

LOCATION

Ethiopia

PARTNER

UNIVERSITY OF GREENWICH,
NATURAL RESOURCES
INSTITUTE, UK

The Natural Resources Institute (NRI) is an internationally recognised, multi-disciplinary centre for research, training and consultancy for the management of natural and human capital to support sustainable development worldwide.

SUMMARY

The project aimed to determine whether the established technology used for controlling tsetse and tick-borne diseases with insecticide-treated cattle could also be used to control malaria in rural areas, where livestock plays an important role in sustaining malaria-transmitting mosquitoes.

PERIOD OF FUNDING

June 2001 to December 2002

GRANT

£51,913

CONTACT

Gabriella Gibson on
g.gibson@greenwich.ac.uk
Tel: +44 (0)1634 883379
Website: www.nri.org

Controlling malaria and trypanosomiasis with insecticide-treated cattle

BACKGROUND

In developing countries, poor communities feel the debilitating effects of malaria most acutely. Poor people are more likely to contract malaria than wealthier people, and time off work because of malaria reduces both productivity and income.

There are already effective technologies for reducing malaria transmission for a large area of sub-Saharan Africa, such as insecticide-treated bed-nets. In areas where the insect carrying the disease parasite (the vector) is not as susceptible to the standard control methods, modifications to technologies originally designed to tackle other problems might make malaria control more cost-effective and therefore more available to poor communities.

One example of this is adapting existing **insecticide-treated cattle (ITC)** programmes for use in malaria control. ITC is already used for controlling

ITC is already used for controlling tsetse flies which are vectors of trypanosomiasis around cattle in sub-Saharan Africa.



tsetse flies which are vectors of trypanosomiasis around cattle in sub-Saharan Africa. In some of these tsetse-infested areas, the main malaria-carrying mosquito is *Anopheles arabiensis*, which obtains half of the blood it needs to survive from humans and half from cattle, and so is vulnerable to being killed by ITC.

Local livestock owners identify trypanosomiasis in cattle and malaria in humans as the diseases that impair their health and livelihoods the most. For many livestock owners, cattle are the main source of wealth and nutrition, as well as being used for load pulling. Trypanosomiasis in cattle results in poverty, as infected animals become progressively weaker, produce less milk and frequently die from the disease if they do not receive adequate drug treatment. Farmers attempt to minimise the risk of both malaria and trypanosomiasis by living and working in the highlands where mosquitoes and flies are less widespread. However, environmental degradation and increasing population densities are forcing people to occupy potentially more productive lowlands, thereby putting themselves and their cattle at greater risk of disease.

THE PROJECT

The KaR-funded project implemented by the **Natural Resources Institute (NRI)** in August 2001 builds on the existing tsetse-control initiatives of livestock owners and non-governmental organisations in southern Ethiopia, managed by the **Konso Development Association** and **FARM Africa**. The objective of this project is to provide evidence that ITC can kill a sufficient proportion of the mosquito population to break the transmission cycle of malaria, an approach that has never been tested in sub-Saharan Africa before.

The objective of this project is to provide evidence that ITC can kill a sufficient proportion of the mosquito population to break the transmission cycle of malaria, an approach that has never been tested in sub-Saharan Africa before.

Initial trials of ITC against tsetse in these areas have been well received. Community-based ITC projects pool the resources of poor communities, and enable families to reap the benefits of a relatively small investment in the cost of protecting their animals from disease. Communities are provided with a pour-on formulation of insecticide to treat their cattle. The NRI project has established that the same insecticide and methodology also kills mosquitoes. Cattle owners can use the insecticide-application method they are familiar with to treat their cattle and so do not have to learn any new techniques.

Local livestock owners identify trypanosomiasis in cattle and malaria in humans as the diseases that impair their health and livelihoods the most.

Initial trials of ITC against tsetse in these areas have been well received. Community-based ITC projects pool the resources of poor communities, and enable families to reap the benefits of a relatively small investment in the cost of protecting their animals from disease. Communities are provided with a pour-on formulation of insecticide to treat their cattle. The NRI project has established that the same insecticide and methodology also kills mosquitoes. Cattle owners can use the

Further activities of the project will:

- identify quantitative relationships between the density and distribution of cattle and people, and the transmission of malaria
- identify quantitative data on the effects of ITC on mosquitoes and make recommendations on the suitability of ITC to control mosquitoes and tsetse in the project area in particular, and tsetse-infested areas of Africa in general.

LESSONS LEARNED

- Early findings by the project indicate that malaria mosquitoes are susceptible to being killed by the standard insecticide treatment used to control tsetse.
- While the effective life of the insecticide is only up to ten days, there appear to be opportunities to improve the cost-effectiveness of the insecticide application, for example, by spraying the parts of the cattle from which the mosquitoes and tsetse most commonly feed.

FUTURE PLANS

The KaR-funded part of this project is complete. However, the wider project continues to investigate the limits within which ITC might succeed in controlling both malaria and trypanosomiasis. The next stage will be to determine the potential effectiveness and acceptability of ITC in a range of areas that reflect the diversity of human ecosystems where livestock are the main source of livelihood, for example, in the agro-pastoralist communities of the **Horn of Africa, Tanzania and Zimbabwe**.

Technical and socioeconomic studies will be conducted, focusing on:

- the diversity, abundance and epidemiological significance of local vectors of malaria
- malaria prevalence
- the effect of cattle-management practices on malaria transmission
- stakeholders' perceptions of the risks and benefits involved with disease control of this kind.

Results will be incorporated into models designed to predict the practical and economic viability of this approach to malaria control.