



RBM Partnership To End Malaria

Thematic brief

Multisectoral Action to End Malaria

“How long will it be before our engineers stop building malaria in, instead of building it out?”

- American malaria field worker, op cit., 1924¹

Since the discovery in 1897 of the role mosquitoes play in transmitting the malaria parasite, scientists have recognized that human designed environments can either exacerbate or help to eliminate malaria.

Key messages

We must address malaria across all 17 Sustainable Development Goals (SDGs) as part of a broader strategy to achieve economic growth, environmental sustainability, and social inclusion by the year 2030.

Just as eliminating malaria will impact every one of the Sustainable Development Goals, so too do all government ministries, departments, and agencies in malaria-endemic countries have a role to play in the national multisectoral response to malaria. Through better planning and coordination, “malaria-smart” investments, and prioritising malaria-affected geographies and populations, multisectoral action will both promote and sustain the gains made by the health sector and national malaria programmes.

The first step is to identify the positive actions in other development sectors that can make a difference in reducing and eliminating malaria. **We need to stop inadvertently**

contributing to the spread of malaria and to use investments in energy, infrastructure and agriculture, among others, to build environments without malaria. This means we need to work multisectorally – to develop the social, economic, and physical environments that improve health, along with improvements in the health system itself.

Agriculture and construction can contribute inadvertently to the growth and spread of malaria. Without deliberate planning and commitment, efforts to expand farmland and build new infrastructure can create new breeding places for mosquitoes and increase exposure to dangerous and even deadly mosquito bites.

Better planning and leveraging of existing resources in other sectors, as well as identifying new opportunities to fight malaria outside of the health sector are crucially needed. Sustainably reducing the number of malaria cases in society requires the work of many sectors acting in concert.

Addressing Malaria in all SDGs to Leave No One Behind

The Sustainable Development Goals (SDGs) are driven by the values of leaving no one behind and raising the standards of living for all populations. As a disease inflicting incredible damage on the youngest, poorest, and most vulnerable populations in the world, malaria directly stands in the way of

the global ambitions driving all of the SDGs. Just as all of the SDGs can be considered from the vantage point of SDG 3: Good Health and Well Being for All, so too can the SDGs be considered multisectorally in the context of malaria elimination.

- | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Reducing malaria prioritizes the poorest, lowers health care costs, and increases household incomes.</p> |  |  | <p>2 Growing more food while reducing mosquito breeding helps to nourish children and better resist all infections.</p> |
| <p>3 Universal health coverage can provide equitable access to prevention services, including community based services and vector control interventions.</p> |  |  | <p>4 Reducing malaria improves school attendance. Better education also leads to greater access to health services.</p> |
| <p>5 Reducing malaria will free women and girls from caring for sick family members and reduce illness in pregnant women.</p> |  |  | <p>6 Better sanitation decreases mosquito breeding sites around homes and improves water quality for better health.</p> |
| <p>7 Access to energy for cooking, lighting, and fans may reduce exposure to vectors and improve mosquito net use.</p> |  |  | <p>8 Reducing malaria creates a healthier, more productive workforce among the poorest and most vulnerable.</p> |
| <p>9 Investing in R&D to develop new tools will accelerate malaria eradication.</p> |  |  | <p>10 Reducing malaria improves the health of the poorest, reducing health expenditures and increasing productivity.</p> |
| <p>11 Improved community planning and management and better housing reduces malaria transmission.</p> |  |  | <p>12 Promote consumption and production of quality-assured malaria products.</p> |
| <p>13 Warming conditions and extreme weather events can increase the spread of malaria.</p> |  |  | <p>14 Safe disposal of insecticides and proper bednet use will prevent contamination of water bodies.</p> |
| <p>15 Responsible insecticide management helps eliminate malaria while protecting biodiversity and preventing resistance.</p> |  |  | <p>16 Reducing malaria-exacerbated poverty supports institutions to help vulnerable populations.</p> |
| <p>17 Mobilizing partners across all sectors to address all aspects of malaria prevention, diagnosis, and treatment will accelerate progress to end malaria.</p> |  |  | |

Controlling Malaria and Doubling Rice Production in Africa

Rice production in Africa has doubled in the past decade and is set to double again to 50 million tons per year by 2030. While this will contribute to making great strides in improving agricultural productivity and fighting hunger, there remain huge risks for the transmission of malaria, as rice paddies form perfect breeding grounds for the mosquito vector species – especially in the African context. With proper planning Africa's ambitious rice production targets could advance a number of sustainable development goals. Without such planning, the unintentional consequences could undermine the overall health goals.

Integrating vector management into agriculture more generally, and particularly in rice production, will protect the gains made by the agricultural sector from the threats posed by malaria resurgence. It is possible to increase agricultural production without producing malaria-carrying mosquitos through:

- Alternate Wet and Dry (AWD) irrigation ensures that rice fields are intermittently dried out, killing mosquito larvae before they hatch.⁵
- A combination of applying biolarvicides with fertilizers to rice fields can maintain harvest yields while killing mosquito larvae.⁶
- Crop-substitution, rotation or planting more water-efficient crops.



Reducing Malaria with Access to Sustainable Energy

In addition to high levels of disease burden, malaria-endemic countries also share a common challenge in providing electricity to their citizens. Historically, the provision of durable electric power supplies has been associated with malaria elimination, including the Tennessee River valley after World War II, on the island of Mauritius in 1990, and along the Amu Darya River in Turkmenistan in 2009.² Particularly in high-burden malaria settings, access to electricity is often associated with both decreasing the risk of malaria infection and increasing access to diagnosis and treatment services.³ However, the relationship between electricity access and malaria transmission is complicated, both in terms of considering the role that electricity can play in shaping human behaviour as well as mosquito behaviour.⁴

In addition to improving malaria and other health-related outcomes, reaching the targets for Sustainable Development Goal 7: Ensuring access to reliable, sustainable, and modern energy for all, faces serious challenges in the highest malaria-burden countries, especially those in Africa.

- 600 million Africans remain without access to electricity
- Electricity access among rural populations, where malaria morbidity and mortality are most concentrated, is approximately 22%, compared with 78% for urban populations

Nevertheless, there exist mechanisms by which electricity access can promote positive malaria outcomes, especially in high-burden settings.

- Electricity for indoor lighting and cooking may limit people's exposure to mosquitos outdoors
- Use of electric fans may increase indoor sleeping and promote mosquito net use
- Electricity access for health facilities promotes longer facility operating hours
- Electricity access promotes economic growth in communities, which lead to improved health outcomes more generally



¹ J. A. LePrince, "What the Engineer can and should do toward prevention of malaria and mosquito nuisances," *The American Journal of Public Health* 14:12, 1035-37, 1924.

² Ministry of Health and Quality of Life Mauritius and the World Health Organization and the University of California, San Francisco (2012). Eliminating Malaria: Case study 4 | Preventing reintroduction in Mauritius. Geneva: The World Health Organization. World Health Organization. Global Malaria Programme & University of California, San Francisco. (2012). Achieving elimination in Turkmenistan. World Health Organization.

³ D. Roberts and G. Matthews, "Risk factors of malaria in children under the age of five years old in Uganda" *Malaria Journal* (2016) Apr 27; 15:246. D. P. Mathanga, A. K. Tembo, T. Mzilahowa, A. Bauleni, K. Mtimaukenena, T. E. Taylor, C. Valim, E. D. Walker, and M. L. Wilson, "Patterns and determinants of malaria risk in urban and peri-urban areas of Blantyre, Malawi," *Malaria Journal* (2016) Dec. 8; 15(1): 590.

⁴ Worall et al. found that in some cases lack of electricity access may promote treatment seeking at facilities – since poorer individuals were less likely to stock antimalarials and self-treat at home. E. Worrall, S. Basu, and K. Hanson, "Is malaria a disease of poverty? A review of the literature," *Tropical Medicines and International Health*, (2005) 10(10): 1047-59. Izadi found in the case of the low-transmission, elimination setting in Iran that electricity access demonstrated no obvious effect on malaria transmission. However, neither did potent interventions like IRS and LLINs. S. Izadi, "The effects of electricity network development besides routine malaria control measures in an underdeveloped region in the pre-elimination phase" *Malaria Journal* (2016), Apr 18, 15:222. On the role of light and malaria vectors, see A. Barghini and B. A. S. de Medeiros, "Artificial Lighting as a Vector Attractant and Cause of Disease Diffusion," *Environ Health Perspect.* (2010) Nov; 118(11): 1503-1506.

⁵ W. van der Hoek, R. Sakthivadivel, M. Renshaw, J. Silver, M. Birley, and F. Konradsen. (2001). Alternate Wet/Dry Irrigation in Rice Cultivation: A Practical Way to Save Water and Control Malaria and Japanese Encephalitis?. International Water Management Institute (IWMI), Colombo, Sri Lanka.

⁶ D. Humphrey, L. E. Mazigo, L. E. G. Mboera, S. F. Rumisha, and E. J. Kweka, "Malaria mosquito control in rice paddy farms using biolarvicide mixed with fertilizer in Tanzania: semi-field experiments," *Malaria Journal* 18 (2019), 18:226.

For more information

Please contact the RBM Partnership to End Malaria at info@endmalaria.org or visit our website endmalaria.org.