



# Epidemic prediction and response

Epidemics can occur when malaria attacks vulnerable populations with little or no immunity. In such situations, people of all age groups are at risk of death or severe disease. Epidemics of *Plasmodium falciparum* malaria, the most severe form of the disease, can be devastating if not controlled in a timely manner. The populations most at risk of epidemics are those living in highlands, arid and desert-fringe zones, as well as those living in areas where successful control measures have not been consolidated or maintained.

Factors that may precipitate a malaria epidemic fall into two categories: natural (climatic variations, natural disasters), and man-made (conflict and war, agricultural projects, dams, mining, logging, failure of control measures). Most of these factors make the physical environment more suitable for mosquitoes to transmit malaria. Other factors, such as local conflicts or development projects, produce massive population movements that expose non-immune populations to the malaria parasite.

Because malaria epidemics occur in populations not normally exposed to the disease, or who are exposed for only a short part of the year, local health services are usually unprepared to predict, detect and control such epidemics in time, resulting in severe cases and high death rates. When control measures are taken, they are often too late, under political pressure and implemented by using non-effective measures with minimal coordination and expertise, resulting in only a marginal benefit. Then, with the epidemic over, hard-won lessons are gradually forgotten, until the next epidemic comes along.

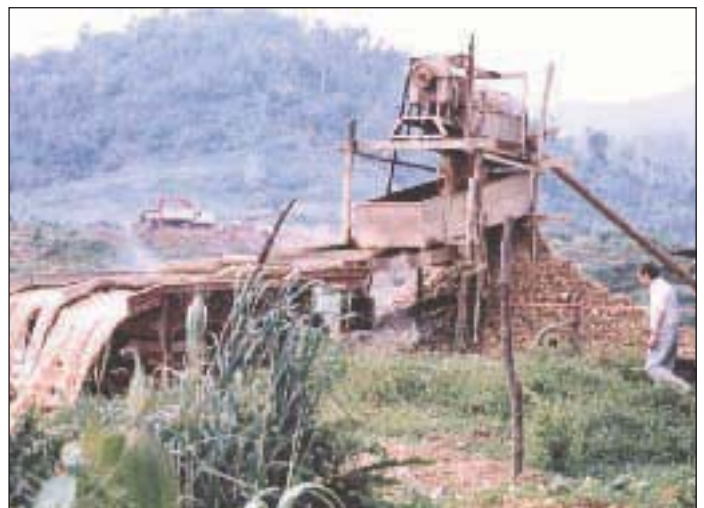
## RBM and epidemic response

The Roll Back Malaria global partnership is working to:

- Accurately forecast and predict the onset and potential impact of malaria epidemics.
- Map epidemic-prone areas and situations to focus surveillance.
- Improve early detection of developing epidemics through strengthening routine epidemiological data collection and analysis.
- Identify and select cost-effective and innovative control options.
- Improve timely access to effective interventions by stockpiling essential supplies.
- Improve the arsenal of strategies to curb mortality when epidemics arise.



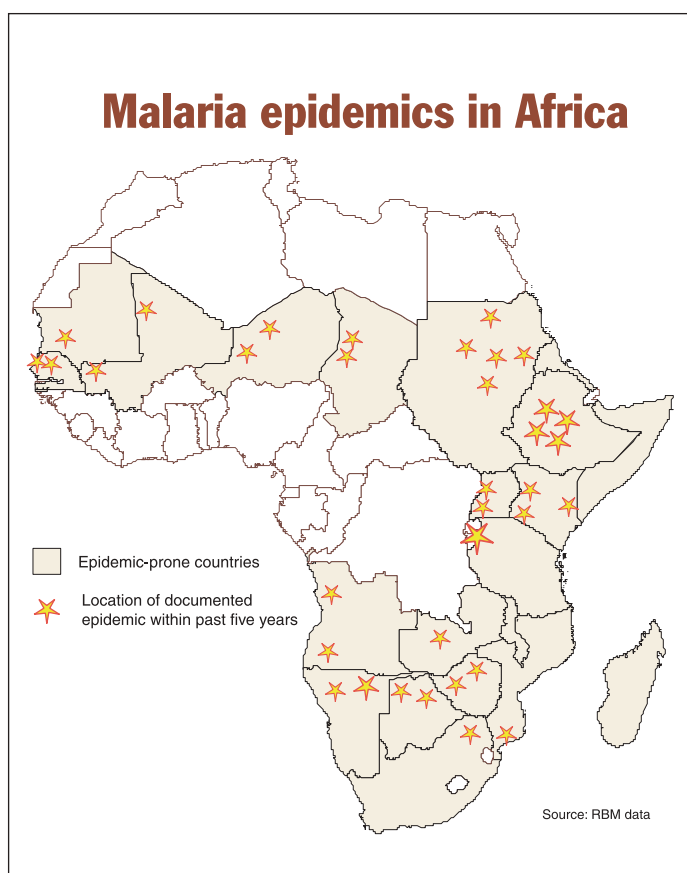
Above: flooding and other natural disasters can trigger malaria epidemics as can (below) man's economic exploitation of the environment such as mining, dams and irrigation projects.



To a large extent malaria epidemics are predictable, through a combination of socioeconomic and meteorological information and local epidemiological knowledge. Man-made epidemics, in particular, can be predicted with considerable precision, for example in relation to development projects, such as irrigation projects, fish ponds, dams, etc. Multisectoral action at the planning stage can help prevent them from occurring.

It is harder to predict malaria epidemics arising from natural causes. However, such epidemics tend to recur, and it is important to learn from past experiences. WHO, with RBM partners, has supported retrospective analyses of malaria epidemics in several African countries. The findings build evidence for practical WHO guidelines on malaria epidemic prevention and control in Africa. RBM and its partners are also supporting epidemic-prone countries in their efforts to develop comprehensive multisectoral epidemic warning systems that combine early detection, early warning/detection and long-range forecasting.

Such systems must include the routine use of valid and accurate indicators and request strong collaboration between the meteorological and epidemiological services from the Ministry of Health. Research aimed at validating epidemic indicators is currently taking place in eastern and southern African countries, including Ethiopia, Kenya, the United Republic of Tanzania and Uganda. RBM is exploring the possibility of establishing a regional technical network for Asian countries, focusing on analysing past experiences and establishing accurate forecasting indicators. Forecasting and early warning can reinforce local preparedness, and allow authorities and communities to use cost-effective and timely control options to prevent excessive deaths. Innovative control options during epidemics have to take into account more efficient therapies such as artemisinin-based combination therapies. RBM is also assisting countries to develop



strategies for epidemic preparedness and emergency action. RBM provides standard treatment protocols for potential epidemic situations, and promotes the stockpiling of efficacious antimalarial drugs and other essential supplies for rapid distribution in emergency situations.



Roll Back Malaria is a global partnership initiated by WHO, UNDP, UNICEF and the World Bank in 1998. It seeks to work with governments, other development agencies, NGOs, and private sector companies to reduce the human and socioeconomic costs of malaria.