

SUSTAINABILITY AND ECONOMIC BENEFITS OF TSETSE CONTROL USING AN INSECTICIDE POUR-ON APPLIED TO CATTLE IN SOUTHWEST ETHIOPIA

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A tsetse control campaign using an insecticide 'pour-on' applied monthly to village zebu cattle in a region in Southwest Ethiopia has provided long-term sustainability since 1991 resulting in major economic benefits to the farming community. During the last four years farmers have paid a cost-recovery price for each animal given treatment. Relative densities of tsetse and biting flies fell by 95% during the second year of vector control. Despite very high levels of drug resistance, trypanosomal prevalence in cattle has been reduced by 63% and the number of curative trypanocidal treatments per animal by 50%. Significant improvements in livestock productivity have led to benefits outweighing the costs of control by a factor of 12 to 1, contributing to increases in individual household income of between 10 and 34%.

Trypanosomosis is a serious constraint to livestock production in much of sub-Saharan Africa. In Ethiopia alone there are 21 million cattle of which 6 million are at risk of the disease. Control of trypanosomosis through drugs is becoming increasingly difficult because of widespread drug resistance. An alternative solution is to utilise improved methods of vector control but these methods need to be sustainable and epidemiological factors that might influence the chances of success fully researched. In South west Ethiopia vector control has been in operation since 1991 which gives one example of long-term sustainability resulting in major economic benefits to the farming community. The method has used an insecticidal synthetic pyrethroid cypermethrin 'pour-on' applied monthly to village zebu cattle in the region. During the last four years the control of tsetse has been sustained by the farmers themselves who bring their own cattle and pay a cost-recovery price for each animal given treatment. A sentinel village herd of approximately 100 zebu cattle has been monitored since 1986 for health and productivity, thus allowing the impact of tsetse control to be measured against pre-control data. Relative densities of tsetse and biting flies fell by 95% by the second year of vector control. Despite high levels of drug resistance, overall trypanosomal prevalence in cattle has been reduced by 63% and the number of curative trypanocidal treatments per animal by 50% (see Table I). Before tsetse control intervention there were fewer than 500 cattle in the area; now, six years later, up to 6,500 cattle may be brought for 'pour-on' treatment in a month.

Table I
The effect of tsetse control on health and performance of cows in a sentinel herd of 100 cattle

	Before tsetse control (1986 - 1990)	During tsetse control (1992 - 1995)
Monthly trypanosomal prevalence (%)	39.1 ± 3.9 ^a	14.4 ± 2.5
Monthly trypanocidal treatment incidence (%)	39.3 ± 4.2	19.7 ± 3.2
Mean body weight (kg)	197 ± 3.5	206 ± 2.2
Abortion and calf mortality	10/52	5/68
Calf/cow ratio	0.49 ± 0.03	0.67 ± 0.08

^aStandard error of annual mean values.

Significant improvements in productivity of cattle in the sentinel herd have been demonstrated, e.g. a 62% reduction in abortion rate and calf mortality, a 37% increase in calf/cow ratio and a 5% increase in cow body weight (see Table I). A deterministic model was used to simulate and compare outputs in terms of meat and milk assuming no increase in herd size under situations of tsetse and no tsetse control. The results showed that major economic benefits have accrued both to individual farmers and to the region as a whole. The reduced expenditures on trypanocidal drugs (US\$39,000 per year among households in the region covered by tsetse control), for example, more than offset the cost of the pour-on (US\$16,000) used in the region. The additional benefits of increased output of meat (40% more) and milk (30% more) were valued at US\$146,000. This led to a benefit/cost ratio of 11.6 in the second year. When expected benefits were spread over 10 years and discounted to the value of today's dollar, the overall benefit/cost ratio was 9.3. Two thirds of households own cattle (one third 1-3 and one third 4-56 cattle). When the above net benefits were expressed in terms of average household income they represented average increases in annual income of between 10 and 34% per household.

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