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# Economics of an East Coast fever immunization trial at the Kenya Coast

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This paper summarizes the results of a financial analysis of an East Coast fever (ECF) immunization trial at the Kenya Coast. The details of the trial methodology, design and bioeconomic data generated are presented by Morzaria et al. (1988) and by Morzaria elsewhere in these proceedings.

Eighty beef cattle were immunized and a similar group of 80 were left unimmunized as a control. The immunized group was divided into 4 sub-groups of 20 animals each, the sub-groups identified as A, B, C and D. The control group was also divided into 4 sub-groups (E, F, G and H) of 20 animals each. Sub-groups A and E were sprayed with an acaricide twice a week, B and F were sprayed once every 3 weeks, C and G had prolonged-release acaricide-impregnated ear tags inserted into each animal ear, and D and H had no tick control treatment.

All groups were maintained and grazed together in an ECF-endemic area on a farm for 9 months, starting in May 1985. The bioeconomic data collected at the end of the trial included starting and ending liveweights; the numbers of surviving animals; the numbers and causes of deaths; and the quantities and costs of materials, drugs, acaricides and veterinary services used for each sub-group. Partial budgeting was used to derive gross benefits, costs that vary among subgroups, and net financial benefits per kg of starting liveweight for each subgroup. Dominance analysis was used to identify dominant and dominated subgroups. This was done first by listing the sub-groups in the order of their increasing costs that vary per kg of starting liveweight with corresponding net benefits. Any sub-group that had net benefits that were less than or equal to those of a sub-group with lower costs that vary was identified as dominated. Conversely, any sub-group with net benefits that were equivalent or greater than those of a sub-group with higher costs that vary was identified as dominant. A farmer would not choose a dominated practice over a dominant one, because the former would have higher costs and lower benefits than the latter. It is the dominant sub-groups that are candidates for recommendation to the farmer.

Marginal analysis was used to calculate marginal rates of return of the dominant sub-groups and to identify the sub-group that would maximize financial benefits to the farmer.

The gross benefits for treatments A, B, C, D, E, F, G and H were Kenya shillings (KShs) 12.50, 11.35, 11.71, 11.88, 11.39, 8.71, 9.07 and 8.30, respectively (KShs 16.00 = US\$1, January 1986). The costs that vary were KShs 0.81, 0.55, 0.71, 0.63, 0.62, 0.90, 1.21 and 1.15, respectively. The net benefits per kg of starting liveweight were therefore KShs 11.69, 10.80, 11.00, 11.25, 10.77, 7.81, 7.86 and 7.15, respectively.

Sub-groups C, E, F, G and H were dominated. Sub-groups B, D and A were dominant in that order of increasing net benefits. The marginal rate of return between B and D was 562.5% and between D and A was 244.4%. In financial terms, sub-group A generated the highest benefits

to the farmer in this trial.

The analysis shows that the immunized sub-groups yielded greater financial benefits, due to lower ECF mortality and higher weight gains, than the non-immunized sub-groups. Of the immunized sub-groups, the one that was sprayed with acaricide twice a week yielded the highest financial benefits. However, such intensive use of acaricides would not be recommended for widespread adoption, because acaricides are becoming increasingly more expensive and less available for smallholder farmers in many countries affected by ECF.

These results demonstrate that immunization is financially superior to non-immunization, but that the frequency of acaricidal application after immunization for tick and other tick-borne disease control requires further on-farm research under various environmental conditions.

#### REFERENCE

Morzaria, S.P., Irvin, A.D., Wathanga, J., D'Souza, D., Katende, J., Young, A.S., Scott, J. and Gettinby, G. (1988). The effects of East Coast fever immunization and different acaricidal treatments on the productivity of beef cattle. *Veterinary Record* 123: 313-320.

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