

Malaria and Climate

Reprogramming examples for GC7¹

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Summary

- This document supports the introduction of **climate change-related interventions** into programs to reduce transmission of malaria and protect vulnerable populations.
- **Priority interventions** that can be supported through Global Fund-malaria grants include:
 - **Coordination and collaboration across sectors**, including health and non-health such as climate finance, disaster management and environment services. A list of stakeholders to consider involving is in Annex 2.
 - **Use of data** to adapt the national malaria strategy, such as: climate, spatial, land use and land cover data, entomologic surveillance, Identify populations vulnerable to both the effects of climate change and malaria.
- **Other interventions** include mitigation through program adaptation to reduce environmental impact, waste management, epidemic and climate disaster preparedness, stockpiles, community, communication, advocacy.
- Annex 1 refers to the **Global Fund's Modular Framework** and details the relevant interventions to support reprogramming.
- Annex 2 includes **a country example from East Africa** and shows how to integrate climate change into a new national strategy on malaria. This includes a **list of stakeholders** to consider for coordination purposes.

¹ Climate and health guidance for GC8 expected to be published in 2025.

Introduction

The impact of climate change on human health is growing, disproportionately affecting the most vulnerable and disadvantaged communities. Climate change is projected to increase the burden of climate-sensitive diseases, including malaria, through factors like rising temperatures, changing rainfall patterns, and varying humidity levels. Moreover, climate change exacerbates malaria risk by disrupting healthcare systems, increasing population displacement, and compounding vulnerabilities through extreme weather events.

By understanding and integrating climate relevant activities into malaria interventions, malaria strategies can become more resilient to climate variability and change, ensuring sustained progress in reducing malaria transmission.

The Global Fund is encouraging national malaria programs and ministries of health to incorporate climate and climate change-related interventions into their programs to become more resilient to climate variability and change, ensuring sustained progress in reducing transmission of malaria and other climate sensitive diseases and protecting vulnerable populations. By working jointly on climate and health, countries can mitigate the impact of climate on health and reduce the environmental impact of health interventions.

The interventions listed in this document provide Country Teams and countries with guidance on how to prioritize interventions based on importance and feasibility to implement during GC7. The list is not exhaustive and might not be applicable based on country context. Please consult your malaria advisor.

Priority Activities for GC7

Coordination/collaboration for a multisectoral approach for climate, malaria, and health systems: programs are encouraged to advocate for national climate health adaptations plans incorporating the key malaria interventions and to work across sectors (including health and non-health actors) to ensure strong, resilient health systems are in place to address the overlap between malaria and climate/climate change issues – including potential epidemics/pandemics.

1. Advocate for national climate adaptation plans to include health and specifically malaria.
2. Develop partnerships with actors working specifically on climate/climate change and its overlap with malaria/health.
3. See example in Annex 2 on partner coordination.

Data: in addition to the standard malaria variables, consider inclusion of the following data to use in adapting the malaria strategy:

1. Climate, spatial, land use and land cover data according to availability: include climate data (temperature, precipitation, humidity, seasonality); spatial (administrative boundaries, health facilities, health catchment areas, roads, bridges, rivers, etc.); land use (agricultural, industrial, etc.) and land cover (forest, savannah, desert, etc.)
 - a. Use local data (current and retrospective) where available and satellite data to complete any gaps.
 - b. An existing solution that can be used is the DHIS2 Climate app: (<https://dhis2.org/climate/climate-data-app/>)
 - c. Integrate climate data into the country data maturity assessment.
Ensure support to **analytical capacity** beyond data collection and integration of climate and health data.
2. Entomologic surveillance to monitor changes in vector bionomics, identify areas of new/varying transmission and assess climate trends historic impact on vector behavior.
 - a. Integrated Vector Management for non-anopheline vectors is and can be added to planned entomological surveillance (but not as stand-alone surveillance)
3. Identify populations vulnerable to both the effects of climate change and malaria and consider most appropriate interventions and how to best reach these populations:
 - a. Population movement due to climate change (ex. changes resulting in land becoming inhabitable, food insecurity, climate disasters):
 - i. From low burden to high burden areas: lack of immunity, lack of prevention measures, lack of knowledge on the disease and its prevention.
 - ii. From high burden to low: potential for outbreaks.
 - iii. From high burden to high burden: affecting programming quantification of HR and commodity needs, availability of shelter, proximity to breeding sites, etc.
 - iv. Potential increased overlap between malaria and malnutrition and/or other climate-sensitive diseases (requiring multisectoral collaboration).
 - b. Vulnerable populations such as pregnant women, children, refugees, internally displaced populations (IDPs), those with limited access to care in areas with on-going malaria transmission.
 - c. Population in areas with increasing transmission due to climate change (ex. Population in highlands or flooded areas): lack of/lower immunity, lack of prevention measures, lack of/lower knowledge on the disease and its prevention.

Adapt national strategic plan/operational plan as necessary: based on inclusion and use of the above-mentioned data, adjustments to the national malaria strategy. This could

include adjustments in targeting and implementation strategies for interventions like vector control, chemoprevention, case management, etc.

Other Potential Activities To Consider

Mitigation through program adaptation: consider implementation adaptation to limit impact on climate/environment (ex. digitization, activity integration, virtual training, bulk packaging).

Waste management: include waste management in routine and campaign activities, which can include engagement of recycling service providers.

Epidemic and climate disaster preparedness: support for epidemic preparedness and response (EPR) malaria plans and for incorporation of malaria into national climate adaptation plans/emergency plans.

- Engage with actors working on anticipatory action for climate and vector-borne diseases.
- Engage with actors working on disaster risk reduction and disaster response.
- Capacity strengthening to respond to perturbations of malaria interventions due to climate disasters (e.g., quantify ITN loss, change in access to care, change in housing to temporary structures, etc.).

Stockpiles: consider stockpiles and plans for reinforcement of human resources for potential epidemics/climate disasters.

- Stockpiles at country level should ensure proximity to disaster-prone areas and climate-resilient warehousing.
- Careful consideration of the strength of the supply chain as well as stock availability (i.e. if stocks already insufficient, stockpiling may not be advisable).
- Careful attention on ensuring supplies are appropriately managed (ex. first in first out) to limit risk of expiration, should supplies not be needed.

Community: broaden community engagement efforts to go beyond malaria service delivery to include feedback on changing circumstances (e.g., climatic, land use, changes in agricultural practices or outcomes etc.) that may require adjustment to malaria-specific or broader health services and their delivery.

- Ensure interlink with other activities/initiatives (disaster response, agricultural actors, administration, etc.).

- Consider community scorecards² (a social accountability approach to provide standardized feedback from communities on key issues, for example, tracking malaria commodity stock levels in disaster-prone areas).
- Consider including climate in community-led monitoring activities.

Communication: adjust communications plan or strategy, as needed, to ensure populations understand the programmatic adaptations and their rationale.

Advocacy:

- a. Advocate for green procurement/health systems (low carbon and low plastic) such as inclusion of climate commitment in tendering criteria within government as well as from donors who procure on the country's behalf.
- b. Advocate for inclusion of the health component in climate change initiatives and funding.

² African Malaria Leaders Alliance (ALMA) has regional, national and community scorecards for key health indicators.
<https://alma2030.org/our-work/scorecard-tools/community-quality-of-care-scorecards-tools/>

Annex 1: Climate interventions within the Global Fund Modular Framework

The activities listed above are mapped to the respective modules and interventions already existing in the GC7 Modular Framework (and will be maintained in the GC8 Modular Framework under development).

Note that adjustments to intervention coverage (such as inclusion of new populations/geographies for ITN distribution, expansion of case management services) based on any updating of the strategic plan should be included in the relevant intervention modules as per standard practices.

Coordination, data, national strategic planning

Module	Intervention	Recommended Actions
RSSH: Health Sector Planning and Governance for Integrated People-centered Services	Integration/coordination across disease programs and at the service delivery level	• Malaria/vector borne disease climate impact, vulnerability, and risk assessment • Development multisectoral plan to adapt/mitigate the impact of climate change on malaria and primary health care • Development / revision of malaria strategic plans and budgets to include adaptations related to climate/malaria • Capacity building of malaria programs to identify cross-cutting health system needs and approaches to address and mitigate the impact of climate change
RSSH: Monitoring and Evaluation Systems	Routine reporting	• Integration/interoperability of meteorologic and other climate related data into HMIS • Inclusion of relevant climate/environment metrics in malaria data repositories: climate data (temperature, precipitation, humidity, seasonality); spatial (administrative boundaries, health facilities, health catchment areas, roads, bridges, rivers, etc.); land use (agricultural, industrial, etc.) and land cover (forest, savannah, desert, etc.) data into malaria data repositories. • Digitalization of data systems for malaria-specific interventions (e.g., ITN & SMC mass campaigns).
	Surveillance for HIV, tuberculosis, and malaria	• Inclusion and use of climate and environmental data into sub-national stratification, tailoring of intervention packages and intervention prioritization. • Activities to determine changes in receptivity (i.e., suitability of the ecosystem for transmission of malaria) and vulnerability of populations, including mapping of populations vulnerable to the effects of climate change and malaria
	RSSH/PP: Surveillance for priority epidemic-	• Development of national surveillance systems in other relevant sectors for surveillance of relevant hazards

Module	Intervention	Recommended Actions
	prone diseases and events	(e.g., climate and environmental hazards, animal disease, vector distribution, food contamination, incidents at point of entry, etc.) • Ad hoc epidemiologic disease modelling to estimate and forecast transmission of new infections, associated morbidity, hospital admissions, mortality, and other clinical outcomes. • Data triangulation meetings combining disease surveillance system data in relevant sectors for early detection of all-hazard signals.
	Analyses, evaluations, reviews, and data use	• Evaluation of the impact of HIV, TB, and malaria interventions on the environment.
Vector Control	Entomological monitoring	• Monitor shifts in mosquito species distribution and behaviors (biting times, locations, etc.) which may be influenced by climate change (e.g., rainfall, temperature, humidity) • Where relevant, include non-<i>anopheline</i> mosquitoes in entomological surveillance opportunistically under surveillance for malaria

Intervention adaptations

Module	Intervention	Recommended Actions
Vector control	Insecticide treated nets (ITN) Relevant for: - Mass campaign - EPI - ANC - School based - Community based	• Adjustments in targeting of ITNs after inclusion of climate/population vulnerability analysis • Targeted/emergency response (in addition to or in replacement of universal distribution) • Adjustment of coordination, planning, budgeting, and logistics due to climate-related challenges (ex. extreme weather events) • Green procurement and logistic equipment/practices • Waste management of campaign materials, end-of-life ITNs (can include recycling)
	Indoor Residual Spraying	• Adjustments in targeting of IRS after inclusion of climate/population vulnerability analysis • Targeted/emergency response • Adjustment of coordination, planning, budgeting, and logistics due to climate-related challenges (ex. extreme weather events) • Green procurement and logistic equipment/practices

Module	Intervention	Recommended Actions
		Waste management/environmental compliance of all IRS campaign waste
	Social and behavior change (SBC)	Any adjustments to standard advocacy, communication, and social mobilization activities as relevant to address overlap of climate change/malaria vulnerability. Ex. targeted SBC to communities receiving vector control in areas with historically low/no malaria transmission, now at risk due to climatic changes
	Removing human rights and gender-related barriers to vector control programs	Adjusting activities to address gender, human-rights, and other equity barriers to all vector control interventions to account for the overlap of climate and malaria-related vulnerability
Case management	Facility based treatment	- Facility-based case management for epidemic response - Green procurement and logistic equipment/practices - Waste management of facility materials
	Integrated community case management (iCCM)	Case management at community level for epidemic response
	Epidemic preparedness	Activities related to development /refining of the epidemic response strategy based on historic malaria epidemiologic trends as well as climate events (i.e., extreme weather events). For example: - Support for malaria epidemic preparedness and for incorporation of malaria into national climate adaptation plans/emergency plans - Updating logistic plans to address climate-related delivery challenges. Could include: - Stockpiling of vector control and case management commodities → Malaria epidemic response related interventions such as vector control, case management should be included in the respective modules. → Epidemic/pandemic surveillance system strengthening as well as preparedness planning should be included under the module “RSSH: Monitoring and Evaluation Systems.” → Recruitment, deployment, and retention of health workers supporting epidemic preparedness should be included under the module “RSSH/PP: Human Resources for Health (HRH) and Quality of Care.”
	Social and behavior change (SBC)	Any adjustments to standard advocacy, communication, and social mobilization activities as relevant to address overlap of climate change/malaria vulnerability. Ex. targeted SBC on prompt care seeking for febrile illness to

Module	Intervention	Recommended Actions
		communities with historically low/no malaria transmission, now at risk due to climatic changes
	Removing human rights and gender-related barriers to vector control programs	Adjusting activities to address gender, human-rights, and other equity barriers to all vector control interventions to account for the overlap of climate and malaria-related vulnerability
Specific Prevention Interventions (SPI)	Seasonal malaria chemoprevention	Adjustments in targeting (and number of rounds) of SMC after inclusion of climate/population vulnerability analysis
	Removing human rights and gender-related barriers to vector control programs	Adjusting activities to address gender, human-rights, and other equity barriers to all vector control interventions to account for the overlap of climate and malaria-related vulnerability
RSSH: Health Products Management Systems	Avoidance, reduction, and management of health care waste	Activities related to strengthening national systems for the avoidance, reduction and management of health care waste including lab waste and other waste generated under Global Fund grants. For example: - Assessments and interventions for responsible green procurement of health products and sustainable “Deliver” and “Return” supply chains compliant with international and national regulations. - Risk assessments and waste management in the supply chain, including reverse logistics of generated medical waste and/or of recalled and no longer needed products and carbon emissions and climate vulnerability. - Development or update of a national plan for the management of health care waste and design of sustainable, safe, and environmentally friendly interventions for the management and/or disposal of health care and lab waste. - Setting up and strengthening of the national waste management systems including safe collection, classification and segregation, handling, return transportation, recycling and/or treatment and disposal of lab and medical waste. - Training of human resources across all tiers in the public and private sector to increase awareness and improve competency in waste management practices, including the return supply chain. - Infrastructure and equipment for the collection, transport, treatment, and disposal of health care waste that are compliant with environmental and occupational health standards. - Public-private partnerships for sustainable and environmentally friendly health care waste management.

Module	Intervention	Recommended Actions
		- Engagement with communities and civil society to implement environmentally friendly health care waste management practices. - Introduction of sustainable innovative methods that seek to comply with the waste management hierarchy to prevent, minimize, reuse, and recycle health care waste. - Supply Chain Design exercises to plan reverse logistics where required for waste management and disposal, while ensuring value for money. - Evaluation of carbon footprint of 'end to end' Supply Chain (incl. climate vulnerability assessment). - Operational costs to implement waste management activities (including costs related to waste collection, transportation, destruction, or costs related to procurement, installation, maintenance and running of smaller scale waste destruction sites/equipment).
RSSH: Community Systems Strengthening	Community engagement, linkages, and coordination	- Mapping of community-led and community-based organizations working on climate, health, agricultural, gender and other relevant areas - Establishing multisectoral community actor climate/disease forum - Community-led development/revision of strategies, plans, and messages to include the importance and relevance of climate and health for social mobilization - Inclusion of climate/environment indices in community led monitoring - Community scorecards monitoring climate and malaria (and other) indices
RSSH: Health Sector Planning and Governance for Integrated People-centered Services	National health sector strategy, policy & regulations	Multi-sectoral policies that benefit the health sector including climate, disaster preparedness, etc.
RSSH: Health Products Management Systems	Policy, strategy, governance	- Development or update of national strategy for procurement and supply chain management (PSCM) and logistics master plan/implementation plan to include green procurement and logistics practices - Related technical assistance.

Annex 2: Country Example

A country in East Africa is looking to implement the activities below, focusing on coordination and integration of climate change into the new national strategy on malaria. Their objective is to move towards a comprehensive climate assessment and action planning for the new strategy.

1. Undertake a climate risk, vulnerability, and impact assessment of malaria
 - a. Past and present climate impacts on malaria including extreme weather events, near-term and long-term climate change.
 - b. Climate projections and future impacts, understanding key climate hazards most relevant to malaria, using existing best available climate-driven malaria projections/modelling.
 - c. Identify vulnerable systems across malaria-related health systems including healthcare workforce, communities, service delivery, infrastructure, procurement and supply chain and finance.
 - d. Assess climate risk and vulnerability including direct and indirect impacts across short, medium, and long-term timescales.
2. Develop a climate mitigation and adaptation plan for the new National Malaria Strategic Plan³:
 - a. Identify relevant options through a catalogue of adaptation and mitigation options and good practice examples.
 - i. Adaptation options, e.g. using climate information for malaria policy and program decision making; climate adaptation of vector control, case management and preventative initiatives for short-term climate risks; climate-informed monitoring and evaluation of malaria control efforts, climate-informed malaria surveillance and early warning systems, innovation and research for climate adaptation options for vector control, case management for long-term time frames based on climate-driven malaria model projections, institutional capacity development for cross-sectoral coordination across climate, environment, health and malaria stakeholders
 - ii. Mitigation options, e.g., low-carbon, environmentally sustainable waste management, carbon footprint and reduction of malaria health product supply chain.
 - b. Assess and select priority adaptation and mitigation options through scoring, ranking, or weighting and stakeholder engagement and validation.

³ Note: the Global Fund encourages inclusion of malaria and other climate-sensitive diseases in national climate adaptation plans.

- c. Undertake a climate public expenditure review of national malaria control program, building on the existing climate-related budgeting and expenditure review tools and initiatives in country.
- d. Costing of priority climate adaptation and mitigation options and developing of a climate finance plan to help finance climate adaptation and mitigation actions of the new National Malaria Strategy.
- e. Develop an implementation plan including activities, roles/responsibilities, timeframe, finance, M&E

Need for a multi-stakeholder and cross-sectoral coordination

1. Identify relevant stakeholders across climate, environment, health, malaria, and finance at national and sub-national levels.
2. Organize multi-stakeholder consultation workshops to bring together key stakeholders across climate, environment, health, and finance.
 - a. to take stock of key climate initiatives, tools, and funding mechanisms.
 - b. to conduct the malaria climate impact, vulnerability, and risk assessment and to identify and select priority climate adaptation and mitigation options for the new malaria strategy through a multi-stakeholder and participatory process.
 - c. to co-create the cross-sectoral and multi-stakeholder implementation arrangement for implementing, monitoring, and reporting on climate adaptation and mitigation actions of the new National Malaria Strategy.

List of stakeholders to consider

Sector	Focal Points
Climate focal points in the health sector	Those engaged in the National Framework for Climate Services
Climate services	National Meteorological Department climate-health focal points to the WMO
Climate, environment policy	Ministry of Environment, Climate change & forestry - Cabinet secretary - Principal secretary - UN Framework Convention on Climate Change (UNFCCC)⁴ focal point - National solid waste management strategy focal point, sustainable waste management act – climate clean air coalition
Disaster management	- National disaster management unit (NDMU) - National disaster operational center (NDOC) - County disaster management unit (CDMU)
Climate finance	The National Treasury – Green Climate Fund NDA Green Climate Fund direct access entities - National Environment Management Authority (NEMA)
Organizations working on climate services	ICPAC – IGAD Climate and Prediction and Applications Center ⁵ Ministry of Agriculture and Livestock (and actors working in these areas)

⁴ <https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change>

⁵ <https://www.icpac.net/>

Sector	Focal Points
	Regional Center for Mapping of Resources for Development⁶ Food and Agriculture Organization (FAO) Famine Early Warning Systems Network (FEWSNET) Red Cross/Crescent Society Water Resources Authority National Drought Management Authority Academic institutions Community and civil society organizations working on climate change and/or vulnerable communities

⁶ <https://www.rcmrd.org/en/>