A Living from Livestock
Pro-Poor Livestock Policy Initiative

Comparable Costings of Alternatives for Dealing with Tsetse: Estimates for Uganda

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EXECUTIVE SUMMARY

As the activities and capacity of veterinary institutions have declined across sub-Saharan Africa, control of trypanosomiasis has been left largely in the hands of farmers, who spend US$ 30 to 40 million a year on trypanocides to protect their livestock. The launching of the Pan-African Tsetse and Trypanosomiasis Eradication Campaign (PATTEC) has mobilised support from African leaders and funding which may provide the continent with a window of opportunity to intervene effectively to control the disease. But only if its initial programmes are seen to be successful – in terms of the areas targeted, the goals set, their effectiveness in dealing with tsetse and their cost – will governments, donors and livestock keepers invest in further tsetse control rather than continue to rely on trypanocides.

In this context it is vital that not only the entomological efficacy of the different techniques at our disposal is studied, but also their relative cost. Most studies of the costs of tsetse control have analysed different control methods based on comparisons from different countries, calculated at different times, including different cost components for projects with different management structures, duration and objectives (see Shaw, 2004). The only two studies undertaken which consistently compare the costs of more than two techniques in one country at one point in time are Barrett (1997) for Zimbabwe and Brandl (1988) for Burkina Faso.

This report presents the initial results from a comparative costing exercise for Uganda. It takes as it starting point the area extending to 40,000 km^2 initially targeted by PATTEC for the creation of a tsetse-free zone in south eastern Uganda, located in a crescent around Lake Victoria's north-western shore and extending to cover the southern part of the Lake Kyoga basin. In this area the predominant fly is *Glossina fuscipes fuscipes* and some areas have also been shown to have localised infestations of *G. pallidipes* (Magona *et al*., 2005, Waiswa *et al*., 2006). Using the most recent census data for Uganda, the core infested area of 20,000 km^2 along Lake Victoria was estimated to contain some 750,000 cattle and 4.9 million rural inhabitants, more than half of whom (2.6 million) subsist on less than $1 a day.

This study integrated approaches from three disciplines. Firstly, geographic information system (GIS) techniques were used to combine modelled tsetse distributions (http://www.fao.org/ag/AGAinfo/programmes/en/paat/maps.html) with estimates of cattle and human populations. Secondly, a tsetse population dynamics model (Vale & Torr, 2005; http://www.tsetse.org) was used to simulate over time the effects of four methods: traps deployed at densities of 10 km^{-2} against *G. fuscipes* or at 4 km^{-2} against savannah tsetse; different densities of cattle treated with insecticide applied to the whole body or only the legs and belly (ITC); aerial spraying using the sequential aerosol technique (SAT) and the sterile insect technique (SIT) following suppression for 90 days using an insecticidal technique. Thirdly, published information on the costs of the different techniques was combined with data from ADB *et al*. (2004) and current prices for staff and materials in Uganda. These were incorporated in an Excel™ spreadsheet so that prices, quantities and other assumptions could be varied and sensitivity analyses be conducted. The

economic analysis included the preparation and monitoring time required for each technique, its field cost as well as administrative overheads and preparatory studies. Following standard practice for livestock projects, all costs were discounted to their present value at the time point when active tsetse control in the field began, using a discount rate of 10%.

These costs were divided into the field costs (the direct costs of deploying the tsetse control method in the field), the cost of accompanying studies (tsetse surveys, parasitological surveys, environmental monitoring and socio-economic studies) and the administrative overheads. The studies and overheads were taken to be the same for each method in the baseline analyses, but possible reductions were examined for some scenarios. The results for isolated populations showed that the costs km^{-2} of the different techniques increased in the order: ITC (US$ 130–400), traps for savannah flies (US$ 400-500), SAT (US$ 500–600), traps for G. fuscipes (US$ 900) and SIT (US$ 1,000–1,300). Compared with earlier studies, refinements to all approaches have reduced their relative costs thus narrowing the differentials among them. The results for non-isolated tsetse populations showed that using a barrier on one side for a three-year period to prevent reinvasion increased costs by 15–60%, with the higher level increases associated with the use of a target barrier alongside savannah flies and the lower cost increase with the use of ITC as a barrier.

This study's aim was to provide a rigorous framework for comparing the cost of different techniques and a series of consistent cost estimates that can be improved on by further field work and trials. These estimates are particularly sensitive to some of the assumptions made – for example the price of flying time for aerial spraying and deployment of sterile males. The cost of SIT is affected by the lead time for developing a colony to produce sterile males and the added cost of a suppression technique, which in principle could itself eliminate tsetse. However, there may be circumstances in which combinations of tsetse control techniques are the most suitable approach, particularly where several species of *Glossina* are present. The calculations undertaken here make it possible to estimate the costs of combined approaches and to select the most cost-effective. Recent research has shown that the restrictive application of insecticide greatly reduces the cost of ITC. Ongoing trials in Uganda will help to quantify this in a field context (Welburn *et al.*, 2006). Thus, although the real costs of the different methods have fallen slightly over time and the differentials between them have narrowed, there remain substantial differences in costs. For this reason it is essential that planners give careful thought to choice of technique on economic as well as on entomological grounds. The selection of cost-effective measures needs to be a component of all poverty alleviation strategies and this study highlights the need to include it in the field of tsetse and trypanosomiasis control.

Inevitably, there remain unanswered questions both about the costs of the techniques and about their efficacy in different situations and against different species of *Glossina*. The questions about costs mainly reflect either uncertainty about technical efficacy or questions about the type of organisation, and in particular the level of administration, management and accompanying studies required. The questions about the relative efficacy of the different techniques will partly be answered by further field experience. However, in the light of the decisions facing planners in this field at the moment, it is strongly recommended that an effort be made firstly to review past tsetse control and elimination schemes and identify their strengths and weaknesses and the reasons for their successes and failures and, secondly, that the tsetse community give some thought to preparing generally agreed guidelines for choice of technique on technical grounds, reflecting a consensus on the situations in which each technique performs best and defining where it is suitable, unsuitable or needs to be deployed alongside another technique to produce the best results.

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