

THE ECONOMICS OF TRYPANOSOMIASIS CONTROL IN THE OKAVANGO DELTA REGION OF BOTSWANA AND THE SCOPE FOR PUBLIC - PRIVATE SECTOR PARTNERSHIPS

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*Annuellement, le gouvernement du Botswana assure des ressources financières et humaines substantielles pour le contrôle de la mouche Tsé-Tsé (*Glossina morsitans centralis*) responsable de la trypanosomose dans la région de delta du pays des Okavango. Bien que cette région abrite un faible effectif d'individus, la contribution de la population Okavango au revenu national est, à travers le tourisme, significative. Le contrôle des glossines est dès lors important pour la survie des populations et la sécurité des visiteurs. En 1992, l'intérêt de défendre l'écologie fragile des Okavango a conduit à proposer l'adoption de pièges odorants imprégnés d'insecticides pour le contrôle des glossines. En 1996, 16000 pièges ont été placés dans le delta. Les problèmes de main-d'oeuvre et de logistique pour la recharge des pièges ainsi que les récriminations des agences de tourisme ont conduit à impliquer le secteur privé dans la lutte contre les mouches tsé-tsé. Cette étude rapporte les résultats d'une série d'enquêtes coût-bénéfice évaluant l'implication du secteur privé dans le contrôle des glossines. Le problème de fond est la motivation des communautés du secteur privé (c'est-à-dire des organisateurs de safaris et des familles résidentes) pour collaborer avec le gouvernement, et en retour, de définir les attentes du gouvernement auprès du secteur privé. L'étude conclut qu'une bonne opportunité existe pour de tels programmes sans coûts additionnels directs significatifs. La gestion d'un groupe de participants d'horizons divers, et des stratégies soutenant à la fois les engagements du secteur privé et les fonds gouvernementaux représentent les principaux enseignements pour des recherches ultérieures.*

INTRODUCTION

In 1994, the Government of Botswana allocated over Stg £900,000 for control of tsetse fly (*Glossina morsitans centralis*), the vector of human and bovine trypanosomiasis. The focus of Botswana's control efforts is the Okavango Delta, an area of approximately 20,000 square kilometres, with a permanent human population of only 2500 and where, by law, cattle are prohibited. The justification provided for such expenditure is the potential for trypanosomiasis to return to historical levels, levels which in the early half of the 20th century resulted in widespread loss of domestic livestock and numerous human fatalities (Davies, 1980). Since the turn of the century, the Botswana government has made extensive efforts to eradicate tsetse fly and eliminate trypanosomiasis in the delta. Measures have included bush clearing, game destruction and both ground and aerial spraying, the latter attributed with finally having brought trypanosomiasis under control. Concerns about the environmental impacts of aerial-spraying on the fragile Okavango delta ecosystem, however, led in 1992 to a government decision to abandon aerial spraying in favour of the more environmentally sensitive tsetse control method of odour-baited, insecticide-impregnated targets (Vale et al., 1988).

As of 1996, there were an estimated 16,000 odour-baited targets (OBT) deployed in the Okavango Delta. To remain effective, a target requires re-servicing approximately every four to five months (Willemse, 1991). This in itself is problematic given seasonal flooding of the delta, not to mention the numerous targets that are frequently damaged by wildlife (elephant), wind and fire. In addition, OBT has not always proven popular with delta-based tour operators who have complained about the visual disturbance caused by the blue and black targets and the presence of mobile tsetse control teams in what is marketed as one of Africa's last true wilderness areas.

Surveys for tsetse fly indicate that the fly population is increasing in the central delta (TCD, 1996). Moreover, household census data reveals that the permanent human population within the delta increased by 155 percent from 1981-1991. With the tourism sector injecting tens of millions of pula each year into the economy, Botswana also has a major economic interest in maintaining the Okavango as a safe tourist destination. The concurrent growth of tsetse fly and human populations implies increasing risk of trypanosomiasis infection.

Logistical problems related to the aquatic delta terrain, insufficient transport and limited manpower have severely hampered efficient implementation of OBT. An alternative to the present approach to trypanosomiasis control is collaborative partnerships between government and the private sector. To elicit private sector response to this idea, and to assess the economic and social costs and benefits associated with alternative partnership arrangements, a study was conducted by the Department of Animal Health and Production's Veterinary Epidemiology and Economics Unit in collaboration with the Tsetse Control Division (TCD).

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METHODOLOGY

Surveys were conducted of all the tour operators, hunting concessionaires and indigenous communities situated in and on the periphery of the Okavango Delta. Contingent valuation involving a 24 hour wait between initial contact and response collection was used to obtain estimates of willingness to contribute to tsetse control (Swallow, 1994). Respondents were allowed to state their contributions in kind, e.g. labour, vehicles, petrol, etc. or by cash payment. Tour and hunting operators were interviewed regarding the partnership arrangement which appealed most to them, e.g. tax relief vs. flat rate payment for target deployment. Both commercial operators and households were asked to state their expectations of government in any partnership arrangement.

RESULTS AND DISCUSSION

Table I indicates the willingness of tour operators and households to assist with tsetse control and the types and levels of their contributions.

Table I
Private sector willingness to assist with tsetse fly control

	Willing to assist			Unwilling to assist		
Camp / Hunting operators (N = 23)	21 (91%)			2 (9%)		
Households (N = 90)	63 (70 %)			27 (30 %)		
Assistance offered by:	Camp / Hunting Operators			Households		
	No.	Mean	Std dev	No.	Mean	Std dev
Labour (man days/week)	13	3.77	5.61	48	4.94	4.59
Finance (Pula/year)	2	1750.00	1061.00	7	74.29	43.92
No explicit commitment	6			0		
Draft power (animal days/week)	0			5	4.6	5.46
Light vehicles (vehicle days/week)	0			2	3.5	.71
Boats (days/week)	0			1	-	-

ER: Pula 3.5 = US \$1

For both private sector communities - safari operators and households - a clear majority expressed willingness to assist with tsetse control. This suggests that good opportunity exists for private sector partnerships in tsetse control. The total addition of 286 man days per week is the equivalent of almost 10 additional field units, and a doubling of the manpower resource presently at the disposal of the TCD. The data do not, however, indicate the private sector as a substantial financial contributor to tsetse control at this point in time. On the contrary, financial compensation is the leading expectation of both the commercial safari operators and local households. Still, this would not automatically pose an impediment to private sector partnerships as a large proportion of commercial operators expressed a willingness to receive indirect compensation in the form of tax relief. Indeed, government commitment to tsetse control in Botswana has in recent years been such that finance has not been the limiting factor but rather the human resources to make OBT effective.

Study results support the hypothesis that many functions currently performed by TCD might be transferred to the private sector through partnership arrangements. Table II reports the arrangements preferred by commercial operators and households and their expectations if entering into partnership with government.

Table II
Private sector preferred partnership arrangements and expectations of government tsetse control authorities

Preferred* partnership arrangement:	Camp / Hunting operators %	Households %
tax relief	48	N/A
continued government responsibility	35	N/A
fixed payment per target	30	N/A
Required from government:		
cash payment		47
technical training	29	21
odour-baited targets and associated materials/equipment	24	
no expectations	24	33
clear delineation of responsibilities	14	
govt monitoring	9	
information on area to be covered	9	

* defined as the respondent's first or second choice

N/A = not applicable

Technical training for field staff, materials and monitoring are already activities carried out by TCD. Therefore, cost implications of private sector partnerships will primarily be determined by household opportunity costs of labour. These, however, are generally quite low in the delta and almost certainly lower than present field unit wages which incorporate various allowances and civil service benefits. While the question of the private sector's relative efficiency in tsetse control remains to be answered, some of the benefits to be gained from partnerships are rural employment, expanded OBT coverage in the tsetse fly belt, releasing TCD's experienced field units to concentrate on more difficult areas and, in general, reduced risk of trypanosomiasis for local residents, tourists, and animal populations. Issues which need to be addressed prior to commencement of such partnerships are the TCD's capacity to manage a larger number of diverse control operations, and alternative strategies for sustaining essential tsetse control activities should either government or private sector support decline precipitously.

BIBLIOGRAPHY

- Davies J., 1980. The history of tsetse fly control in Botswana. Ministry of Agriculture: Gaborone, Botswana.
- Douthwaite R., Fox P., Matthiessen P., Russell-Smith A., 1981. The environmental impact of aerosols of endosulfan applied for tsetse fly control in the Okavango Delta, Botswana: final report of the Endosulfan Monitoring Project. Overseas Development Administration: London.
- Swallow B., Woudyalew M., 1994. Evaluating willingness to contribute to a local public good: application of contingent valuation to tsetse control in Ethiopia. *Ecological Economics* 11, 153-161.
- Tsetse Control Division, 1996-97. Tsetse News (various issues). Ministry of Agriculture: Maun, Botswana.
- Vale G., Lovemore D., Flint S., Cockbill, G., 1988. Odour-baited targets to control tsetse flies, *Glossina* spp. (Diptera: Glossinidae), in Zimbabwe. *Bulletin of Entomological Research* 78, 31-49.
- Willemse L., 1991. A trial of odour baited targets to control the tsetse fly, *Glossina morsitans centralis* (Diptera: Glossinidae) in west Zambia. *Bulletin of Entomological Research* 81, 351-357.
- Wooff, W., 1993. A review of tsetse control in Botswana (mimeo). Department of Animal Health and Production, Ministry of Agriculture: Gaborone, Botswana.

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