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**THE INNOVATION TRAJECTORY OF SLEEPING SICKNESS CONTROL
IN UGANDA: RESEARCH KNOWLEDGE IN ITS CONTEXT**

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DISCUSSION PAPER SERIES

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THE INNOVATION TRAJECTORY OF SLEEPING SICKNESS CONTROL IN UGANDA: RESEARCH KNOWLEDGE IN ITS CONTEXT

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Abstract

This paper documents the way in which the “Stamp Out Sleeping Sickness” (SOS) Campaign in Uganda made use of research knowledge to have large-scale impact on the livelihoods and health of rural people in its target area. The SOS campaign mobilised private and public resources to control the deadly disease of human sleeping sickness, using mass treatment of cattle to destroy trypanosomes, the parasites that cause human sleeping sickness but also live in cattle, and insecticidal spraying of cattle to control the tsetse flies that are vectors of both human sleeping sickness and the related disease of trypanosomiasis in cattle. The research knowledge used to create the SOS campaign was communicated through a variety of formal and informal channels, within a web of institutional and personal connections between the main actors. This paper provides a detailed description of the SOS Campaign in order to consider the complex ways in which research knowledge can be put to policy use, and the complex factors that facilitate or encourage that process.

Keywords: Research knowledge; sleeping sickness; SOS campaign; communication networks; public-private sector partnerships; agricultural research; development narratives; Uganda

JEL Codes: I1, I18, L32, L33, L38, N5, N57, O13, O19, O31, O32, O33, O38, Q13, Q16, Q18

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LIST OF ACRONYMS

3V Vets	-	(originally Vectocid, Veridium, VerebinB12): veterinary graduates funded by Industri Kapital and Ceva working on messaging and drug-sales
AfDB	-	African Development Bank
AIDS	-	Acquired Immune Deficiency Syndrome
COCTU	-	Co-ordinating Office for Control of Trypanosomiasis in Uganda
CSR	-	Corporate Social Responsibility
CTVM	-	Centre for Tropical Veterinary Medicine, University of Edinburgh
DFID	-	The UK's Department for International Development
DVO	-	District Veterinary Officer
FAO	-	The United Nation's Food and Agriculture Organization
FVM	-	Faculty of Veterinary Medicine, Makerere University
HIV	-	Human Immunodeficiency Virus
IK	-	Industri Kapital
IKARE	-	Industri Kapital Aid & Relief Enterprise
INSEAD	-	Institut Européen d'Administration des Affaires (European Institute for Business Administration)
ISCTRC	-	International Scientific Council for Trypanosomiasis Research and Control
LIRI	-	Livestock Health Research Institute, Uganda
LRA	-	Lord's Resistance Army
NGO	-	Non-Governmental Organisation

NLPIP	-	National Livestock Productivity Improvement Programme
NORAD	-	Norwegian Agency for Development Co-operation
NRI	-	Natural Resources Institute
NRM	-	National Resistance Movement
NUSAF	-	Northern Uganda Social Action Fund
OECD	-	Organisation for Economic Cooperation and Development
PPP	-	Public Private Partnership
RAP	-	Restricted Application Protocol
RIU	-	Research Into Use
SOS	-	Stamp Out Sleeping Sickness campaign in Uganda
SRA	-	(Human) Serum Resistance-Associated
<i>T b</i>	-	<i>Trypanosoma brucei</i>
UK	-	United Kingdom
UN	-	United Nations
US	-	United States
UTCC	-	Uganda Trypanosomiasis Control Council
UTRO	-	Ugandan Trypanosomiasis Research Organisation
WHO	-	World Health Organization

1. INTRODUCTION

This paper documents the way in which the “Stamp Out Sleeping Sickness” (SOS) Campaign in Uganda made use of research knowledge to have large-scale impact on the livelihoods and health of rural people in its target area. The campaign was intended to control the deadly disease of human sleeping sickness. To do so it used mass treatment of cattle to destroy trypanosomes, the parasites that cause human sleeping sickness but also live in cattle, and insecticidal spraying of cattle to control the tsetse flies that are vectors of both human sleeping sickness and the related disease of trypanosomiasis in cattle. The campaign mobilised private and public resources for a mass treatment of almost 180,000 cattle — belonging to around 50,000 households — with trypanocidal drugs and insecticidal sprays over five districts. Following this, attempts have been made to build new sorts of institutions for the sustainable delivery of the relevant drugs to the five districts. It is too perhaps early to talk of use of these approaches as becoming policy in Uganda, but the adoption of them on such a large scale merits discussion.

After a chronology of the SOS Campaign, the paper discusses three themes that emerge: the long-term unfolding of research on different topics that came together to form the knowledge base for SOS; the importance of various (positive and negative) contextual factors; the complex network of formal and informal communication of research knowledge; and the particular role of the private sector and its consequences. The first three of these themes correspond closely to the three-way conceptual framework of evidence, context and links, used by Court et al, 2005 (see also Leksmono et al., 2006) for analysing the ways in which research is incorporated into policy.² These accounts of evidence, context and links are generated retrospectively to explain the way in which the SOS campaign was planned, funded and received government blessing — they are not pre-existing categories of research, policy or communication. The key questions here are: through what channels were research findings disseminated, how and why

² In the work referred to the sequence is usually context-evidence-links, but it appeared easier to present aspects of the SOS campaign starting with the evidence or research knowledge.

did those findings come to have such apparent influence, and what other factors were important?

The study as a whole was conducted through a series of semi-structured interviews with relevant actors, particularly Ugandan policy-makers,³ Ugandan and British researchers, the private-sector actors, district veterinary officers, and the veterinarians recruited by the project⁴ as well as a review of relevant documents. The risks of this sort of research, as pointed out by Court et al. (2005:10), are relevant: risks of actors using hindsight, “rewriting history” and making competing claims for credit for key ideas. As with the case-studies presented by Court et al., these risks were mitigated by careful triangulation between different stakeholders, and cross-checking against key documents.

³ This refers mainly to staff at COCTU and members of the UTCC Technical Committee. These people have been referred to in this study as policy-makers, but it should be noted that they stress their distance from senior civil servants such as permanent secretaries, and from ministers, to whom they then have to convey the information they receive and the recommendations they develop, on the Technical Committee.

⁴ Interviews in Uganda took place during the first two weeks of October 2008. Some preliminary conclusions were fed back to Ugandan policy-makers at a small workshop held for that purpose on October 13, 2008. Further interviews were held in the UK in subsequent months, with Charles Waiswa and the 3V vets in May 2009, and with various parties at the time of the case-study validation workshop in July 2009. The longer version of this case-study (available on request from the author) includes more detailed referencing of findings from informants and the document review.

2. THE SLEEPING SICKNESS OUTBREAK IN UGANDA AND THE SOS CAMPAIGN

Uganda is the only country in the world to have endemic foci of both forms of human sleeping sickness, the acute form caused by *Trypanosome Brucei Rhodesiense* found in the southeast of the country and the chronic form caused by *T b gambiense* found in the northwest (Fèvre et al., 2001, Welburn et al., 2001a and b). This distribution was thought to have remained unchanged for a century. However, in December 1998, a case of human sleeping sickness was reported in Soroti District, which lies northwest of the documented extent of *T b rhodesiense*. Apart from an isolated case in 1965, which was assumed to have been contracted elsewhere, this was the first case in areas north of lake Kyoga (Fèvre et al., 2001), and therefore raised major concerns about a possible “merger” or “overlap” of the two forms of sleeping sickness, which would heavily complicate diagnosis and treatment (see discussion below). The fact that the outbreak constituted a major external threat is crucial to understanding the way that knowledge was then put to use.

Tsetse control measures were implemented, but the outbreak persisted, and by June 2000 119 cases had been recorded (Fèvre et al., 2001). Diagnosis was initially delayed by the assumption that sleeping sickness cases were, in fact, suffering from AIDS.

Researchers from the University of Edinburgh, the Ugandan Livestock Health Research Institute (LIRI) and elsewhere established that there was a strong geographical association between sleeping sickness cases and a cattle market — Brookes Corner — where 54 per cent of cattle traded originated in the *T b rhodesiense* endemic zone, making cattle trade by far the most likely cause of the outbreak (Fèvre et al., 2001).

This team and other researchers from Cambridge and the London School of Hygiene and Tropical Medicine also used the SRA (human-serum-resistance-associated) technique — a new method and rapid methods for assays of cattle blood samples — to demonstrate that up to 18

per cent of cattle in Soroti District were infected (asymptomatically) with *T b rhodesiense* (Welburn et al., 2001b).

These findings were relayed to Ugandan policy-makers — people such as the Director and Deputy Director of the Co-ordinating Office for Control of Trypanosomiasis in Uganda (COCTU) and the Commissioner for Livestock Health — by a variety of formal and informal interactions, including publications, reports and presentations. The policy-makers relayed these findings to their superiors (senior management of ministries and ministers).

There was some response to the outbreak in Soroti District by existing donor-funded development projects, including mass treatment of livestock with long-acting trypanocides and some vector control during 2000 to 2003. The last stages of these activities were disrupted by the southeastward spread of Lord's Resistance Army attacks in late 2003.

New cases of sleeping sickness were still being reported in Soroti into early 2005, bringing the total reported cases to over 400, and by extrapolation, total reported and unreported cases to over 700⁵ (Fèvre et al., 2005). The same team of researchers from Edinburgh, with Ugandan colleagues, used blood sampling and the SRA-based identification of trypanosomes to establish that interventions in Soroti had failed to contain the epidemic, and that it had spread across an arm of Lake Kyoga into Kaberamaido District.

In September 2005 Ugandan policy-makers lobbied WHO to convene a round table, as a side-event of the 28th Meeting of the International Scientific Council for Trypanosomiasis Research and Control (ISCTRC) in Addis Ababa, Ethiopia, to discuss the situation. The meeting was attended by representatives of COCTU, the Ugandan Ministries of Health and Finance, LIRI, Makerere and Edinburgh Universities, WHO, FAO and international researchers. It resolved, among other measures, to map out routes of livestock movements and ensure treatment of

⁵ Using a mathematical model developed by Odiit et al., 2005.

cattle at livestock markets, and to ensure that block trypanocidal treatment and targeted vector control were implemented as public health interventions.⁶

At the end of May 2006 COCTU organised another meeting in Entebbe with representatives from the Ministries of Agriculture and Health, LIRI, Makerere and Edinburgh Universities. Also attending were senior representatives of the multinational veterinary drug company Ceva and two Ugandan veterinary drug companies. Speakers highlighted the *need* for an emergency response and several *opportunities*, especially a) block treatment of cattle with trypanocides to eliminate the animal reservoir of trypanosomes, and b) the newly cost-effective Restricted Application methods for insecticide spraying of cattle to control the tsetse fly vector. Ceva and its then major shareholder, Industri Kapital, offered a donation of drugs, insecticide and running costs, while others spoke more generally on the new climate of corporate social responsibility and public-private partnerships. Participants agreed to: using a combination of trypanocidal drugs and deltamethrin spray to eliminate *T b rhodesiense* from the newly-affected districts; rolling back through south-eastern Uganda; preventing the merger of the two forms of sleeping sickness; and making these achievements sustainable by involving local people.

In the following months, detailed agreements were reached and operational plans laid for the first phase of a longer-term programme to validate the methods chosen. This would involve mobilising eight teams, each comprising a lecturer and five students, from Makerere University⁷, to screen cattle in five districts⁸, carry out block treatment with trypanocides and deltamethrin spray on over 86 per cent⁹ of the cattle, ensuring that farmers then carried on spraying deltamethrin on their own with support from District Veterinary Offices, as well as simultaneously engaging in “messaging” activities. The programme was officially launched in Kampala in October and the first round of activities carried out in November 2006.

⁶ <http://www.au-ibar.org/isctrc/28Meeting/en/annex/002a.html>

⁷ These teams were available because of curriculum changes within the Faculty of Veterinary Medicine, which required students to become involved in outreach activities in their last year (see Kabasa and Waiswa, 2009)

⁸ Lira District was then in the process of being divided, with Dokolo and Amalotar being hived off as new districts. Overall, it is convenient to talk of the SOS Campaign as taking place in five districts: Kaberamaido, Dokolo, Amalotar, Lira and Apac.

⁹ The figure of 86 per cent is produced by a mathematical model, set out in the online supplementary material for Welburn et al, 2006.

One of the trypanocides, Veridium, was already licensed under Uganda's comparatively stringent drug licensing procedures. Registration takes a minimum of one year and unlike other African countries veterinary drugs are subject to the same procedures as human drugs. The other trypanocide, VerebinB12, and the insecticide Vectocid were not licensed. Import was permitted under a special channel for drugs donated to development and relief programmes. Full license for import was only obtained in September 2007 (for Vectocid) and April 2008 (for VerebinB12).¹⁰ Some ambiguity remained until December 2008 over whether drug importation for the programme allowed commercial resale.

By November 2007, the first phase of the project (Selby et al., 2007), had carried out trypanocidal treatment on 178,000 cattle — over 100 per cent of the estimated cattle population — though sample surveys suggest the proportion covered was 82 per cent. It had also carried out a mass spraying of cattle with deltamethrin. Supplies for two more rounds of spraying were left with local communities and used under co-ordination by the DVOs, but the coverage of the second round in January/February had dropped.¹¹ Makere centrally organised a third round in June/July 2007, which was more successful. Selby et al. (2007) also reported that there was insufficient brand awareness of Vectocid, the recommended formulation of deltamethrin, and some distrust of the programme objectives, both of which decreased coverage. The overall prevalence of *T brucei*¹² dipped but then recovered nearly to baseline levels. *T b rhodesiense* was present at very low levels overall, focused on a cluster of three villages on the Kaberamaido/ Dokolo border.

A further round of trypanocidal and insecticidal treatment of the selected villages on the Kaberamaido/Dokolo border — on a total of 30,000 cattle — started in April 2008. For the remaining areas of the five districts, a different sort of intervention was planned and set in

¹⁰ Registration of VerebinB12 was subsequently suspended due to new requirements to inspect factories in countries of origin, but definitively reinstated in April 2009.

¹¹ Subsequent work by CTVM highlights strong variations of coverage within and between districts (Welburn, pers.comm.).

¹² Both *T b rhodesiense* and *T b brucei*.

motion. In May 2008 IKARE¹³ and Ceva arranged for five veterinarians to be sent to the field for six months, with the possibility of an extension following a review. These five became known as the “3V Vets” after Vectocid, Veridium and VerebinB12.

The overall aim of mobilising the 3V Vets was to inculcate a habit of regular insecticidal spraying, preferably using Vectocid, among cattle owners. Spraying would serve a public health objective of controlling tsetse fly as a vector of sleeping sickness, but also assist farmers by controlling ticks. This second benefit was both more urgent and more visible to farmers. Some rival preparations on the market killed ticks without killing tsetse.

Within this overall aim, the motivations for mobilising the 3V Vets were distinctly fuzzy, as discussed in Section 6 later on. At first they mainly worked on raising awareness of spraying and the use of Vectocid in particular, as well as mapping of actual and potential outlets for drugs. In late 2008 IKARE and Ceva committed themselves more specifically to a vision of the 3Vs as self-sustaining businesses, with an extension of support through salaries, business training, and start-up loans to start veterinary drug-stores. The success of this initiative, up to mid-2009, has been mixed. The 3Vs were growing their businesses and dealing with a large and diversified customer base. However, they faced several serious problems: increasing prices of Vectocid, and uncertainties on how wholesale drugs could be cheaply and efficiently sourced. Farmer purchasing power, always precarious and seasonally variable, and for many reduced by long stays in the camps for displaced persons, was reducing further. The 2008-09 long dry season was unusually long. Because of the foot and mouth quarantine, farmers could not sell animals to meet cash needs, but had to sell food and use food stores.

By May 2009 farmers had very little money to buy animal drugs, and the 3Vs were highly uncertain about their future, and could not envision becoming self-sustaining businesses without prolonged support from IKARE. One response of the 3Vs was to sell increasing amounts

¹³ IKARE is a UK-registered charity established by the partners of Industri Kapital. By this stage Industri Kapital had divested its shares in Ceva but its participation in the Campaign continued through IKARE.

of other cheaper preparations, especially Amitix (amitraz) which is effective against ticks but not against tsetse.¹⁴ Data on farmers' awareness of and practice of regular spraying is inconclusive. Butcher (2009) reports that by June 2009 45 per cent of cattle keepers had sprayed their animals in the last month, not dissimilar to the 40 per cent who reported spraying their animals monthly in 2006.¹⁵

¹⁴ In fact, if used at the correct concentrations, Amitix is *more* expensive per cow treated than Vectocid (Alex Shaw pers.comm.), but it still appears to be regarded as a cheaper alternative by farmers and the 3Vs alike.

¹⁵ Noted that the question posed was slightly different and might have inflated the 2006 figures.

3. THE KNOWLEDGE BASE: RESEARCH ON TRYPANOSOMIASIS AND ON TSETSE CONTROL

This section reviews the several distinct strands of research that came together to make the SOS Campaign possible. Firstly, knowledge of the existence of two sub-species of *T. brucei* in Uganda is decades old: Fèvre et al. (2001) cite Abaru (1985) and Lancien (1991) while Maudlin (2006) provides a fuller historical review. The way in which this knowledge became a “policy narrative” around the threat of a merger is discussed in Section 5 later on.

The second strand demonstrated that from the late 1950s wild and domestic animals act as important reservoirs for *T b Rhodesiense* sleeping sickness in humans. Much of this research took place in Uganda and neighbouring parts of Kenya (an important contribution being that of Onyango et al., 1966).¹⁶ Some of the research was carried out by staff members of the Ugandan Trypanosomiasis Research Organisation (UTRO) (Okuna et al., 1986, Enyaru et al., 1993), as Ugandan policy-makers and researchers were keen to point out. Research on the topic is partially reviewed, and further developed with previously published Ugandan data by Hide et al. (1996), who state:

Analysis of infection rates in humans, cattle and flies during the recent sleeping sickness epidemic in southeast Uganda shows just how important the domestic animal reservoir can be ... a fly infected with T. b. rhodesiense is five times more likely to have picked up that infection from domestic cattle as from a human being (1996:51).

Fèvre et al. (2001:625) state that “an animal reservoir is considered essential to the long-term persistence of *T b rhodesiense* sleeping sickness”, though the references they cite do not go this far. Subsequent statements are less emphatic but continue to stress the importance of the cattle over the human reservoir (e.g. Welburn et al., 2006).

¹⁶ In the early 1990s this research already to proposals for mass treatment of the cattle reservoir in the core *T b rhodesiense* endemic areas of south-eastern Uganda, that were put forward for partial DFID (then ODA) funding. This was declined as DFID health work was then heavily focused on HIV/AIDS (I. Maudlin pers.comm.).

It is important to note that *T b rhodesiense* is asymptomatic in cattle and other non-human hosts. A third strain of *T brucei*, *T b brucei*, is very mildly pathogenic in cattle; it cannot infect humans. Cattle in the area can be infected with other species of trypanosome — *T vivax* and *T congolense* — which cause clinical illness in cattle, sometimes referred to as nagana, though this is hard for farmers to distinguish from other infections such as various tick-borne diseases.

A third strand of research has been on techniques for distinguishing between the three sub-species of *T brucei* in human and cattle blood. Existing techniques up to 2001 were described by Welburn et al., (2001b) as “laborious, time-consuming, and impractical for application to the field situation”. The same paper demonstrates that detection of the human-serum-resistance-associated (SRA) gene could provide the basis for a simple diagnostic test to enable targeted control of *T b rhodesiense* in the domestic livestock reservoir”, as well as for diagnosis of human cases in the event of the threatened merger (Hutchinson et al., 2003).

The final strand of research to be discussed here is research on the feasibility of applying pyrethroid insecticides to cattle on a large-scale basis as a means of tsetse fly control. The insecticide does not prevent a fly delivering an infective bite before it dies, but if applied to a sufficiently large proportion of cattle, to give a sufficient and sufficiently even level of treated cattle per hectare, it controls tsetse fly at a population level. This research moved through basic proof of the concept, through studies of which cattle in a herd were differentially bitten by flies, and thus most effective to treat. Most relevant to the SOS Campaign were findings (from research carried out on-station in Zimbabwe) that the tsetse fly bites the legs and belly of cattle differentially, so that treating these parts would be considerably more cost-effective than whole-body treatment (Torr et al., 2007). Torr et al.’s findings had been circulating, as conference and workshop presentations, and on the web, for several years before formal publication in 2007.¹⁷ In the context of planning the SOS Campaign, this technique became referred to as the Restricted Application Protocol or RAP. While the research findings did not

¹⁷ The basic ideas were sketched by Glyn Vale (1999).

include *Glossina fuscipes fuscipes*, the most important tsetse fly sub-species to act as a vector in the relevant areas of Uganda, unstructured observations made various scientists reasonably confident that application to legs and belly would also work with *fuscipes*.

An important aspect of much of the above research, especially that on SRA-gene techniques and on tsetse control¹⁸, was that it was funded by the UK's Department for International Development (DFID) through its Animal Health Programme, managed by the University of Edinburgh over the period 1995-2006¹⁹, which allowed a certain degree of continuity to the research. Through various research programmes and bilateral and multi-lateral aid, DFID invested almost £38 million on research and development of trypanosomiasis and tsetse control over the period 1980-2006 (Shaw, 2009, updating Budd, 2002) of which £2 million was spent on research on trypanosome biology and almost £5 million on research on tsetse biology (including behaviour).

It was important that DFID funding allowed a mixture of strategic and adaptive research, carried out in laboratories and research stations and on farms, with practical control programmes and the dissemination of knowledge. As Shaw (2009) puts it:

“This ‘blue skies’ research made it possible to finally prove that cattle were the main reservoir of rhodesiense sleeping sickness in the area and that cattle movements were the main reservoir for an out break of the disease in a new area...the SOS project provides a perfect example of how what would be regarded as ‘blue skies’ research was rapidly translated into field trials and the identification of a major threat to human health. The parallel development of a new and cost-effective means of controlling tsetse made it possible to set out a control strategy and a viable and ongoing project on the ground to deal with that problem while benefiting livestock production as well.”

¹⁸ Researchers funded by this programme and its predecessors, Maudlin (manager of the Programme) and Welburn also of the University of Edinburgh, were also co-authors of the papers by Hide et al., 1996, Fèvre et al., 2001 and Hutchinson et al., 2003.

¹⁹ The tsetse work was also funded by DFID's Livestock Production Programme

It was also important to note that the SOS Campaign also constituted research, as it was the first time either block trypanocidal treatment or Restricted Application had been used on a mass scale, and a considerable amount of resources and effort was put into monitoring the outcome in terms of biophysical parameters, especially prevalence of the various trypanosome sub-species in cattle blood samples.

Much of the research, and in particular the basic and strategic research, was led by British scientists, funded by DFID to research problems common to large numbers of African countries, using the infrastructure of British universities. Ugandan researchers had been a part of that effort before 1999, but from then on their active involvement became key to the way research was carried out on the Ugandan epidemic, and in the ways it could be communicated to Ugandan policy-makers.

The research effort was, therefore, long-term, characterised by research on multiple topics and at multiple levels, taking place in Britain, Uganda, Kenya and (in the case of the tsetse behavioural research) Zimbabwe. This does not exhaust a description of what could be called the “innovation system” behind the SOS Campaign. Also involved were the drug companies, multinational and Ugandan, engaged in formulating, testing and manufacturing the trypanocides and insecticides, as well as the various outreach workers, both the Makerere teams and later the 3Vs. As insecticidal spraying was done by or for individual farmers, rather than in the mass campaigns, farmers themselves need to be seen as part of this “system”. However, in this case at least, the innovation system needs to be seen not as something pre-existing, but as a construct we can use to describe the innovations that contributed to the SOS Campaign.

4. THE POLITICAL AND ADMINISTRATIVE CONTEXT

In the national political and administrative context of Uganda, two elements stand out as important for understanding the SOS Campaign: continuing patterns of insecurity and responses to it and the existence of relatively strong inter-sectoral mechanisms within the government for co-ordination on matters of trypanosomiasis control. This section reviews these and also discusses the overall context of limited government expenditure and public-private partnerships.

Insecurity

Uganda has a tragic history of armed conflict. Paradoxically, both conflict and post-conflict rehabilitation efforts have contributed in different ways to facilitating the spread of sleeping sickness. Three strands of conflict are relevant to the current analysis. During the fall of the Amin regime in 1978, Karimojong pastoralists from Moroto and Kotido Districts were able to arm themselves with automatic weapons and greatly intensified the existing pattern of intense cattle raiding (Zaal and Dietz, 1999, Epelu-Opio, 2009). Major victims of this were the Teso people of Soroti, Kaberamaido and neighbouring districts. Teso are linguistically close to Karimojong, but had long settled into mixed farming, including cotton cultivation using draught oxen. Karimojong raiding not only devastated this farming system, it also led to depopulation of the region and reversion of fields to bush that formed a more favourable habitat for tsetse fly (Hutchinson et al., 2003). Teso perceptions that the NRM government that came to power in 1986 was favouring the Karimojong were one factor in the “Teso War” of 1986-1992, which itself caused further disruption in Soroti and Kaberamaido Districts (Epelu-Opio, 2009). Following the return of stability in the late 1990s, the population returned, and was assisted by large-scale restocking and other agricultural programmes organised by the government and donors (Hutchinson et al., 2003).

However, these areas suffered renewed insecurity in the shape of the brutal insurgency carried out by the Lord’s Resistance Army. The LRA had been active in districts inhabited by Acholi

people in the far north of Uganda since 1987, but their attacks on civilians abruptly spread south-eastwards in June 2003 to districts inhabited by the Teso and Lango peoples — Lira, Apac, Kaberamaido, Katakwi and Soroti Districts (Lomo and Hovil, 2004). As a result, much of the population was displaced to camps guarded by the Ugandan army (in some cases sleeping in the camps and travelling back to their villages to farm by day, but still with grave impacts on their livelihoods). People in the camps only began to return properly to farming in 2006, and the task of rebuilding livelihoods has not been easy.

Once again restocking became a major feature of agriculture in the area. There are different accounts of the balance of spontaneous and assisted restocking. Lira and Apac Districts have seen considerable restocking implemented by NGOs but funded through the World Bank/government's Northern Uganda Social Action Fund (NUSAF), and implemented by the government through District Veterinary Officers under the AfDB-funded National Livestock Productivity Improvement Programme (NLPIP). In Kaberamaido it seems that the majority of restocking is spontaneous. For example, farmers use remittances from their educated children in Kampala to buy their own cattle.²⁰ The minutes of an SOS Campaign meeting state that 90 per cent of all restocking initiatives were "private", but this includes community initiatives funded through NUSAF.²¹

In government and NGO programmes, and spontaneous restocking, cattle have been largely sourced from districts in southeastern Uganda such as Kamali, Palissa, Tororo and Mbare, which are important endemic areas for *T b rhodesiense*, though some are sourced from Central Uganda. While, in principle, there are strict disease controls on cattle moving between districts, it is unclear to what extent NGO programmes comply with these²², and it is virtually certain that a large proportion of spontaneous restocking evades the controls.

²⁰ Author's interviews with farmers, May 2008.

²¹ Notes of a meeting at the Ministry of Agriculture, Animal Industries and Fisheries on September 15, 2008

²² Very different views were expressed by two district-level officials in Lira: one said that many NGOs involved in restocking never make applications for movement permits. See also Faculty of Veterinary Medicine (2009) and materials from CTVM.

Insecurity in neighbouring Southern Sudan, and its resolution, also had an impact on real and perceived trypanosomiasis risk in Uganda. The presence of Sudanese refugees in Masindi and Hoima (to the west of the SOS Campaign area) in 2000 was seen as a risk factor for the easterly spread of *T b gambiense*.²³ During 2008 there were increasing reports of Southern Sudanese livestock traders, or their agents, buying cattle as far south as Ocheri market to satisfy growing demand for meat in Juba town as it became a centre for rehabilitation and development programmes. This was contributing to the northward flow of cattle that was thought to be increasing the risk of trypanosomiasis transmission. However, in late 2008, strict quarantine regulations to restrict an outbreak of Foot and Mouth Disease were imposed across the region, closing down all legal trade in livestock and livestock products, and drastically affecting livelihoods.

Inter-sectoral Co-ordination

Uganda has a framework for co-ordination of work on trypanosomiasis control across the sectoral divisions of human health, animal health and environment, which sets it apart from other African countries. Co-ordination is vested in the Uganda Trypanosomiasis Control Council (UTCC), established by statute in 1992. UTCC was originally established to ensure the implementation of a master plan drawn up by government and donors in August 1988 and is composed of representatives “not below the rank of Under-Secretary” from a wide range of Ministries.²⁴ UTCC is seen as the policy-making body on trypanosomiasis control.

UTCC also has a secretariat, the Co-ordinating Office for Control of Trypanosomiasis in Uganda (COCTU). The technical committee, which is currently chaired by the Commissioner for Livestock Health and Entomology, advises on technical interventions, looks at workplans, and, through COCTU, makes recommendations to UTCC. Technical committee meetings receive

²³ Interview with Freddie Kansiime, COCTU, October 2008.

²⁴ According to the statute, UTCC comprised representatives from ministries responsible for animal health, human health, agriculture, local government, environment, tourism and wildlife, planning and economic development, finance, lands, and foreign affairs. Some of these portfolios have subsequently been combined.

presentations from others; COCTU will publicise the subject of a forthcoming meeting and invite other stakeholders or channel their requests to attend. Meetings are not necessarily held in Kampala or Entebbe; for e.g., seven or eight technical committee members, before the launch of the SOS Campaign, met in Kaberamaido with the entire district council, plus council staff and members of the public, and also toured displaced people camps and villages.

Structural Adjustment and Public-Private Partnerships

Like other African countries, Uganda has experienced structural adjustment and its effects on government services, but given the low baseline of service provision following the conflicts of the 1970s and 1980s, this has been less of an active cause for controversy than elsewhere in Africa. “Restructuring and downsizing” of government veterinary staff in the centre and in the field from the early 1990s affected the SOS Campaign in terms of the need to look to Makerere for human resources for the SOS Campaign and the need for alternative private sector mechanisms to deliver field-level services in the SOS districts.

In a liberalised economic climate, various forms of public-private partnership for development have become popular with donors and government, as surveyed by Steadmans (nd.) for the agriculture sector, and also in the human health sector.²⁵ There is currently discussion around a major programme for developing an export-oriented meat industry in Uganda (establishing disease control zones, animal health and meat hygiene services, and an export abattoir) following a feasibility report conducted in 2006-07, which was co-funded by NORAD and a Norwegian private company. The plan is to combine investment by farmers’ co-operatives, international finance institutions and private investors (Marc Moens pers. comm.).

Of course an even more fundamental context for the actions that were taken is the inability of the Ugandan government, like so many African governments, to fund development initiatives, and the assumption that these have to be met from donor (or perhaps now private) funds.

²⁵ Interview with Kakemba Abbas, October 2008, and also draft in circulation of the forthcoming “National Health Policy: Promoting people’s health to enhance socio-economic development”.

Critics would point out that this remains the case even when so much donor assistance is given in the form of budget support. Whatever the roots of this inability, or the ways to address it, it has certainly been a subtext for the formation of the SOS Campaign. From the point of view of government, the decisions behind the campaign were made “with very little dissent”.

Government policy-makers, such as those on the UTCC Technical Committee, say they felt “bound” by what researchers were telling them.

5. THE COMMUNICATION OF RESEARCH KNOWLEDGE

The research knowledge used to create the SOS campaign was communicated through a variety of formal and informal channels, within a web of institutional and personal connections between the main actors. A key element of the communication process was the centrality of the idea of the “threat of merger” between the two forms of sleeping sickness, which we can categorise as a *development narrative* (following Roe, 1991). This narrative constituted the context within which the external *threat* represented by the spread of *t b rhodesiense* sleeping sickness outside its traditional foci at the end of 1998 was understood and acted upon.

The most obvious way in which research evidence was communicated, and one clearly considered important by the authors, was through articles in highly prestigious peer-reviewed scientific journals.²⁶ Some Ugandan policy-makers read articles in scientific journals, but face issues of lack of access to the journals, lack of time, and wide remits covering many different scientific topics. As a means of communication to fellow-scientists these articles were undoubtedly important, but within the context of the SOS Campaign and in the eyes of Ugandan decision-makers they acted less as a means of communication, and more as a guarantee of quality for the research. This was especially important in the context of international fora such as the meeting convened by WHO in 2005. This guarantee of the excellence of the research was also important, to a smaller extent, in the process of due diligence that Industri Kapital undertook before becoming involved.

Although some of the Ugandan decision-makers were critical of researchers for not producing other outputs like briefing papers and executive summaries, information was being transmitted to them effectively in less formal ways. One event that made a particular impression was the visit by Eric Fèvre of Edinburgh to the Commissioner for Livestock Health at the end of 2001, and the workshop the commissioner then organised to discuss his findings.

²⁶ Especially the *Lancet* (Fèvre et al., 2001, 2005, Welburn et al., 2001) and the *British Medical Journal* (Picozzi et al. 2005).

Another channel was the major meetings and workshops, especially those in Addis Ababa in 2005 and Entebbe in 2006. The Addis Ababa roundtable made very public and formal, and announced WHO's support for, concerns that had been circulating for some time. Jenna Fyfe of CTVM gave a Powerpoint presentation entitled "The magnitude of the problem: current epidemiological evidence", using a variety of graphical means to present epidemiological statistics. Charles Waiswa of Makerere presented verbatim quotes from an informal gathering of district councillors, the District Veterinary Officer (DVO) and civil servants in Kaberamaido (Fyfe et al., 2005, Waiswa, 2005). These forms of presentation may well have influenced how research evidence was received in this meeting.

The Entebbe meeting not only catalysed the Memorandum of Understanding drafted the following day, it also appears to have been the major channel for the idea of Restricted Application (which had had very limited publication in scientific journals, and had not been tried on a large scale in Uganda or anywhere else) to be presented to, and accepted by, the Ugandan policy-makers.

In fact, in terms of effective communication, informal channels, regular presentations to the ministries, and the dense interpersonal networks between researchers and policy-makers were more important than either publications or the large set-piece meetings. The combination of all these channels helped to make the evidence persuasive and effective.

Communication took place within long-standing and dense networks (see Keeley and Scoones, 2003). Maudlin of Edinburgh (and the DFID Animal Health Programme) and Mitchell of Ceva had known each other for 20 years and Ceva had made drug donations to CTVM research over many years. Both had known Lawrence Semakula, Director of COCTU, for many years. Makerere scientists had worked alongside CTVM for some time, and key individuals, such as Freddie Kansiime, had worked as both researchers and policy-makers.

In addition, COCTU itself is a network. More specifically the UTCC Technical Committee functions as a network bringing together mid- to senior-level civil servants from a very broad range of ministries, including agriculture, health and finance. COCTU members had good links with Ugandan researchers in both FVM and LIRI, but the personal links were more effective in transmitting information than the institutional links.

The final aspect of communication within the campaign we wish to discuss was its crystallisation around a narrative. From around 1999 concern that the two forms of sleeping sickness might overlap in Uganda grew among researchers and policy-makers. One key argument for this concern was the 2002 Masters thesis for the London School of Hygiene and Tropical Medicine entitled “Consequences for control of the spread and overlap of *Trypanosoma brucei gambiense* and *Trypanosoma brucei rhodesiense* in Uganda” by Freddie Kansiime, a Ugandan medic who had been with COCTU²⁷ since 1994, and is now its Deputy Director. The merger was seen to be becoming more likely because of human and animal population movements, in part a response to insecurity in both Uganda and Southern Sudan (from where it was feared *T b gambiense* might spread). It was seen as concerning because of the difficulties of accurately diagnosing the two strains, the different recommended treatments, and the different implications for control. This threat of a merger²⁸ was mentioned in interviews by several policy-makers, and is stressed in literature from IKARE:

“The diagnosis and treatment of sleeping sickness is already problematic, but if the two forms of the disease were to meet then the situation would become almost impossible. These infections require different drugs but are extremely difficult to tell apart, hence diagnosis and treatment would be severely compromised” (Anne Holm Rannaleet, quoted in *IK News* 17, Autumn 2006).

²⁷ The Co-ordinating Office for the Control of Trypanosomiasis in Uganda, discussed in more detail in Section 3.

²⁸ Or “convergence” or “overlap”.

Details on *why* this is the case seem rare in both the scientific and the grey literature. Hutchinson et al. (2003) provide what seems to be the first summary of international literature on drug treatments in the context of the threatened merger in Uganda. Economic work under the present case study that started to quantify the costs of more difficult and less reliable diagnosis associated with a merger has instead focussed on the costs of a continued outbreak within the five project districts (the “interphase zone” between the *rhodesiense* and *gambiense* zones), as these costs are both far larger than, and will be felt well in advance of, the costs of merger.²⁹

The “imminent danger of merger” has become what Roe (1991) has called a “development narrative”. A development narrative

“has a beginning, middle, and end...Development narratives tell scenarios not so much about what should happen as about what will happen – according to their tellers – if the events or positions are carried out as described... [They] have the objective of getting their hearers to believe or do something” (Roe 1991:288).

Keeley and Scoones (2003), who prefer the term “policy narratives”³⁰, discuss the sources of their power.

“Knowledge finds its way into policy through the prolonged reiteration of these pragmatic tales of cause and effect. Such messages are easily communicated: they make for good sound-bite political marketing, and they fit well with demands for clarity and measurable manageability of large-scale bureaucratic organisation. Given these selling points, the reasons for their persistence seem all too clear (Keeley and Scoones 2003: 38).

²⁹ Discussions with Alex Shaw.

³⁰ Also discussed by Leach and Mearns (1996).

As Roe points out in contrast to Keeley and Scoones' more negative tone (though it is important to note that for none of these authors is it implied that a narrative is necessarily true or untrue; rather, that it is simplified and easily communicated) narratives have to be made use of. Roe (1989) also uses the idea to discuss specific plans for intervention, as distinct from general narratives around development problems. He illustrates this with the case for aerial spraying against the outbreak of medfly in California in 1981. Roe suggests that this narrative won out against a rival narrative of combined ground treatment and sterile insect release not because it was more true — there was huge scientific uncertainty around both — but because it was simpler, more stand-alone and less internally contradictory.

In Uganda the simple and easily communicated plan for mass trypanocidal treatment to “clean” cattle of parasites, followed up by insecticidal spraying to control tsetse, can thus also be seen as a narrative — one that was successfully sold to policy-makers, and that, in turn, brought to centre-stage the private sector, which could provide the materials. It is important to emphasise again that the literature cited does not argue that narratives are fictional, but that they are very specifically structured ways of communicating information. In the Ugandan case, both the threat-of-merger narrative and the mass-treat-and-spray narrative were solidly based in fact. However, the attractiveness as a narrative of spray-and-treat was one factor in distracting attention from the concomitant need for effective cattle movement control.

The Addis Ababa roundtable recommended that the government with its partners “map out routes of livestock movements and ensure treatment of cattle at livestock markets”, and this has also been a clear implication of much of the published research, as far back as Fèvre et al. (2001).

A clear structure is in place on paper requiring trypanocidal treatment and certification of animals moved between districts. A discussion between government, Ceva, IKARE, Edinburgh and Makerere in September 2008 underlined the importance of effective movement control and enforcement of treatment of animals sold in markets. But implementation clearly

continues to be very patchy, and it appears some traders and even some NGOs wholly bypass controls. Improving this situation will take political will, a readiness to take on vested interests, and effective deployment of government's own resources. Given the external resources, and the consensus of enthusiasm around the simple narrative of mass treatment and spraying, it is easy to see why implementing effective movement control has been given a lower priority.

The narratives were bolstered with the use of “killer facts”. The figure of 86 per cent as the proportion of cattle needed to be block-treated was one such. Even more important was the figure of 2 US cents as the cost of treating a cow with insecticide by restricted application, a figure published in scientific literature (Kabasa, 2007), but not argued for in detail. The fact that it has been misquoted without correction as 0.02 US cents further bolsters the impression that it has been used loosely but impressively to mean “very little indeed”. It was useful in focussing policy-makers' attention on the opportunities presented by restricted application, but perhaps distracted attention from the issues of farmer purchasing-power and willingness to pay that amount, which emerged as the 3V programme unfolded. Such simplifications of research findings into narratives and killer facts are useful, but can also be double-edged.

6. THE ROLE OF THE PRIVATE SECTOR

Private sector players have been vital in both the realisation of mass treatment and spraying, and the subsequent attempts to build sustainable institutions for drug delivery. This section will further discuss their motivations, and raise some questions on the consequences of private sector involvement.

The SOS Campaign has been mentioned as a “public-private partnership” (PPP), for example, by Kabasa (2007), Mitchell (2008), Waiswa (2008) and Maudlin (nd). This term is notoriously loose of definition, and often defined mainly by what PPPs are not.³¹ The OECD Glossary defines public-private partnerships (PPPs) as “arrangements whereby the private sector provides infrastructure, assets and services that traditionally have been provided by government”. The SOS Campaign certainly fits within this definition. But the UK Treasury (H.M. Treasury, 2000) lists three pre-eminent types of partnership (partial privatisation, long-term commitments by government to purchase services from the private sector, and partnerships for commercial sales of government services), none of which bear much resemblance to the campaign. The government has not provided capital, or a subsidy, or a guarantee of purchasing services. The private sector has donated human resources, consumable supplies and running costs, but has not invested capital, or entered into any agreement that is particularly binding over the long-term.

The campaign is probably better thought of as an exercise of Corporate Social Responsibility (CSR):

“Corporate social responsibility is the commitment of business to contribute to sustainable economic development — working with employees, their families, the local community and society at large to improve the quality of life, in ways that are both good for business and good for development” (World Business Council for Sustainable Development, nd).

³¹ For example, Gerrard (2001) contrasts PPPs with privatisations and with traditional public sector procurement.

The term is certainly accepted by both Ceva and IKARE. Mitchell of Ceva used the term “corporate social responsibility” in a presentation of the campaign to INSEAD, and the Industri Kapital/IKARE representative used it in interview (about her own organisations and Ceva). Industri Kapital/IKARE was, once it divested from Ceva, engaging in philanthropy³², but the actions of Ceva fit better under what has been called the “business case for CSR” (Zadek, 2001 and many other sources). In terms of Zadek’s classification of different business cases, Ceva’s motivations could be categorised as “Traditional/ Cost Benefit”, “Strategic” and “New Economy/ learning innovation and risk management”. Their engagement manifested a long-run hope of building a market; an interest in contributing to the education of consumers and traders; and a desire to learn what works

The leading role of both Industri Kapital and Ceva has had one important implication, and possibly a second. Firstly, the way the campaign was run was striking in its flexibility. Stakeholders were unanimous in agreeing that the campaign was very different in this respect to what it would have been like under traditional donor funding — with logframes and the like. Activities could be improvised as needs arose and understandings became clearer. Especially in the phase of supporting the 3V Vets, fundamental objectives were left fuzzy until they had been in the field almost six months.

The original objectives behind mobilising the 3V Vets were complex and somewhat ambiguous. The head contract for their engagement gives a key objective: “to initiate and co-ordinate the establishment of a commercial logic for livestock owners to purchase [the three products and] to ensure the products are widely available at all key points in the SOS area”. Key items in the job description were: interaction with government and NGOs; maintaining high visibility at main markets; developing contact and sales through all local traders in agro-veterinary products;

³² Recent writing on CSR and development has sometimes tended to exclude philanthropy, often defined as donations made post-profit (Jenkins 2005), or activities “not related to the core business strategies of companies” (Prieto-Carrón et al., 2006: fn 33), but to exclude this from a discussion of CSR in the present case seems unnecessarily narrow.

community work (demonstrations of spraying with Vectocid and training of community sprayers); and work with local media.

For Ceva the main objective was to “fully test whether there was a viable market” for the insecticide. The IKARE representative stated that at the beginning there was “no clear vision”, but that the main tasks were “messaging and mapping”; mapping the complex landscape of small businesses and NGOs that might act as channels for sales. For the 3V Vets, interviewed in October 2008, the task they spent most time on was “sensitisation”. They saw themselves as fundamentally different from drug shops, “people educators” and “preachers of the gospel”. In line with this, the margin they were making on drug sales by October 2008 was in the order of only 10 per cent of the amount they received as salary from the SOS Campaign.

This flexibility was definitely a strength in allowing a period of “testing the market”, followed by a switch to promotion of the 3Vs as businessmen. But the apparent lack of a long-term commitment to that promotion (and the apparent divergence of the aims of Industri Kapital and Ceva) has been perceived by the 3Vs themselves as a serious source of uncertainty, which is itself constraining the development of their businesses in ways that also foster trypanosomiasis control.

The story of the 3V vets is, as yet, unfinished. At the time of writing, it is not clear whether the 3Vs will sustain themselves as successful rural businessmen. In particular it is not clear if they can be supported by farmers, whose ability to pay for drugs is systemically undermined by shocks such as conflict, market bans and droughts. It can be argued that these fundamental issues of effective demand, which should not have been unexpected in the context of African smallholder livelihoods, should have been addressed more carefully in the process of business planning facilitated by IKARE and an international trainer supplied by them.

It is also not clear whether the imperative of business survival (in which they have been trained, then forced by the forthcoming withdrawal of their salary/subsidy) will allow them to continue

to encourage sufficient take-up of spraying to give the necessary degree of tsetse control, rather than neglecting promotion of Vectocid in favour of other products, or even selling large amounts of supposedly cheaper anti-tick preparations that have no efficacy against tsetse.

These are empirical questions that will need to be answered by continued monitoring, but there is also a general question of whether there is a tension between the initiative's dual objectives of sustainability of businesses, which implies maximising drug sales and diversifying to a broad range of drugs, and sustainability of sleeping sickness control, which will require attention to “messaging” and encouraging farmers in an activity that has a certain public good aspect.³³ Such a tension may well increase as control works and the visible immediate threats of nagana and sleeping sickness recede. If there is such a tension, there is a further question of how it can be managed, and precisely how the 3V Vets can be incentivised or required to promote the appropriate chemical for tsetse control, particularly if there is no further subsidy to the 3Vs and thus no effective contractual hold over them.

³³ The efficacy of tsetse control depends on a certain proportion of farmers within communities spraying their cattle — unlike the private benefits of tick control (Eisler et al., 2003).

7. CONCLUSION

A detailed description of the SOS Campaign allows consideration of the complex ways in which research knowledge can be put to policy use, and the complex factors that facilitate or encourage that process. Court et al.'s (2005) trichotomy of context, evidence and links is useful here. The relevant context is provided by conflict and the unplanned or misplanned movements of people and cattle that generated conditions for a disease outbreak, as well the readiness of the Ugandan government to look for both external aid and partnerships with private capital. A positive aspect of the context was the unusual degree of co-ordination within government between human health and livestock policy-makers. Finally, the disease outbreak itself provided the crucial part of the context, an *external threat* that brought policy-makers and many other stakeholders together.

The evidence used in the campaign was generated through several strands of long-term research, taking place in various countries, and at various levels between “blue-skies” and adaptive, and that the gathering of data and generation of knowledge continued during and through the campaign itself. The combination of these strands of research, and their use in designing and implementing the SOS Campaign, was made possible by a dense and longstanding network of relations between the major stakeholders, within which research information could be transmitted informally, and an easily communicable narrative, complete with its own killer facts, expressing a particular reading of the external threat and responses to it.

In addition to these factors, the SOS Campaign was unusual in the involvement of major private sector players, who were ready to become involved as a form of corporate social responsibility, and to see the project managed with a flexibility that was very different to the style of traditional development donors.

From the evidence of serological monitoring and the reporting of human sleeping sickness (Welburn, 2009), the SOS Campaign has been a success. In terms of the sustainability of that success, much remains to play for. It can be argued that the very success of the initiative has distracted from the equally important but more difficult task of enforcing cattle movement control. Flexibility has had the downside of creating uncertainty and tension between objectives. Information flows have been largely top-down, with a relative absence of learning from farmers, and the hard realities of building service delivery businesses between impoverished farmers and a global market have become more apparent. These issues require further research and further reflection.

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