local capacity to support adoption.

/ Policy and strategy advisory services

Expertly bringing in climate data and predictive analytics, we use rigorous quantitative and qualitative methods to provide deep, action-oriented insights into the design and implementation of climate policies and strategies. Our policy and strategy advisory services are always tailored to local contexts, and our multisectoral approach helps decision makers understand the wide-ranging impacts and environmental and social tradeoffs of climate policy decisions.

/ Monitoring, evaluation, and learning

We generate reliable evidence about impactful climate interventions, harnessing our expertise in conducting impact evaluations and contribution analyses and extensive experience serving as a full-service learning partner. We integrate climate data, satellite data, and other big data sources to enrich these analyses. To support investments in climate adaptation, we provide flexible yet rigorous methods to measure climate resilience at the household and system levels.

/ Data visualization and decision support tools

Impactful climate solutions rely on vast data streams because climate outcomes are influenced by a complex array of factors. Our climate innovations seek to provide relevant data and evidence that are accessible and engaging for non-technical audiences, using expert analytics to distill key messages and data visualizations and dashboards built with human-centered design principles. For our **ClimaWATCH** tool, our data science experts applied advanced analytics to big data on health care to uncover the relationships between extreme weather events and health outcomes and health care costs. We have prototyped a **Resilience Platform** to demonstrate a possible approach to an integrated data and analytics repository that facilitates understanding, tracking, evaluating, and visualizing resilience across geographies and time. The platform supports evidence-informed climate adaptation actions and the measurement of climate resilience and makes use of existing platforms and resources, rather than duplicating them.

Illustrative engagements

Supporting sustainable agriculture decision-making

Mathematica is leading a pilot evaluation of a tool for the U.S. Agency for International Development (USAID) designed to inform and facilitate adoption of integrated agricultural innovations that improve agricultural productivity and climate outcomes. These innovations provide projected financial, environmental, and economic costs and returns through conductive predictive analytics that use climate forecasts and yield and GHG modeling.

Assessing private investments to drive clean energy finance

Mathematica assessed private sector investments in renewable energy and energy efficiency, including evaluating political and market-enabling conditions and outcomes of energy procurement systems. For USAID's Caribbean Energy Initiative, we conducted a multimethod landscape assessment of clean energy financing to help design mechanisms to support related private investment.

Developing a MEL framework for sustainable food systems

Mathematica is providing comprehensive monitoring, evaluation, and learning (MEL) support for AGRA as it seeks to enhance sustainable agricultural practices across 11 countries in sub-Saharan Africa and improve farmers' resilience to climate change. Mathematica is developing a central MEL plan that will enable AGRA to measure progress and adaptively manage its programming portfolio over time.

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