

Heartwater, caused by the rickettsial organism *Cowdria ruminantium*, is a serious constraint to livestock development in much of sub-Saharan Africa. Traditionally, the disease has been controlled by the use of chemical acaricides to control the vector tick. The University of Florida/USAID-supported heartwater research project (based in Zimbabwe) is developing a new inactivated vaccine to control the disease. In order that the vaccine is used effectively, the project has been studying the epidemiology of the disease in different livestock production systems of Zimbabwe, and evaluating the economic impact of the disease and of its future control using a vaccine such as the one under development. Initially, field studies were conducted to characterise the communal and commercial livestock-productions systems at risk from heartwater and to understand the epidemiology of the disease. The data from these studies were then applied to an infection-dynamics model of heartwater, which was used to provide estimates of disease incidence and impact under various scenarios over a period of 10 yr. Two principal outputs of the epidemiological model (cumulative annual heartwater incidence and infection-fatality proportion) were key inputs into an economics model. The estimated total annual national losses amount to Z\$ 61.3 million (US\$ 5.6 million) in discounted value terms over 10 yr. Annual economic losses per animal in the commercial production system (Z\$ 56 discounted values) are 25 times greater than the losses in the communal system (Z\$ 2.2). The greatest component of economic loss is acaricide cost (76%), followed by milk loss (18%) and treatment cost (5%). Losses in outputs other than milk (beef, traction and manure) appear to be minimal. A new vaccine has the promise of a benefit : cost ratio of about 2.4 : 1 in the communal and 7.6 : 1 in the commercial system. A control strategy based on a new vaccine would yield additional non-financial benefits to farmers and the government resulting from reductions in the use of chemical acaricides.