

Partnerships for tsetse control - community participation and other options

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This research was funded by the Department for International Development of the United Kingdom. However, the Department for International Development can accept no responsibility for any information provided or views expressed.

PARTENARIATS POUR LUTTER CONTRE LA MOUCHE TSÉ-TSÉ - PARTICIPATION COMMUNAUTAIRE ET AUTRES OPTIONS

Le présent document a pour objectif de stimuler le débat et de clarifier les questions liées à la participation des communautés à la lutte contre la mouche tsé-tsé en utilisant des pièges et des cibles. Un cadre est fourni afin de faciliter la planification du programme. En intégrant différents niveaux et types de participation et un certain nombre d'éventuels partenaires, le cadre apporte une série d'options à prendre en compte. Le défi que doivent relever les planificateurs est de faire coïncider l'objectif général, éradication ou suppression, avec les aspects techniques de la lutte et les paramètres sociaux, institutionnels et économiques, afin de mettre au point un programme durable.

Les incidences que les politiques d'éradication ou de suppression peuvent avoir sur la composition des partenariats font l'objet d'un examen. Un certain nombre de variables incluant les objectifs généraux, les priorités de développement, la densité et la répartition des populations humaines et animales, la capacité organisationnelle des communautés et la taille proposée de la zone de contrôle seront déterminantes pour les gouvernements, les organisations non gouvernementales et les individus lorsqu'il s'agira de décider de lancer un programme de lutte contre la mouche tsé-tsé - ou d'y participer. Sur la base d'études de cas, le présent document conclut que l'engagement envers la participation communautaire a été bien faible. Toutefois, il est évident que la participation communautaire ne constitue pas une stratégie d'ensemble appropriée en matière de lutte contre la mouche tsé-tsé même si elle peut être réalisable dans certains contextes. Une stratégie plus durable consisterait vraisemblablement à faire intervenir des partenariats des différentes parties prenantes. Une vision claire de la manière dont ces partenariats peuvent fonctionner et des avantages attendus tels que perçus par chacun des partenaires est nécessaire.

ASOCIACIONES PARA LA LUCHA CONTRA LA MOSCA TSÉ TSÉ: PARTICIPACIÓN COMUNITARIA Y OTRAS OPCIONES

El presente artículo tiene por objeto aclarar los problemas en relación con la participación comunitaria en la lucha contra la mosca tsé tsé utilizando trampas y blancos. Se proporciona un marco para facilitar la planificación de los programas. Mediante la incorporación de diversos niveles y tipos de participación y una serie de posibles socios, el marco permite plantear diversas opciones. El problema para los planificadores está en hacer coincidir el objetivo de la política general, erradicación o supresión, con los aspectos técnicos de la lucha y los parámetros sociales, institucionales y económicos, para llegar a un programa sostenible. Se examinan las repercusiones de las políticas alternativas de erradicación y supresión de la mosca tsé tsé para la formación de asociaciones. Hay una serie de variables, entre ellas los objetivos de las políticas generales, las prioridades de desarrollo, la densidad de distribución de la población humana y pecuaria, la capacidad de organización de las comunidades y el tamaño propuesto de la zona de lucha, que determinan las decisiones en cuanto al comienzo de una lucha contra la mosca tsé tsé de carácter comunitario o la participación en ella de los gobiernos, las organizaciones no gubernamentales, las comunidades y los particulares. Tomando como base estudios monográficos, en el artículo se llega a la conclusión de que el compromiso en relación con la participación comunitaria ha sido escaso. No obstante, es evidente que dicha participación no es una estrategia global apropiada para la lucha contra la mosca tsé tsé.

The objective of this paper is to stimulate debate on the factors that determine when, where and how it might be appropriate to involve communities in tsetse control operations. Its purpose is not, therefore, to advocate community participation in all situations but rather to provide a framework to facilitate decision-making.

In recent years the participation of local communities in tsetse control has been widely promoted and is even a prerequisite for funding by many donors. This emphasis on community management of tsetse control reflects policy changes in other areas of natural resource management where communal resources are involved. However, in the case of tsetse control, little attention has been paid to the context within which community participation is expected to operate and to the appropriateness of participation as a strategy in different contexts. The discussion has focused on technical issues, and not only have community aspects been overlooked but the role and capacity of other partners which are necessarily

involved in any control exercise have also been ignored and/or taken for granted.

This article explores these issues in cases where traps and targets are the principal technologies being proposed for tsetse control. Although some other technologies have also been implemented with a degree of community participation, the specific properties of traps and targets and their use raise a number of unique issues, such as the necessity for a coordinated group effort, since individual action has been ineffective. The article therefore pays particular attention to how programmes have approached this problem, although much of the discussion will be equally applicable to other situations where community involvement is under consideration. It begins with a brief overview of programmes with an element of community participation, followed by a discussion of variables to be considered in determining appropriate strategies and developing action plans based on task sharing by the various partners involved. It concludes by highlighting major concerns and suggests how the planning process might move forward.

The discussion is based on documentation from the FAO Regional Tsetse and Trypanosomiasis Control Programme (RTTCP) and individual tsetse control programmes in sub-Saharan Africa in addition to the authors' own ongoing comparative study in Kenya, Uganda, Zambia and Zimbabwe. Information on projects visited during the course of this study is provided in Table 1.

1a Characteristics of projects studied Caractéristiques des projets étudiés Características de los proyectos estudiados

Project	Kalobolelwa, Western Province Zambia, 1992-1994	Zambezi Islands, Western Province, Zambia 1990-1997	Msanzar, Eastern Province, Zambia 1995 onwards	Lambwe Valley, Kenya 1992 onwards	Busia, Kenya 1992-1996
Institutions: Implementor (I) and Funder (F)	I: LDP and DVTCS F: Netherlands Govt.	I: LDP and DVTCS F: Netherlands Govt.	I: ASVEZA-East and DVTCS F: RTTCP, ASVEZA	I: ICIPE F: ODA (1992-96)	I: KETRI F: WHO
Project area/previous control	Discrete area 50 km from barrier maintained by contractors	3 islands in Zambezi River adjacent to existing barrier	Previous trial in adjacent area (Mvuvye), with maintenance by employed staff	Technology tested in area from 1990	Previous control by govt., covering 6 villages. Current stage covers 2 villages
Tsetse	<i>G. morsitans centralis</i>	<i>G. morsitans centralis</i>	<i>G. morsitans morsitans</i>	<i>G. pallidipes</i>	<i>G. fuscipes fuscipes</i>
Technology	656 targets - 10/km ² grazing areas, 4/km ² other areas	122, 60 and 20 targets on 3 islands, respectively	c. 3 625 targets at an average density of 4/km ²	64 NGU traps in thicket, 40 along park edge, 524 planned	40 pyramidal traps near each village in previous stage 60 near the two villages in current stage
Control area	140 km ² (7 x 20 km)	3 islands	930 km ²	100 km ²	2 villages - 10 and 15 km ²
Partner contributions	Cash from cattle owners Free community labour for deployment and maintenance	Free materials from project Free community labour for deployment and maintenance	Free materials and facilitators from project Free community labour for deployment and maintenance	Cash from community Free community labour for construction, deployment and maintenance	Cash from community Free community labour for construction, deployment and maintenance
Local organization involved	Existing crushpen associations	Liaison with village head	Committees set up to mobilize community	Committee created to coordinate activities	Committee created to coordinate activities
Incentives for local participation	Free Berenil for positive cases	Mobile health clinic and cheap drugs			
Population, households, villages	Villages: 20	Total population: 1 365 Villages: 1, 2 and 7 (on 3 separate islands)	Total population: 63 141 Households: 14 093 Villages: 269	Total population: 12 000 Homesteads: 1 212	Households: 464 and 442
Cattle ownership and numbers	Cattle owners: 41 Cattle: 300	Cattle owners: 58 Cattle: 1 022	Cattle owners: 844 Cattle 4 257 (5.4% of households)	Cattle: 22 600 (78.8% of households)	Cattle owners: 52% of households

1b
Characteristics of projects studied
Caractéristiques des projets étudiés
Características de los proyectos estudiados

Project	Southeastern Uganda 1987 onwards	Bukooli County, Uganda 1993 onwards	Zimbabwe 1994 onwards	Okavango Delta, Botswana 1995 onwards
Institutions: Implementor (I) and Funder (F)	I: Ugandan Govt. depts (COCTU) F: EU, Ugandan Govt.	I: LIRI (UTRO) F: WHO	I: Zimbabwe Govt. F: EU and Zimbabwe Govt.	I: Botswana Govt. F: Botswana Govt.
Project area/previous control	Much previous control in area	Pilot project in 2 subcounties, 1988-1992. Now covers whole county	Much previous control, including aerial spraying	Previous control includes aerial spraying
Tsetse	<i>G. fuscipes fuscipes</i>	<i>G. fuscipes fuscipes</i>	<i>G. pallidipes</i> and <i>G. morsitans morsitans</i>	<i>G. morsitans centralis</i>
Technology	6 000 pyramidal traps in Oct. 1996; 16 000 in 1993	c. 100 monoscreen traps plus 100 tree targets in October 1996	c. 70 000 swinger targets at average density of 4/km ²	17 000 targets in grid pattern, around or along centre of islands
Control area	8-4/km ² Parts of 6 districts	375 km ²	Along northern borders	Delta area
Partner contributions	Paid labour for construction and maintenance of traps	Individuals and groups encouraged to buy materials, make and deploy own traps	Some community sensitization to reduce theft/vandalism	No community involvement
Local organization involved	Committees to monitor trap maintenance	No organization Individual activities	No organization	No organization
Incentives for local participation	Community workers paid for construction and maintenance			
Population, households, villages	Average population density: 100/km ²	Total population: 239 000		Small population to service tourism
Cattle ownership and numbers				No cattle in Delta

EXPERIENCE TO DATE

Numerous programmes can be or are listed as community tsetse control programmes with the earliest beginning in the mid 1980s, for example in Bouenza region, the Congo (Gouteux *et al*, 1989), and new programmes are about to be initiated through the European Union-funded East Africa regional programme. As national governments in Africa continue to face financial crises which limit both staffing and recurrent funding, the call for community-driven programmes is likely to continue.

Tsetse control programmes using traps and targets which have been initiated to date have involved local populations in various ways. These include the creation of local awareness about the problems of tsetse and trypanosomiasis and the function of the technology in order to reduce theft and vandalism (Ghibe Valley, Ethiopia); the provision of traps and targets or component materials by governments or other agencies, with local communities undertaking partial or total responsibility for trap and target construction, deployment and maintenance (Msanzara, Zambia and Vavoua, Côte d'Ivoire); the employment of local people to deploy or maintain the technology (southeastern Uganda); the hiring of private contractors to maintain target barriers (Senanga West, Zambia); the provision of technical assistance following local requests, with community responsibility for financing control measures and undertaking all de-ployment and maintenance activities with minimal out-side facilitation and support (Lambwe Valley, Kenya). Although all these types of participation have been used, the most common scenario entails local provision of labour for trap and target maintenance.

Table 2 presents the range of contributions from local populations and links community participation levels with the type of external assistance necessary. In large part, the contributions expected from communities have been minimal and this is acknowledged by communities themselves. In interviews few complained of onerous duties, even though individuals are rarely paid for contributing labour. The most common community-level tasks have been to organize meetings to mobilize villagers to participate in maintenance sessions or to appoint individuals who would

contribute labour for maintenance either with or without assistance from technical support staff.

2

Level and type of participation by communities and partners

Niveau et type de participation des communautés et des partenaires

Nivel y tipo de participación de las comunidades y los socios

Level of external involvement and organization required	Type of external support	Type of community participation/contributions	Level of community participation and organization required
Minimum	Training and information	Make decisions on control methods, implement and coordinate all activities	Maximum
	Inputs provided free	Financial contribution towards traps/targets or components	
	Inputs supplied with costs wholly or partially recuperated	Provide free labour	
	Local people hired	Provide paid labour	
Maximum	All inputs supplied and work undertaken by government staff	Tolerate technology in local area	Minimum

Note: The type of organization required for providing each of the inputs from both external institutions (government or other) and communities will vary.

Several programmes have required communities to make financial contributions to cover, either wholly or partially, the cost of the traps and targets in addition to placing and maintaining traps in the field - Lambwe Valley, Kenya (Ssenyonga, 1994); Busia, Kenya (Echessah *et al.*, 1997); Kalobolelwa, Zambia (Dietvorst, 1995) and Bukooli County, Uganda (Okoth, personal communication). Materials are then made available for purchase by the technical agency involved, the only exception being the project in Bukooli County, Uganda, where the traps are manufactured from locally available materials. Furthermore, it is rare for community members to have any significant input into decision-making about where traps and targets should be placed. In the Lambwe Valley the initial trap placement strategy was designed by researchers and, following community training, trap deployment decisions were made by the community. And in Bukooli County, Uganda, although advice is offered by technical staff, location decisions are made at an individual rather than at a community level.

In general, the experience has been one of partnerships between public agencies and communities, with a considerable financial and technical burden continuing to be met by government, frequently with donor funds (Table 1). Thus, government personnel (livestock extension staff and veterinarians) provide training and technical information and, in most programmes, they also frequently provide materials for the traps and targets, while in others they also maintain them.

Alternative partners have rarely been considered and indeed are not discussed. The case of Zambia (initially in Western Province but now also in other areas) is unique in the extent to which it is involving the private sector in target maintenance (Thakersi, 1996). Here, barrier maintenance has been contracted out by the government. Elsewhere there are plans or discussions to broaden participation and include other partners, such as tour companies (in Zimbabwe and Botswana). If it is reasonable to expect participation from others benefiting from enhanced resource access and use, the potential would also seem to exist for including second-tier beneficiaries such as crop and livestock merchants and associations. Such possibilities have yet to be seriously explored in any location.

Nevertheless, most of the discussion and debate is about community involvement and the ability of local populations to organize themselves and to make a long-term commitment to control operations. There are few instances where communities have organized themselves for this particular activity.

The Lambwe Valley Project, supported by the International Centre of Insect Physiology and Ecology (ICIPE), has paid most attention to community organization and this was necessitated by the fact that community members were expected to pay for and implement a tsetse control programme (Omolo *et al.*, 1995) and there has been a clear commitment to sustainability beyond the project life. Other organizational forms used for tsetse control are detailed in Table 1. The most usual practice has been either to make use of existing community or village committees or to create dedicated "tsetse" committees which then appoint individuals to participate in maintenance sessions or are responsible for mobilizing as many villagers as possible to join in with these sessions. The responsibilities of such committees rarely extend to decision-making on other aspects of the control programmes. As indicated in Table 2, only minimal levels of local and government organization are likely to be required where their respective contributions are minimal.

A FRAMEWORK FOR DECISION-MAKING

In spite of the apparent growing interest in community participation and the number of projects that have already been implemented, it is difficult to learn from the experience, much of which has been gained within a project context with uncertain and even only short-term funding. The area and number of communities involved have been comparatively small (given the tsetse-infested area as a whole), and the level of community involvement has been minimal (Table 2). Nevertheless, the main questions raised in the literature relate to the ability of local populations to sustain their interest over time and the willingness of members to make financial and other contributions in a situation where freeriders can benefit (Swallow and Woudyalew, 1994).

There are certainly instances where after a period traps and targets have not been maintained, including at Nguruman (one of the most well-known experiences) and in Bouenza region, the Congo. While the specific problems associated with each of these apparent failures will not be discussed in this article, they raise questions about factors likely to sustain community-level participation. Planners need to consider the various factors that should guide decision-making about types and levels of participation by different partners. Here we look at three levels - community, individual and district/national (Table 3), although there are others that should also be considered. Although some variables are relevant at more than one level, we suggest that only one variable, human health, is likely to be relevant at all three levels.

3

Significant variables determining decisions to initiate or participate in community-based tsetse control programmes

Principales variables déterminant les décisions de lancer ou de participer à des programmes communautaires de lutte contre la mouche tsé-tsé

Variables significativas determinantes de decisiones de iniciar programas de lucha contra la mosca tsé tsé de carácter comunitario o de participar en ellos

Variables	Levels of decision-making		
	District/national	Community	Individual
Overall policy objectives	X		
Previous experience of external assistance	X	X	
Links with outside agencies	X		
Population density/distribution/movement	X		
Alternative disease management strategies	X		
Costs:			
- Technical advice	X		
- Cash	X		
- Labour	X		
- An organization	X		
Perceived immediate and future benefits:			
- Human health	X	X	X
- More land	X		
- More livestock	X		
- More productive livestock	X		
- Status/power	X		
- Fly-free environment	X		
Public pressure	X		
Development priorities	X	X	

Note: A cross indicates a strong association; the individual and community levels may coincide, for example in the case of a "livestock-owning village".

Individual and community-level decisions to participate in community control programmes

We have suggested a number of variables determining decision-making at different levels regarding community participation in tsetse control programmes (Table 3). Only the most significant ones are discussed here although it is difficult to discuss variables as though they are

independent of one another.

A significant variable used to justify programmes in western Kenya and southeastern Uganda is the incidence of sleeping sickness and, in locations where serious outbreaks of this disease have occurred within living memory, this would logically provide a major incentive for community action. Outside these locations, it is not easy to identify similar incentives which might mobilize the whole population. At the level of whole communities, we have suggested that a desire for continued outside linkages is an important incentive, although development priorities and existing commitments to these are likely to determine the types and levels of participation.

In all the study areas, cattle ownership (but also in some instances the ownership of other livestock) was indicated as a significant variable determining individual willingness to contribute but it is not clear what level of ownership might be linked with specific contributions. For example, in the Msanzara trial in Zambia, even though only 5.4 percent of households own cattle, expected community contributions were met. However, only a minimal level of contribution (free labour) is required and participation is still not widespread throughout the community. In general, however, it might be expected that the larger the proportion of livestock owners within a community the greater the community incentive to contribute - and this is supported by the findings reported in Swallow and Woudyalew (1994). However, what we might refer to as "livestock communities" living in tsetse-infested areas - where the majority of households either own or are largely dependent on cattle for their livelihood security - will already have a means of addressing the problem, and the costs and benefits of these alternative strategies will obviously influence their decisions to participate.

In our framework, we have suggested that contributions may reflect a more general expectation of future benefits - more livestock and more draught power, meat and milk. It may also reflect satisfaction with a fly-free environment (a conclusion from our own work and also that of others) but also, perhaps even more simply, a reflection of the impact of community pressure.

Nevertheless, all our research also suggests that previous experience of externally initiated development action is an important variable which determines willingness to contribute, and Swallow and Woudyalew (1994) attribute at least some of their positive response to the interest of local people in being more involved in the activities of the research institute (the International Livestock Centre for Africa).

As already noted, the broader discussion in the literature on community participation has revolved around the willingness of individual community members to make financial contributions towards an activity which has a large public good element. Unfortunately, examples where substantial contributions have been made are few largely because in most instances it is argued by the project organizers themselves that local populations are not in a position to contribute. Hence, communities are often given incentives to participate - such as free cattle treatment or payment for labour - and the contributions sought are minimal (Table 1). However, the sustainability of this approach is dependent on the ongoing provision of materials and other inputs by governments and donors. Survey data from the Ghibe Valley in Ethiopia demonstrated a large expressed willingness to contribute - only 3 percent of the sample volunteered neither money nor labour (Swallow and Woudyalew, 1994). A study carried out in Busia, Kenya, arrived at a similar percentage - 4 (Echessah *et al.*, 1997). However, it is noteworthy that in Busia, actual contributions were lower than those pledged (Mwangi, 1996).

Much of the evidence to support or refute arguments about financial and other contributions is based on premises about individual motivation and choice and the extent to which individual "self interest can undermine the effectiveness of voluntary organizations or community natural resource management" (Uphoff, 1996, p. 328). Using the work of others and the experience from Gal Oya in Sri Lanka, Uphoff argues for an alternative scenario to one which predicts "tragic outcomes" following from individuals deriving benefits at the expense of others (i.e. freeriding). These alternative outcomes are based on the assumptions that individuals are motivated by cooperation and generosity rather than by individualism and self-interest, and that individual choice is determined partly by the situation in which decisions are being taken: whether there is communication and anticipation of future communication between the actors, including "some capacity to promise, threaten, cajole or retaliate" (Ostrom, 1986 in Uphoff, 1996, p. 355). He agrees with the conclusions of others that "if an activity produces benefits greater than the cost of the individual's contribution, a rational chooser gains more by proceeding on the assumption that others - at least most or a sufficient number of others - will similarly recognize the advantage of the first alternative and accordingly participate in collective action" (p. 353). Our own surveys in general support these alternative arguments, which predict freeriding but not to the exclusion of voluntary collective action for improving people's well-being.

National/district decisions to initiate community control programmes

The question of the overall objective of tsetse control - eradication or suppression - has significant implications for issues of participation and this objective is usually incorporated into a national tsetse control strategy. Although it appears to be widely appreciated that the eradication of the tsetse fly is both technically difficult in large areas of the tsetse belt and financially out of the reach of most countries affected by human and animal trypanosomiasis, eradication continues to be the implicit objective of many programmes (Barrett, 1997). Given this objective, a number of considerations automatically follow.

First, all the available evidence (Barrett, 1994) suggests that the financial cost is likely to be far greater than the economic benefits to the communities located in close proximity to the area where "a holding operation" is likely to be initiated, while the area threatened is likely to be much wider than that covered by the immediate location of the barrier and/or control operations. This would appear to exclude any plan to seek financial contributions from local populations without also considering measures for taxing communities at risk but located further from the area of greatest challenge.

Second, the length of the barrier through often uninhabited areas rules out communal labour contributions although local people might be hired for pay. In the case of Western Province, Zambia, for example, the barrier consists of approximately 6 000 targets covering a length of 200 km,

much of it through very sparsely populated areas. In Zimbabwe many of the targets are located in uninhabited areas.

Third, it is unrealistic to expect communities to take responsibility for a function that meets the needs of a national strategy but is not necessarily in line with their own objectives. An eradication policy may satisfy national or regional livestock and agricultural objectives but is likely to exceed by far the expectations and needs of local communities.

The range of options for community participation widens once the objective shifts from eradication to suppression. The greater the contributions expected from communities, the more they should be able to determine the desired level of suppression, which will be a function of the resources - labour, time and money - they are able and wish to invest as well as of their satisfaction with the level of fly and trypanosomiasis reduction.

Beyond these issues of policy, we can hypothesize about the other most important variables which are likely to - or should - influence national or district decisions to involve communities directly in a tsetse control programme (Table 3). As indicated above, population density, distribution and movement are important if communities are expected to provide labour to maintain traps or targets over a wide geographical area. In areas with very low population densities and/or widely distributed inhabitants, participation in trap or target maintenance will be more difficult: travel time is increased and control over theft and vandalism is almost impossible to maintain. However, the layout and density of traps and targets compared with population distribution and the extent to which the location is on a major route for others will be the important considerations.

Making land available for livestock has certainly directed thinking around past programmes but cannot logically involve populations which are not already there but may move in once tsetse challenge has been reduced. The risk of human sleeping sickness is another factor which will significantly influence national level considerations regarding tsetse control. Such disease prevention efforts will undoubtedly require the coordination of a number of government agencies, as happens in Uganda under the auspices of the Coordinating Office for Control of Trypanosomiasis in Uganda (COCTU).

DISCUSSION AND CONCLUSIONS

Despite the new philosophy of local participation in tsetse control, this review has demonstrated an apparent lack of serious commitment to the possible gains from community participation. Since most tsetse control projects were designed by veterinarians and/or entomologists with little, if any, input from social scientists or trained extension staff, certainly few technical staff are convinced that control by local populations using traps and targets can be achieved and sustained as well as it can by other partners. Some reluctance stems from the understanding by technical staff of what is referred to in development studies as "local agency" (Long and Long, 1992) which leads to local populations changing the implementation of the technology in line with local objectives and understandings. Further hesitation by technical staff possibly arises out of an appreciation on their part of the gaps in knowledge relating to the impact of this technology on trypanosomiasis in varying situations but also of the complexity of implementing an apparently simple tool such as traps and targets.

One of the outcomes of this lack of commitment is the continued absence of input from individuals with community organization skills and there appears to be little intention of addressing this shortfall (e.g. the new RTTCP-sponsored M.Sc. course in Tsetse and Trypanosomiasis Control will barely cover this topic). The Bukooli County programme in Uganda appears to be unique in this respect. This Livestock Health Research Institute (previously UTRO) project uses existing community workers alongside the technical staff to ensure that social issues are incorporated into control efforts from the outset. Associated with this gap is the lack of emphasis on local organizational capacity, which is critical to the continuation of activities beyond the lifetime of projects (Mitti, Drinkwater and Kalonge, 1997) but is also essential for providing incentives and guarantees that all or a sufficient number of people will contribute towards the creation of a public good (Uphoff, 1996). We would suggest that another outcome is the refusal to address the need to institute self-financing programmes from the outset even in situations where it is known that livestock keepers are already self-financing trypanocidal drugs, which is the case in most countries. Nevertheless, we have argued in this article that it is not realistic to adopt an overall strategy of community participation. As a planning process, a decision has first to be taken about the objective of the control strategy: eradication or suppression. Although there is verbal agreement in most countries that suppression is now the only realistic option, we have suggested that there continues to be confusion over required or possible suppression levels and that this has implications for community involvement. It would seem to be essential to accept that this will be determined by communities themselves if they have any considerable input into and control over the operation. The next decision, possibly to be taken at a different level, relates to technical options for different types of locations - and the associated tasks, needs and requirements with, possibly, different levels of suppression. With these in mind, the full range of possible partners and stakeholders can be defined and an analysis of likely incentives required for reaching different levels of involvement by these different stakeholders. Using this approach, planners might arrive at a whole series of partnerships - some possibly even excluding community participation - and a whole range of sites where control programmes can be initiated.

Although traps and targets are now in use in a variety of locations, they are not constructed or deployed in the same way in each situation, so maintenance requirements differ. Research continues to be carried out on all these variables and there would still seem to be considerable room for manoeuvre. These technical considerations must be part of any understanding about the participation of local populations in tsetse control, since the level of responsibility for implementation by local communities and/or others is likely to determine the extent to which the technology will be implemented as a whole package and what changes, if any, are likely to be made.

The design and implementation of a tsetse control strategy also requires consideration of a whole range of other factors, including land use planning. Although such issues are beyond the remit of this paper, it is worth noting that where land use plans have been drawn up in order to maximize the benefits of tsetse control while minimizing potentially damaging environmental consequences, plans have largely been made

without any serious consideration being given to local knowledge and experience. In general, therefore, local communities in these locations are required to manage the resources within a framework of controls and restrictions reflecting the needs and interests of other groups. A number of the points raised in this paper, therefore, about the role of different stakeholders in tsetse control generally are also applicable to the issue of land use planning.

Following this planning scenario, a national priority-setting exercise for tsetse control is one that takes into account the fact that different decisions will be taken at different levels. Once suppression is the policy and different stakeholders are involved, there is no single set of objectives and no necessity for a single ranking of sites where tsetse control will be carried out. Indeed, the priority would seem to be to prepare and disseminate information, including clear guidelines for decision-making at different levels. In an era of decentralization, the desired and possible level of suppression would obviously also vary depending on local development priorities and a successful community-based tsetse control programme might be indicated by its eventual incorporation into the local development plan.

Bibliography

- Barrett, J.C.** 1994. Economic issues in trypanosomiasis control: case studies from southern Africa. University of Reading, UK. (Ph.D. thesis)
- Barrett, J.C.** 1997. Control strategies for African trypanosomiasis: their sustainability and effectiveness. In G. Hide *et al.*, eds. *Trypanosomiasis and leishmaniasis*, chap. 22. London, CABI.
- Dietvorst, D.C.E.** 1995. *Community participation in the control of tsetse fly, Kalobolelwa, Western Zambia*. Working Paper 95/9. Department of Veterinary and Tsetse Control Services, Western Province, Zambia.
- Echessah, P.N., Swallow, B.M., Kamara, D.W. & Curry, J.J.** 1997. Willingness to contribute labour and money to tsetse control: application of contingent valuation in Busia District, Kenya. *World Dev.*, 25(2): 239-253.
- Gouteux, J.-P., Noireau, F., Sinda, D. & Frezil, J.L.** 1989. *Proc. 20th Meeting of the ISCTRC, Mombasa, Kenya*. OAU Publication No. 115. Nairobi, OAU.
- Long, N. & Long, A.**, eds. 1992. *Battlefields of knowledge: the interlocking of theory and practice in social research and development*. London, Routledge.
- Mitti, G., Drinkwater, M. & Kalonge, S.** 1997. *Experimenting with agricultural extension in Zambia: CARE's Livingstone Food Security Project*. ODI Agricultural Administration (Research & Extension) Network Paper No. 77. London, ODI.
- Mwangi, D.K.** 1996. Socio-economic factors affecting implementation of community-managed tsetse control in Busia District, Kenya. University of Reading, UK. (Ph.D. thesis)
- Omolo, E.O., Ssenyonga, J.W., Ngugi, A., Kiros, F. & Okali, C.** 1995. Community mapping exercises: an evaluation. ODI Agricultural Administration (Research & Extension) Network Paper No. 52. London, ODI.
- Ostrom, E.** 1986. *How inexorable is the "tragedy of the commons"? Institutional arrangements for changing the structure of social dilemmas*. Distinguished Faculty Lecture, Indiana University, Workshop in Political theory and Policy Analysis.
- Ssenyonga, J.W.** 1994. Implementing community-based tsetse trapping technology in Lambwe Valley, Western Kenya. In L.H. Otieno & L. Bugembe, eds. *Proc. Fourth Int. ICIPE Mobile Seminar, Addis Ababa, Ethiopia, 27-30 September 1993*. Nairobi, ICIPE Science Press.
- Swallow, B.M. & Woudyalew, M.** 1994. Evaluating the willingness to contribute to a local public good: application of contingent valuation to tsetse control in Ethiopia. *Ecol. Econ.*, 11(2): 153-161.
- Thakersi, H.** 1996. *Towards privatised tsetse control operations: experiences, lessons and recommendations*. Working Paper No. 96/3. Western Province, Zambia, Department of Veterinary and Tsetse Control Services.
- Uphoff, N.** 1996. *Learning from Gal Oya: possibility for participatory development and post-Newtonian social science*. London, Intermediate Technology Publications Ltd.