

# One Health working brings widespread Rift Valley fever out of the shadows



**Government at the highest level is listening to researchers as they reveal the hidden health impact of transforming rangeland into irrigated farmland.**

RIFT Valley fever (RVF) is a disease of sheep, goats, cattle and camels. It is caused by a virus carried by mosquitoes. The disease can also be transmitted to people, both through mosquitoes and through the body fluids of infected animals.

In livestock, RVF causes abortions, stillbirths and the death of young animals, and so severely affects livestock

productivity, including herd viability. In people, it mainly causes a flu-like illness, though in rare cases illness is severe, even causing death.

Epidemic occurrences of RVF have huge, known impacts and can make global headlines. A lot of attention has rightfully focused on RVF epidemics. But what had been less well understood and little investigated was the extent

of endemic occurrence of the disease – that is, its low-level but generalised persistence within particular areas.

## **Knowledge gaps**

Endemic transmission of RVF was known to be common in rural areas near rivers in Kenya but the impact of this mode of transmission, and the identification of the potential drivers of it, such as land-use change, had not been identified.

Important, fundamental questions remained to be answered: are endemic occurrences of RVF beneficial, in that they boost immune responses in the periods between epidemics? Or are they disastrous, silent occurrences of community ill-health, and at times death, with accompanying impacts on wellbeing and livelihoods?

The Dynamic Drivers of Disease in Africa Consortium applied a One Health framework to gauge the impacts of the disease at the livestock-human interface, working in the north-east of the country. This saw human and animal health experts, anthropologists, economists, entomologists and other



Children and livestock Image: Bernard Bett

scientists working together to gain a holistic understanding of the problem.

Socio-economic studies showed that knowledge on how people acquire RVF was poor. Researchers found that pastoralists considered mosquito bites to be the main way in which people could

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be infected. There was little understanding that the fluids that people could come into contact with while caring for animals, assisting at births or slaughtering animals presented a risk.

There were also differences in the levels of knowledge about RVF between people in pastoral and people in irrigated areas, with people in irrigated areas showing considerably less knowledge of the disease.

This has significant risk implications as the number of people testing positive for RVF was found to be higher in riverine and irrigated areas compared to pastoral areas. The density of mosquitoes, including those species known to transmit RVF, was also found to be relatively high in irrigated areas, most likely as a result of the presence of large masses of standing water in drainage canals and on farms. Both are good breeding grounds for the mosquitoes.

The analysis of land-use changes also showed that the conversion of rangeland into crop land through irrigation has resulted in extensive habitat degradation. The density in these areas of large mammals such as buffaloes, elephants, giraffes and impalas fell, suggesting that land-use changes have reduced biodiversity.

An RVF dynamics model integrating the epidemiological processes involved in disease transmission and a socio-economic module for estimating impacts is now being finalised. It is expected to bring the impacts of endemic infections to light. Importantly, it will be used to identify intervention measures.

Results from the surveys

of blood serum, especially those indicating exposure of people to multiple diseases transmitted from animals (zoonoses), have attracted much interest. For example, the research showed that more than one in 10 apparently healthy people test positive for the RVF virus and *Brucella* antibodies, suggesting previous exposures to both of these disease-causing agents (pathogens) placing a great burden on poor, rural people.

### **New partners**

A concept note has been developed seeking to identify the ecological factors that predispose people to these pathogens. It takes further the partnerships developed in the Drivers of Disease consortium and, with the addition of new partners, builds on them. Importantly, it brings in the Kenya Zoonotic Disease Unit (ZDU) as a senior partner. The ZDU is a policy institution directly linked to both Kenya's Ministry of Health and Ministry of Agriculture, Livestock and Fisheries. It is mandated to promote One Health practices, including the harmonisation of interventions for zoonoses in the country.



Irrigated farmland, formerly rangeland. Image: Bernard Bett

*This is one of a series of impact case stories produced by the Dynamic Drivers of Disease in Africa Consortium, an ESPA-funded research programme designed to deliver much-needed, cutting-edge science on the relationships between ecosystems, zoonoses, health and wellbeing with the objective of moving people out of poverty and promoting social justice. Find more info at [www.driversofdisease.org](http://www.driversofdisease.org).*

