

## Knowledge and attitudes of cattle owners regarding trypanosomosis control in tsetse-infested areas of Uganda

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### ABSTRACT

A pilot survey using a structured questionnaire was conducted in Tororo and Busia districts of Uganda on the knowledge and attitudes of cattle owners regarding tsetse fly and trypanosomosis control, in order to understand factors that hindered their full participation. A total of 81 cattle owners was randomly selected and interviewed, of which 92.5 % were aware of tsetse flies and trypanosomosis and 87.6 % recognised animal trypanosomosis as a problem in the area. Most cattle owners were aware of tsetse fly trapping (76.5 %), isometamidium chloride use (55.5 %), diminazene aceturate use (48 %) and pour-on applications (18.5 %). However, knowledge did not coincide with the application of control measures. Despite the widespread awareness, tsetse fly trapping and pour-on applications were used by only a small percentage of cattle owners (7.5 % applied tsetse fly trapping while 76.5 % were aware of it; 1.2 % applied pour-on insecticides while 18.5 % were aware of them). Differences between awareness and application were highly significant for tsetse fly trapping ( $\chi^2 = 67.8$ , d.f. = 1,  $P < 0.001$ ) and pour-on applications ( $\chi^2 = 10.8$ , d.f. = 1,  $P < 0.05$ ), but not for isometamidium chloride use ( $\chi^2 = 0.08$ , d.f. = 1,  $P = 0.77$ ) and diminazene aceturate use ( $\chi^2 = 0.00$ , d.f. = 1,  $P = 1.00$ ). Most cattle owners (97.5 %) were willing to participate in future control programmes, but preferred participating on a group basis (85.2 %) rather than individually (14.8 %). The 4 most favoured control options in order of importance were: fly traps supplied by the government and maintained by cattle owners; contribution of labour by cattle owners for trap deployment; self-financing of trypanocidal drugs and self-financing of pour-on insecticide. The control options that should be selected in order to elicit full participation by cattle owners are discussed.

**Key words:** cattle, trypanosomosis, tsetse fly, Uganda.

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### INTRODUCTION

Control of tsetse flies and both human and animal trypanosomosis in Tororo and Busia districts of southeastern Uganda was effectively carried out between 1991 and 1995. The programme involved large-scale deployment of insecticide-impregnated pyramidal traps<sup>6</sup> integrated with limited application of pour-on and chemotherapy against animal trypanosomosis<sup>8</sup>. In these areas, during the period 1991 to 1995, the apparent density of tsetse flies and the detected prevalence of animal trypanosomosis was reduced by 95–99.5 % and 79–94 %, respectively<sup>8</sup>, and human trypanosomosis was effectively controlled. However, due to lack of a sustained supply of control materials and

drugs because of lack of investment for sustaining disease management programmes, trypanosomosis has become increasingly difficult to control in southeastern Uganda.

It is now recognised that the top-down approach of tsetse and trypanosomosis control has failed and the only successful interventions in the control of especially bovine trypanosomosis will be the farmers' own (R J Connor, pers. comm.). An alternative would be to have community-level management control programmes in which government offers technical support<sup>5</sup>. However, many such tsetse fly and trypanosomosis control programmes have failed because of lack of individual incentives arising from the provision of public goods, e.g. maintenance of tsetse fly traps/targets<sup>1</sup>. Within areas where the human form of trypanosomosis is common and where a major community incentive would be expected, it is not easy to identify incentives that could mobilise

the whole population<sup>1</sup>. However, it was recognised that it was important to identify incentives in southeastern Uganda that could motivate farmers' full or partial participation in area-wide tsetse fly and trypanosomosis control programmes. This paper reports on the findings of a survey of the knowledge and attitudes of cattle owners regarding trypanosomosis control conducted as a sequel to a donor-funded area-wide tsetse fly and trypanosomosis control programme in Tororo and Busia districts in southeastern Uganda.

### MATERIALS AND METHODS

#### Location of study area

Tororo and Busia districts are located north of Lake Victoria in southeastern Uganda. The vegetation and climatic conditions in the districts are similar. The vegetation is mainly composed of savanna grassland interspersed with *Lantana camara* shrubs. Thick forests and swamps are found along rivers and streams, which form suitable habitats for *Glossina fuscipes fuscipes*, a riverine tsetse fly species that is predominant in the study area<sup>3,10</sup>. Another species, *G. pallidipes*, is scarce<sup>7</sup>. Animal trypanosomosis due to *Trypanosoma brucei*, *T. congolense* and *T. vivax* is endemic<sup>8</sup> and outbreaks of human sleeping sickness due to *T. brucei rhodesiense* often occur. The area receives 1200–1500 mm rainfall annually, which is bimodal in nature: 2 wet seasons (March–May) and (September–November), and 2 dry seasons (December–February) and (June–August). The mean relative humidity is 65 % and the daily mean temperatures range between 15 °C (minimum) and 27 °C (maximum).

Most cattle owners in the study area keep livestock and also cultivate crops. Zebu cattle are the most common livestock breed kept under traditional management, where cattle are grazed or tethered on communal land during the day and kept in kraals or tied near homesteads at night. Cotton is the major cash crop grown in the area, but cassava, millet, maize, beans, sweet potatoes, sorghum and rice are the main food crops. Under

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this mixed farming system, farm sizes are usually small (<2 acres) and the majority of cattle herds are also small (below 10). In a previous study conducted in Tororo and Busia districts, 71–83 % of herds comprised 10 or fewer head of cattle, 16–21 % had 11–20 and 1–8 % had more than 20<sup>9</sup>.

#### Selection of cattle owners for interviews

During selection of cattle owners, the area covered by the previous tsetse and trypanosomosis control project in Busia and Tororo districts<sup>2</sup>, was stratified according to administrative units. A multistage sampling technique was used to select 8 administrative units out of a total of 12 in the 2 districts. Four of 6 administrative units were randomly selected from each district and at least 10 farmers were randomly selected from approximately 50 listed cattle owners in each unit. Participation of village administrators was sought during the administration of questionnaires to create an environment conducive to interviews and to mitigate the potential bias associated with the mistrust cattle owners could have towards outsiders asking questions. A total of 81 cattle owners, comprising 41 from Tororo district and 40 from Busia district, were interviewed.

#### Administration of questionnaires

Visits were made to households and structured interviews were carried out using a standard questionnaire. The questionnaire was pre-tested on a pilot basis and questions were made precise, in order to shorten the interrogation of the respondents. A single interviewer with good knowledge of the local conditions, languages, people, geography and experience of the previous control activities in the area, conducted all the interviews. This was in response to the recommendation made from previous studies that highlighted the importance of a single interviewer of local origin conducting all interviews<sup>12</sup>. The interviewer was trained for 3 days and was introduced to the farmers during household visits by the village administrators and local veterinary staff, whereafter he was left to conduct the interviews alone.

Information was sought on awareness of tsetse flies and trypanosomosis, importance of trypanosomosis, awareness of and experience with the various control methods, willingness to participate in future control programmes, participation arrangement preferences and control option preferences, with possible reasons for their preferences. Data analysis was conducted using the statistical package Minitab (Minitab Inc, Pennsylvania, USA).

Table 1: Level of awareness about tsetse flies and trypanosomosis and their control methods among cattle owners interviewed in the Tororo and Busia districts of southeastern Uganda.

	District		Entire study area n = 81
	Tororo n = 41	Busia n = 40	
Awareness of tsetse flies and trypanosomosis (%)	87.5	100	92.5
Recognition of trypanosomosis as a problem (%)	87.8	87.5	87.6
Awareness of any control measures (%)	78	92.5	85.2
Awareness of tsetse fly trapping (%)	78	75	76.5
Awareness of pour-on applications (%)	22	15	18.5
Awareness of isometamidium chloride use (%)	43.9	67.5	55.5
Awareness of diminazene aceturate use (%)	36.6	60	48

## RESULTS

Of the 81 cattle owners interviewed, 92.5 % were aware of tsetse flies and trypanosomosis, and 87.6 % recognised animal trypanosomosis as a problem (Table 1). Respondents were familiar with tsetse trapping, pour-on (Spoton<sup>®</sup>, Coopers) application, use of isometamidium chloride (Samorin<sup>®</sup>, Rhône Merieux) and diminazene aceturate (Diminaveto<sup>®</sup>, VMD) as control measures against tsetse flies and animal trypanosomosis. Most of them (85.2 %) knew about at least 1 control method, but the level of awareness of the various control methods differed depending on the area. Most cattle owners, independent of the area, were aware of tsetse trapping

(76.5 %), followed by isometamidium chloride (55.5 %), diminazene aceturate (48 %) and pour-on application (18.5 %). Whereas the level of awareness among cattle owners interviewed in Busia was over 50 % for all the control methods, apart from pour-on application, the level of awareness among their counterparts in Tororo was below 50 % for all control methods, apart from tsetse fly trapping.

The level of awareness and experience with various control measures of cattle owners from different areas are compared in Fig. 1. Despite the high awareness, tsetse trapping and pour-on application were used by only a small percentage of cattle owners (7.5 % applied tsetse fly trapping while 76.5 % were aware of it;

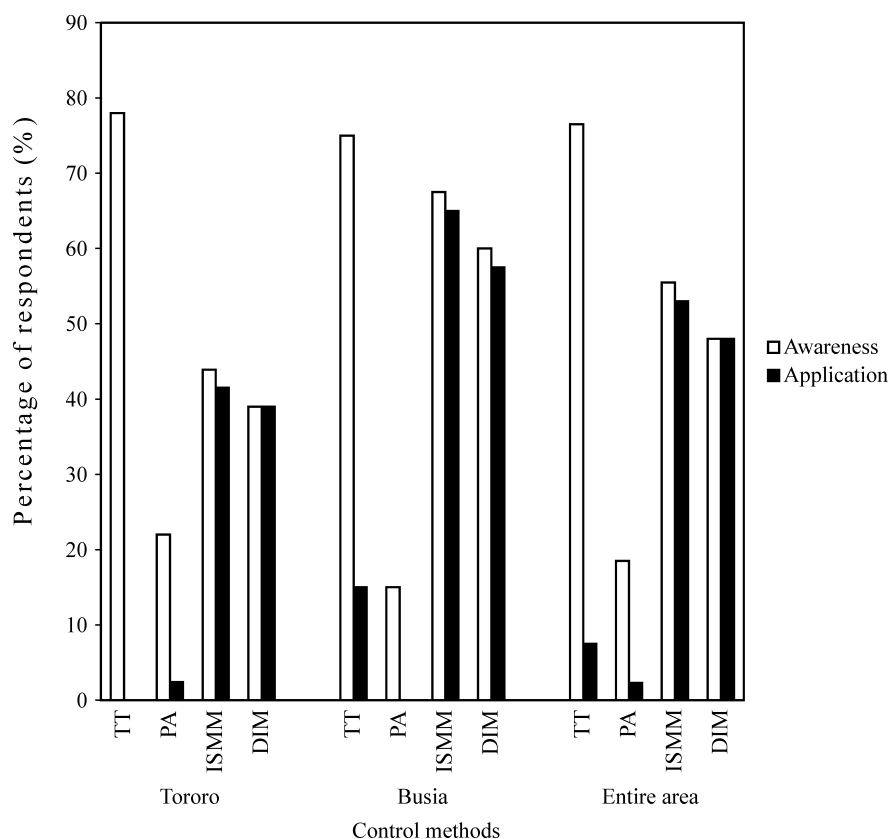


Fig. 1: Level of awareness in relation to the application of control methods by cattle owners in different study areas. Control methods are abbreviated as follows: tsetse trapping = TT, pour-on applications = PA, isometamidium chloride = ISMM, diminazene aceturate = DIM.

Table 2: Percentage of cattle owners willing to participate in tsetse and animal trypanosomosis control and preference for various control options.

	Districts		Entire study area n = 81
	Tororo n = 41	Busia n = 40	
Willingness to participate in control programmes (%)	97.5	97.5	97.5
Willingness to participate on a group basis (%)	90.2	80.0	85.2
Willingness to participate on individual basis (%)	9.8	20.0	14.8
Option: Government brings traps and cattle owners deploy and maintain them (%)	92.7	50.0	71.6
Option: Government brings and maintains traps but cattle owners contribute only labour during deployment (%)	95.0	47.5	71.6
Option: Cattle owners pay for prophylactic and curative trypanocidal drugs (%)	87.8	50.0	69.1
Option: Cattle owners pay for and use pour-on on their own (%)	2.4	50.0	25.9
Option: Cattle owners pay for diminazene aceturate treatments only for sick animals as they occur (%)	9.8	0	4.9
Option: Cattle owners procure tsetse traps on their own initiative (%)	4.9	0	1.2
Option: Cattle owners take full management of tsetse control operations (%)	0	0	0

1.2 % applied pour-on insecticides while 18.5 % were aware of it). While 55.5 % of cattle owners were aware of isometamidium chloride, 53 % used it. An equal proportion of cattle owners (48 %) were aware of and used diminazene aceturate. The difference between awareness and application was highly significant for tsetse fly trapping ( $\chi^2 = 67.8$ , d.f. = 1,  $P < 0.001$ ) and pour-on applications ( $\chi^2 = 10.8$ , d.f. = 1,  $P < 0.05$ ), but not for isometamidium chloride use ( $\chi^2 = 0.08$ , d.f. = 1,  $P = 0.77$ ) and diminazene aceturate use ( $\chi^2 = 0.00$ , d.f. = 1,  $P = 1.00$ ).

The majority of the cattle owners (97.5 %) were willing to participate in future control programmes, but preferred participating on a group basis (85.2 %) rather than individually (14.8 %) (Table 2). The 4 most favoured control options in order of importance were: traps supplied by government and maintained by cattle owners (71.6 %), contribution of labour by cattle owners for trap deployment (71.6 %), self-financing of trypanocidal drugs (69.1 %) and self-financing of pour-on (25.9 %). The least appealing control options in order of importance were: cattle owners taking over all tsetse control operations, cattle owners paying and caring for traps on their own initiative and cattle owners only treating sick animals periodically with diminazene aceturate.

## DISCUSSION

In the present study, 92.5 % of the 81 cattle owners interviewed were aware of tsetse fly infestation and 87.6 % recognised animal trypanosomosis as a problem in Tororo and Busia districts of Uganda. This was probably a result of a previous donor-funded tsetse and trypanosomosis control programme carried out in the area. This high level of awareness of tsetse flies and trypanosomosis among cattle owners positively influences their partici-

pation in control programmes. In a similar survey conducted among Maasai pastoralists in Transmara district in Kenya, the realisation of the constraint of tsetse and trypanosomosis to cattle production was important if the pastoralists were to participate in the control<sup>11</sup>.

Knowledge did not coincide with application of control measures. Despite the high level of awareness, only a small proportion of cattle owners used tsetse fly trapping and pour-on applications. A substantial number of cattle owners, however, used diminazene aceturate and isometamidium chloride. This disparity between knowledge and its application is an important observation in the context of knowledge versus application of knowledge for extension and change in behaviour.

The main constraints affecting the use of pour-on insecticides were limited awareness among cattle owners and unavailability of products. It is evident that little pour-on insecticide was used in the area during the previous control programme and thus few cattle owners were exposed to this control method. The low trap usage was attributed to the cost as well as lack of control, supervision and ownership of traps. Cattle owners felt that traps were expensive and not easily controlled by the household in that they were neither deployed close to owners' homes nor on owners' land. As a result of traps not being located within their own land, cattle owners felt no sense of ownership. In addition, to be effective, traps require a coordinated group effort, which needs close supervision. Cattle owners appeared reluctant to commit effort and time to close supervision of a coordinated group action on tsetse trapping. Even with current attempts to reduce the cost of traps by replacing them with simple blue, black or blue and black targets, which cost only 33 % of the price of a

monoconical trap<sup>2</sup>, other limitations would prevent usage, unless the tsetse-trapping programme is conducted by an external organisation. Unlike tsetse trapping and pour-on application, the difference between the level of awareness and utilisation of isometamidium chloride and diminazene aceturate among cattle owners was not significant. This was probably due to the policy of partial self-financing advocated during the previous control programme.

Although several constraints affected tsetse fly and trypanosomosis control, a large proportion of cattle owners was willing to participate in future tsetse fly and trypanosomosis control programmes. This reflected the importance they attached to the problem of tsetse fly and trypanosomosis, probably due to their awareness of and previous experience with this disease and its vectors. Individual awareness of trypanosomosis is known to influence the level and type of resources farmers are willing to commit to such programmes<sup>4,11</sup>. It has also been noted that the larger the proportion of livestock owners there are within a community, the greater the community incentive to contribute<sup>13</sup>.

Most cattle owners preferred the control option of government supplying the traps, while they take care of them. Cattle owners were happy to contribute labour for trap deployment, finance pour-on application and pay for both curative and prophylactic trypanocides for treating their livestock. This implies that cattle owners still regard tsetse fly trapping as a government responsibility aimed at achieving a public good for the entire community. This attitude probably arose because during the previous tsetse fly and trypanosomosis control programme in southeastern Uganda, the government-controlled project deployed insecticide-impregnated tsetse traps to primarily

reduce the incidence of human trypanosomosis, and community involvement was limited to trap maintenance. This historical association of government with the tsetse fly trapping programme in southeastern Uganda, coupled with the high cost of traps and the requirement for good supervision and coordination that go with effective tsetse fly trapping, are the reasons cattle owners still feel it is the government that has adequate resources to effectively manage an area-wide tsetse fly trapping programme. Hence they preferred traps to be supplied by the government. On the other hand, use of trypanocides and to a certain extent pour-on applications is accepted by cattle owners as their own responsibility (private goods) aimed at reducing the problem of animal trypanosomosis that affect their own livestock. Experience gained during animal trypanosomosis control programmes in West Africa has shown that direct application of insecticides to livestock, which gives direct and private benefit for the livestock owner, is more likely to be financed and sustained by the owners than insecticide-impregnated traps or targets, which require community action<sup>2</sup>.

Most cattle owners indicated that they preferred to participate on a group basis rather than individually in future tsetse and trypanosomosis control programmes. This would enable them to pool labour, reduce costs and increase the chances of a successful area-wide control of trypanosomosis, that is beneficial to the communal cattle herding system. A small number of cattle owners preferred participation on an individual basis, because some individuals were not cooperative during community service schemes.

The present study shows that availability, affordability, awareness of the different

control methods and associated direct benefits seem to be the major factors affecting tsetse and trypanosomosis control. Control methods (chemotherapy using diminazene aceturate and chemoprophylaxis using isometamidium chloride) and pour-on application for vector control are likely to constitute the most popular options in any future tsetse and trypanosomosis control programmes managed by cattle owners. This is because these methods are associated with private benefits such as direct improvement of cattle health and a sense of ownership. It appears that private benefit is the driving force behind cattle owners' selection of tsetse and trypanosomosis control measures.

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