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## PRESS INFORMATION

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### **The "Stamp Out Sleeping sickness" (S.O.S.) Initiative**

The Stamp Out Sleeping sickness (SOS) campaign is a public private partnership launched in Kampala, Uganda in October 2006. This partnership was formed in response to an emergency situation arising in a number of districts in Northern Uganda where the two existing strains of human sleeping sickness (Rhodesiense and Gambiense) threatened to converge. This could have had a catastrophic effect for the already stretched local health services, as well as for the rest of Africa. The WHO (World Health Organisation) believes that were the two diseases to overlap, treatment would be more difficult due to the different efficacy of available drugs for the two forms of the disease.

The initiative brings together the Government of Uganda represented by COCTU (Co-ordinating Office for the Control of Tsetse and Trypanosomiasis in Uganda), the private sector represented by Ceva Santé Animale, a multinational veterinary pharmaceutical group headquartered in France and IKARE (a UK registered charity whose main donor is the pan-European private equity firm IK Investment Partners) and the academic world through the University of Edinburgh, Scotland and Makerere University, Uganda.

Together with research inputs from the World Health Organisation, The Wellcome Trust and the DFID Animal Health Programme, phase I of SOS represents a combined investment of more than USD 900,000.

#### **The aim of the initiative**

Recent findings have shown that the most efficient way of fighting the Rhodesiense strain of sleeping sickness in rural communities is by treating cattle (the most important reservoir of the sleeping sickness parasite which is then transmitted to humans).

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## CONT, PRESS INFORMATION

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Rather than “only” aiming to treat cases of the acute human disease, the initiative set out to attack the problem at source by treating the cattle reservoir and therefore preventing tsetse fly transmission. The initiative needed to prove not simply its efficacy but that it could also be sustainable by providing farmers with the know-how and access to affordable veterinary services and products, so they could do it “for themselves”.

Research has shown that by treating over 80% of the cattle population with trypanocidal drugs and then spraying them on a regular basis with insecticides (to avoid re-infection and suppress tsetse flies) human-infective parasites circulating in cattle can be eliminated. If there are no sleeping sickness parasites in cattle in areas affected by the zoonotic Rhodesiense sleeping sickness, there will be no new cases of sleeping sickness in people.

It has been shown that applying the insecticide only to those parts of the body where tsetse flies like to feed (Restricted Application Protocol or “RAP”) – the belly and the front legs - as well as for the added benefit of tick control - the ears - is as effective as conventional whole-body spraying, but at a fraction of the cost.

### **Achievements so far**

During the eight weeks of the initial emergency intervention, final year veterinary students from Makerere University successfully treated approximately 250,000 cattle in five districts in Northern Uganda, reducing the prevalence of the sleeping sickness parasite in the cattle by close to 70 per cent. After treatment each animal was also sprayed with a deltamethrin based insecticide spraying only the legs and belly of the cow, as well as spraying the ears for ticks, in order to prevent re-

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## CONT, PRESS INFORMATION

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infection as well as reduce the numbers of ticks and tsetse flies. (See below for additional treatment data).

This was the first time the veterinary students were given a chance of hands-on in-field experience and an opportunity to do community service, making them much better equipped for their future working lives in the public and private sectors. This positive and highly motivational experience has led the Veterinary Faculty at Makerere University to adapt its curriculum in order to accommodate such lecture free periods. The In-field Training and Community Service ("InTracs") programme now allows students on an ongoing basis to be deployed in-field and undertake treatment, spraying, sampling, interviews etc during these weeks.

Because protective spraying with insecticides needs to be repeated on at least a monthly basis, the SOS partners recognised a need to educate farmers and key stakeholders further about the causes of sleeping sickness and the close links between animal health and human health. This was a challenging task in an area with many "competing" health priorities but fortunately by the end of 2007 the immediate threat of crisis had been averted.

Even more importantly, during 2009, the five first SOS communities have demonstrated their determination to protect their own futures by working together with five young veterinarians, originally part of the Makerere student group. With the experiences gained from the intervention, the five young people, encouraged by the community, had identified enough demand for the products and services offered by them, to decide to build their own businesses - this is the basis of the so called "3 V Vet Initiative". IKARE and CEVA, working together with their local partner High Heights Services Limited are providing financial

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## CONT, PRESS INFORMATION

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as well as non-financial support to these emerging businesses. The objective is to build up a permanent distribution chain for veterinary products and services in previously unserved rural areas.

### **What lessons have we learned from SOS?**

**It works** - Integrated control of tsetse and ticks by first “cleaning” animals of *T.b.rhodesiense* infections through treatment and then preventing re-infection by regular spraying of legs and belly (and ears for ticks) of the animals is efficient and can be carried out at a reasonable cost (USD 0.06 per cattle per month for farmers doing it themselves or USD 50 per km<sup>2</sup> of organised mass-treatment) compared to other forms of control.

**Who pays?** - Livestock owners pay and do have cash available to keep their cattle “tryps free” but there are limits as to how far they are able to travel and how much they are prepared to spend. The visible benefits of having fewer flies (including nuisance flies) and controlling ticks are as important “levers to purchase” as the “invisible benefit” of controlling tsetse and sleeping sickness.

**Organisation/motivation** - As with many other provisions of services which can benefit both individuals and the community as a whole, some form of public programme is required. There is currently a void in the provision of veterinary services as a result of policy decisions which reduced government involvement and spending in the 90’s and absence of private sector activity to fill in. It is debatable whether the full responsibility and cost for tsetse control should be borne by individual cattle owners.

There is also a need to re-think how veterinary students and animal assistants are best trained for the tasks that face them and how best to

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## CONT, PRESS INFORMATION

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find ways to ensure that they are able to live and work close to communities, who so obviously need and demand their services. In addition, the animal health service providers in affected areas need to be better equipped with information on sleeping sickness, currently classified as one of the neglected zoonotic diseases.

**“Models don’t work, tailored animal health solutions do”** - The SOS partnership with its innovative utilisation of veterinary students to carry out block treatment of cattle in local communities (InTracs) and the use of RAP technology is one example of how the private and public sectors can partner up to improve delivery of animal health services in rural and other areas.

The intervention has helped to establish five of the former Makerere students in business. They now run their own veterinary practices, as well as supply products to more than 60 spray pump operators, who in turn carry out regular commercial spraying of cattle at the local village level. The livestock owner is simply charged a “fee per head” and has none of the difficulties of sourcing and securing product etc. This type of infrastructure is a key component of ensuring that re-infection does not occur.

**The SOS initiative has therefore been very successful in:**

1. Preventing the convergence of the two forms of sleeping sickness.
2. Reducing the cases of sleeping sickness in the areas where treatment of cattle was undertaken.
3. Creating employment through the provision of veterinary products and services.
4. Improving the health and livelihood of cattle and people in the SOS area.

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## CONT, PRESS INFORMATION

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5. Providing the undergraduate veterinary students with an opportunity for hands-on in-field training and community service, equipping them much better for their working lives.

### **Additional treatment data**

Cattle in the Dokolo and Kaberamaido districts were treated with isometamidium chloride, which has a prophylactic effect against trypanosome infections for up to three months. Cattle in the remaining SOS target treatment area (districts of Lira, Amolatar and Apac) were treated with diminazene aceturate, which is curative, but does not have a prophylactic effect against new trypanosome infections. The choice between the two depended on the level of infection in the district.

### **About Sleeping Sickness - Human African Trypanosomiasis (HAT)**

HAT is a vector-borne parasitic disease. The parasites are transmitted to humans by the bite of an infected tsetse fly (Genus Glossina), which acquired its infection from feeding on animals harbouring the human pathogenic parasites or from an infected person. A person is more than 1,000 times more likely to be infected from a tsetse having previously fed on an infected cow than another person. As the disease can be transferred from animals to humans it is called a zoonotic disease.

- 60 million people at risk in 37 countries
- 30,000 – 50,000 new cases reported per year
- An estimated 300 000 - 500 000 people are currently affected by the disease
- 48,000 deaths / year
- 1.5 million DALYs<sup>1</sup> per year

There are two human forms of the disease – the chronic form called Gambiense sleeping sickness as well as the acute form known as Rhodesiense sleeping sickness. Uganda is the only African country unfortunate enough to host both of them.

More than 100 people die everyday from sleeping sickness in Africa.

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<sup>1</sup> DALYs = Disability Adjusted Life Years. The sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability.

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## CONT, PRESS INFORMATION

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### **Animal trypanosomiasis (Nagana)**

Other parasite species and sub-species of the Trypanosoma Genus are pathogenic to animals and cause animal trypanosomiasis in many wild and domestic animal species, causing lower productivity, weakness and eventual death. All of these symptoms can have devastating effects on farming and food production in affected areas as, if oxen are too weak to plough crops are not planted; nor will cows calve properly nor produce enough milk. Without being affected, animals can also host the human pathogenic parasite acting as long-term reservoirs of the disease.

The northward spread of the disease in Uganda is associated with movement of cattle carrying the human-infective parasites. It is only in recent years that new sensitive diagnostic tools have revealed the importance of the cattle reservoir of infection for sleeping sickness. It is now believed that most cattle in endemic areas carry the human-infective parasites.

Recent findings have shown that the most efficient way of fighting the Rhodensiense strain of sleeping sickness in rural communities is by treating cattle, either with isometamidium chloride, which has a prophylactic effect against trypanosome infections for up to three months or with diminazene aceturate, which is curative, but does not have a prophylactic effect against new trypanosome infections. The choice between the two usually depends on the level of infection in the district. In order to avoid re-infection cattle should then be sprayed with insecticide on a regular (monthly or ideally bi-weekly) basis.



### **Geographical distribution of the disease**

The disease occurs in 37 countries, all in sub-Saharan Africa. The most severely affected are amongst other Sudan, Uganda, Tanzania, Democratic Republic of Congo and Angola. The prevalence of the disease differs greatly from one country to another as well as within different regions of each country.

Sleeping sickness mostly affects the most active (15-45 years old) and poorest parts of the populations living in remote rural areas of Africa. Uganda is the only country in Africa where the two forms of the disease occur. The chronic form of the disease (Gambiense) occurs in north-western part, near the Sudanese border and until recently, the acute form (Rhodesiense) of the disease was confined to the south-east of the country. But since the late 1980s, acute sleeping sickness has been spreading north, as cattle were imported back into areas which were previously unstable because of civil strife and there was in 2006 a real risk that the two forms of disease would overlap. This was the original rationale of the SOS initiative, to treat the five districts at the epicentre of the possible convergence and drive the extent of the *T.b. rhodesiense* belt back south once more.

### **Infection and symptoms**

The disease is transmitted through the bite of an infected tsetse fly. The trypanosomes multiply in subcutaneous tissues, blood and lymph. After a first "common" stage of the disease (fever, headaches, joint pains and itching), the second stage begins when the parasite crosses the blood-brain barrier and invades the central nervous system. In general this is when the signs and symptoms of the disease appear: confusion, sensory disturbances and poor co-ordination. Disturbance of the sleep cycle, which gives the disease its name, is an important feature of the

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## CONT, PRESS INFORMATION

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second stage of the disease. Without treatment, sleeping sickness is fatal.

The chronic form represents more than 90% of reported cases of sleeping sickness and may last for years in the infected person without major signs or symptoms of the disease occurring. When symptoms do emerge, the patient is often already in an advanced disease stage, when the central nervous system is affected.

The acute form represents less than 10% of reported cases. First signs and symptoms are observed after a few months or weeks. The disease develops rapidly and invades the central nervous system.

### **Disease management**

Every attempt to curb sleeping sickness has faced a number of difficulties, which hinder or even stop the progress made:

- the disease only occurs in sub-Saharan Africa, where poverty, social instability, insecurity, and consequently weak health systems are often “the norm”.
- the disease is rural, occurring mostly in remote, difficult to access areas, with poor or no access to health services;
- current tools to combat the disease require a technical and medical competence of calling for specialized staff with extensive experience and strong dedication, which places severe pressures of implementation on national health services,
- the disease competes with other pandemic diseases e.g. malaria and HIV, consigning sleeping sickness to a low rank in health priorities, thus receiving little support from national health authorities and donors.

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## CONT, PRESS INFORMATION

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### **Treatment**

Only four drugs are registered for the treatment of Human African Trypanosomiasis which all have a certain level of toxicity and can have severe side-effects, including death.

The treatment regime is still complex, all patients should be followed up for two years with lumbar punctures every six months to look for relapse. This is extremely difficult to organise and sustain in many of the areas where sleeping sickness is endemic.

### **The SOS-partners**

#### **CEVA Santé Animale**

CEVA Santé Animale headquartered in Libourne, France is a multinational veterinary pharmaceutical group with 2, 274 employees worldwide. The company has 46 sites around the world, 14 manufacturing plants, 6 Research centres (2 Pharmaceutical and 4 Biological) with revenues of EUR 395 M of which 8.3% are allocated to research.

#### **COCTU Coordinating Office for Control of Trypanosomiasis in Uganda (COCTU)**

In 1986, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) created the Uganda Trypanosomiasis Control Council (UTCC) to deal with the issue of sleeping sickness. The UTCC later created COCTU to supervise the initiation, formulation, negotiation and implementation of all projects involving the control of tsetse and trypanosomiasis in the country.

#### **High Heights Services Limited (HHS)**

HHS is a private company registered in Uganda and was founded in 2007. HHS aims at promoting public private partnerships in providing services to the rural communities through helping in the establishment and management of small scale business. It has a particular focus on services that promote the one health concept through community engagement in problem identification and solving.

#### **IKARE**

IKARE (IK Aid and Relief Enterprise) is an independent charity founded in 2006. IKARE aims at transferring key business concepts, such as

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## CONT, PRESS INFORMATION

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fund utilization efficiency and financial transparency as well as project management skills, from the private equity industry into the causes it supports. Starting small-scale and focused, IKARE's resources are presently fully dedicated to the "Stamp Out Sleeping sickness" initiative. IKARE's main sponsor is IK Investment Partners.

### **IK Investment Partners**

IK Investment Partners (formerly known as Industri Kapital) ("IK") is a European private equity firm, having raised a total of EUR 5.7 billion, including EUR 1.7 billion in the latest fund IK2007. Since 1989, IK has acquired 69 European companies. IK invests mainly in mid-sized companies with strong cash flow and profit improvement potential, operating in mature industries with fundamental underlying growth.

### **Makerere University**

Often referred to as the "Harvard of Africa", Makerere University established in 1922 is the oldest and largest university in Uganda. Makerere University has 22 faculties, institutes and schools offering programmes for about 30,000 undergraduates and 3,000 postgraduates.

### **University of Edinburgh, Centre for Tropical Veterinary Medicine (CTVM)**

The CTVM was established in 1970 as a department in the faculty of Veterinary Medicine of the University of Edinburgh. CTVM's research laboratories are fully equipped for the techniques associated with modern immunological and molecular biological studies of entomology, helminthology, virology, bacteriology, protozoology, nutrition and animal production. CTVM's staff number around 60 in the UK and in developing countries.

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## CONT, PRESS INFORMATION

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### **Contacts:**

CEVA Santé Animale (France): Martin Mitchell  
martin.mitchell@ceva.com/ Phone: +33 5 57 55 40 80

High Heights Services Limited (Uganda): Professor Charles Waiswa  
[cwaiswa@yahoo.co.uk](mailto:cwaiswa@yahoo.co.uk), charles.waiswa@vetmed.mak.ac.ug /  
Phone: + 256 772 801 247

IKARE/IK Investment Partners (pan-European): Anne Holm Rannaleet  
anne.rannaleet@ikinest.com / Phone: +46 70 378 9550

Makerere University (Uganda): Professor John David Kabasa  
kbasajd@vetmed.mak.ac.ug / Phone: +256 772 499 27

University of Edinburgh (UK): Professor Susan Welburn  
sue.welburn@ed.ac.uk / Phone: +44 77 4095 0863

**[www.stampoutsleepingsickness.com](http://www.stampoutsleepingsickness.com)**