



Climate shocks and changing weather patterns threaten to undo decades of progress—and U.S. investments—in malaria control and elimination. To achieve our vision of a world free of malaria, PMI developed a framework to guide our approaches and investments in support of greener and more climate-resilient malaria programs.

EXTREME WEATHER EVENTS

The frequency and severity of extreme weather and natural disasters, such as cyclones, droughts, and floods, are increasing in many PMI partner countries.¹ These events impact malaria programming and transmission, including by:

- Destroying infrastructure—including health facilities, warehouses, and roads—which disrupts health services and supply chains, decreasing access to preventive interventions, diagnostics, and treatment
- Damaging homes and prevention tools, such as insecticide-treated nets, which leaves communities at greater risk of exposure to infectious mosquito bites
- Displacing populations from their homes, which reduces the ability to use preventive interventions, such as insecticide-treated nets and indoor residual spraying, and can cause the malaria parasite to move with people, potentially bringing malaria to lower-endemic areas such as urban centers
- Creating new breeding sites for mosquitoes in stagnant water

CONTINUOUS WEATHER CHANGES

A number of malaria interventions are based on seasonal timing (e.g., the onset of the rainy season), and transmission dynamics can shift based on weather patterns. Warming temperatures and changing rainfall patterns affect malaria programming and transmission, including by:

- Increasing the unpredictability of seasons, which affects the timing and duration of interventions, leading to gaps in coverage and a possible increase in cases
- Potentially putting more people at risk of malaria² by expanding the geographic distribution of the vector and the parasite to areas previously too cold for malaria transmission or with previously low endemicity
- Potentially making certain warmer locations uninhabitable for the vector,³ which affects resource allocation and program planning, meaning malaria commodities could be at the wrong place at the wrong time
- Increasing transmission rates by accelerating the vector lifecycle (leading to increased numbers of mosquitoes) and reducing the time it takes for the malaria parasite to multiply, which could increase the number of malaria cases

¹ Rodell, M., Li, B. Changing intensity of hydroclimatic extreme events revealed by GRACE and GRACE-FO. *Nat Water* 1, 241–248 (2023). <https://doi.org/10.1038/s44221-023-00040-5>
<https://yaleclimateconnections.org/2023/05/five-of-africas-top-30-deadliest-weather-disasters-have-occurred-since-2022/>

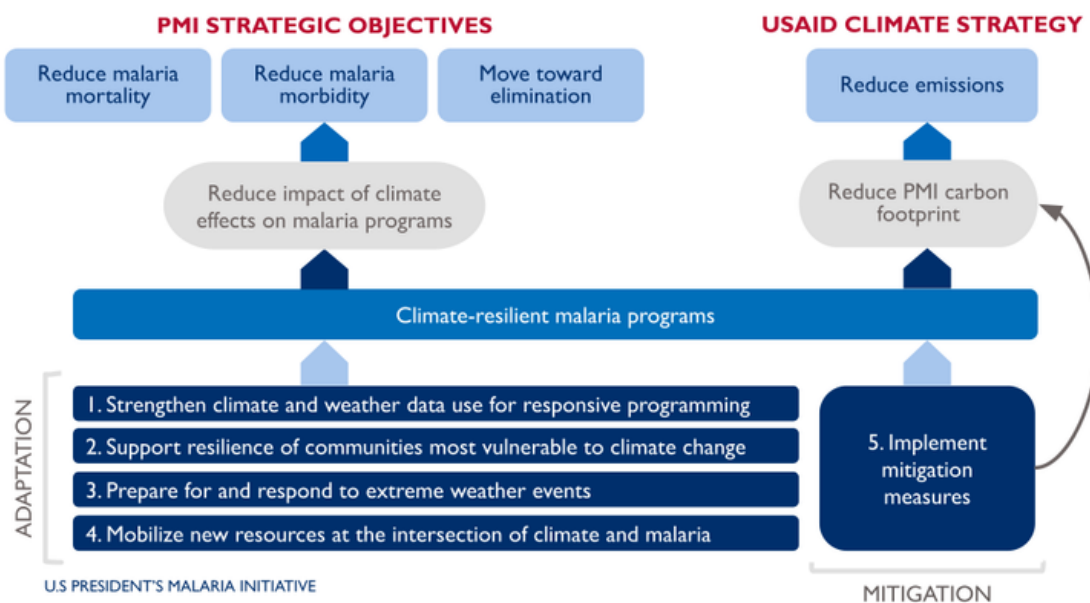
² Ryan, S.J., Lippi, C.A. & Zermoglio, F. Shifting transmission risk for malaria in Africa with climate change: a framework for planning and intervention. *Malar J* 19, 170 (2020). <https://doi.org/10.1186/s12936-020-03224-6>

³ Gething, P., Smith, D., Patil, A. et al. Climate change and the global malaria recession. *Nature* 465, 342–345 (2010). <https://doi.org/10.1038/nature09098>



PMI'S CLIMATE FRAMEWORK

PMI's climate framework, outlined below, includes both adaptation and mitigation measures to make PMI programming more climate-resilient—and, ultimately, more effective. The framework will shape PMI investments and approaches where appropriate, with the goal of ensuring that climate-associated threats do not prevent PMI and our partner countries from achieving our shared objective of a world free of malaria.



Many PMI partner countries are already pursuing actions that align with this framework, with approaches based on local needs.

ADAPTATION

PMI is working to make climate and weather data more accessible and supporting early warning systems to predict climate-based malaria outbreaks so that malaria interventions can be deployed at the optimal time. PMI is supporting our partners to pre-position critical supplies so that communities will have continuous access to care during and after extreme weather events.

MITIGATION

PMI is undertaking mitigation efforts where possible and aligned with country needs, reducing carbon emissions and strengthening program resilience. From FY 2019 to FY 2023, PMI transitioned from primary reliance on air freight to using sea and land freight to transport malaria commodities. This effort resulted in an 85 percent reduction in transportation-related greenhouse gas emissions. PMI also piloted renewable energy systems and is promoting greener manufacturing.

In 2024, in addition to continuing to implement ongoing climate-related activities, PMI will focus on documenting and learning from current activities, analyzing existing climate and weather data to inform programming, and defining the geographic areas at highest risk of negative effects of climate change, while determining how to further incorporate climate considerations into country planning. These actions will guide PMI's strategic approach to implementing this framework in the future.

CROSS CUTTING PRINCIPLES

Cross-Cutting Principles will be embedded into PMI's efforts: (1) Listen and Invest Locally, (2) Diversify Partnerships, (3) Challenge the Status Quo, (4) Learn by Doing.

This framework has been informed by and complements [PMI's Strategy 2021-2026](#), [USAID's Climate Strategy](#), and [CDC's Climate and Health Strategic Framework](#). For more information, contact: PMIcommunications@usaid.gov.