

## **Experiences with community-based and participatory methods for rinderpest surveillance in parts of southern Sudan**

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### **1. Background**

#### **1.1 The southern region of Sudan**

The southern region of Sudan has a long history of underdevelopment and conflict. The conflict areas have an estimated population of 5.5 million people of numerous different tribal groups. The majority are transhumant agro-pastoralists, whilst some are nomadic pastoralists, or agriculturalists. There are approximately 6 million cattle, 12 million sheep and goats, and most households keep a few chickens (Jones et al, 1998). In spite of ongoing conflict many areas are relatively stable but are undeveloped and remote, with a harsh climate and difficult terrain. These areas, therefore, have much in common with other pastoralist areas of Africa.

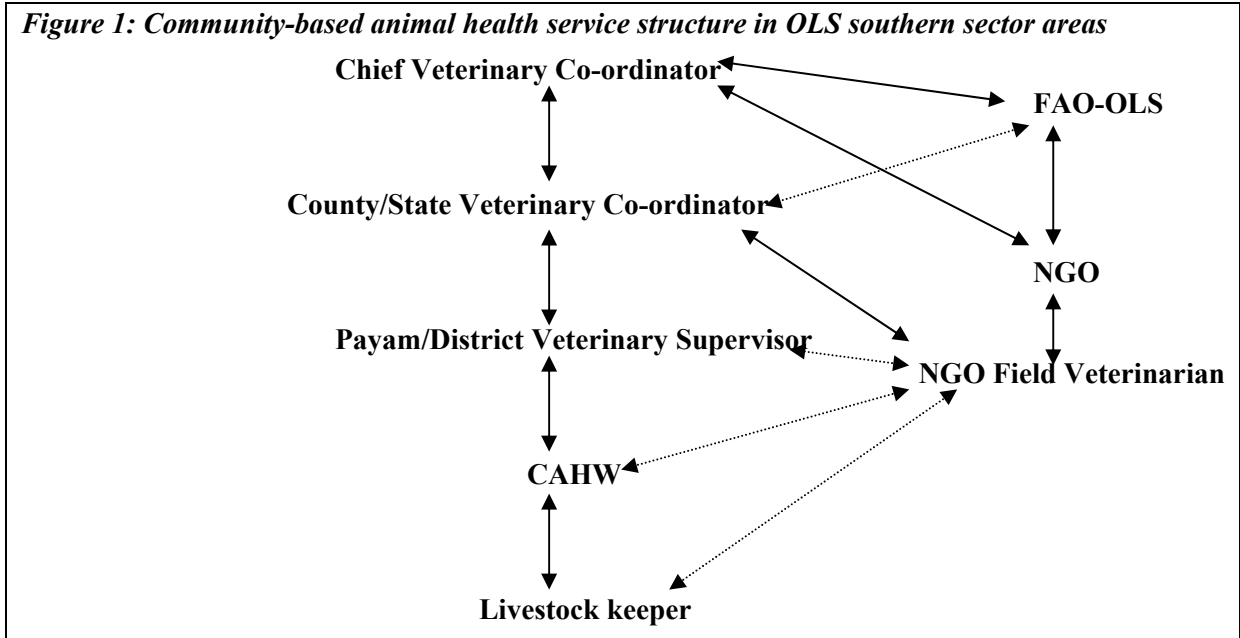
Operation Lifeline Sudan (OLS) was formed in 1998, as a result of a tripartite agreement between UNICEF, Government of Sudan and Sudan People's Liberation Movement to provide emergency relief to areas affected by conflict in southern Sudan. Southern conflict areas were served by OLS Southern Sector, which is a consortium of UN agencies and NGOs, whilst the rest of southern Sudan was served by OLS Northern Sector, composed of UN agencies in partnership with the Government of Sudan. In 1993, UNICEF OLS Southern Sector started a programme to develop a community-based animal health service<sup>1</sup>. UNICEF OLS Northern Sector started a similar programme in 1996 in partnership with PARC Sudan. Initially the programmes focused on rinderpest control using thermostable vaccine, but have gradually widened the activities to include control of other major cattle, sheep, goat and poultry diseases (Jones *et al.*, 1998). In OLS Southern Sector, treatments and vaccinations are currently provided by 1,500 community-based animal health workers (CAHWs) on a cost recovery basis, under the supervision of 180 local Veterinary Supervisors and Co-ordinators, and 40 NGO field veterinarians and livestock officers from 12 NGOs<sup>2</sup> (Figure 1).

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<sup>1</sup> In 2000 UNICEF handed over the livestock programme and its co-ordination to FAO-OLS.

<sup>2</sup> NGOs currently participating in the OLS southern sector livestock programme are: ACORD, ADRA, DOT, NPA, Oxfam-GB, SC-UK, VSF-Belgium, VSF-Suisse, VSF-Germany, Network Services Trust, and World Relief.

**Figure 1: Community-based animal health service structure in OLS southern sector areas**



The activities of the NGOs are co-ordinated by the lead livestock agency, Food and Agriculture Organization (FAO)-OLS. Veterinaires sans Frontieres (VSF)-Belgium is the lead agency in rinderpest eradication in the southern sector and supports the following projects:

- Community-based animal health projects are implemented in selected areas of southern Sudan.
- The South Sudan Animal Health Auxiliary Training Institute trains Animal Health Auxiliaries (AHAs), initially for four months, followed by a further 5 months training for the more able AHAs. Most AHAs become Veterinary Supervisors or Co-ordinators. The programme provides refresher training for AHAs and short specialized training courses.
- The Rinderpest Project, which is funded by the African Union – Interafrican Bureau for Animal Resources (AU-IBAR) Pan African Programme for the Control of Epizootics (PACE) to co-ordinate and implement rinderpest eradication activities in OLS Southern Sector areas.

### **1.3 Rinderpest Eradication**

The internationally recognized objective of Global Rinderpest Eradication Project (GREP) is to eradicate Rinderpest from the world by 2010. Sudan has a national strategy, based on the OIE pathway, which has been developed by PACE and has involved stakeholders from both northern and southern Sectors, in cooperation with PARC Sudan. Several milestones are part of the strategy, one being that Sudan must achieve a status of ‘disease free’ by the end of 2005. Stakeholder meetings

between both northern and southern sectors keep all groups abreast of activities and ensure a harmonised approach to rinderpest eradication.

The community-based animal health programmes in southern Sudan have contributed to the achievement of the first stage of rinderpest eradication; the reduction of rinderpest outbreaks, using mass vaccination carried out by CAHWs (Jones, 2001). There has been no confirmed outbreak of rinderpest since 1998. In late 2001, AU-IBAR PACE contracted VSF-Belgium to implement the 'Fight Against Lineage One Rinderpest Virus Project' for southern Sudan (VSF-Belgium Rinderpest Project). The main activities of this project are to co-ordinate and implement rinderpest eradication activities in OLS southern sector areas, in co-ordination with PACE Sudan.

## **2. Rinderpest surveillance**

Mass rinderpest vaccination ceased throughout Sudan in June 2002, therefore, the current focus for rinderpest eradication is on surveillance. The aim is to have a very sensitive system of surveillance that will detect any cases of rinderpest-like disease and that will build up a body of evidence to verify that there is no rinderpest present. It is too early to use sero-surveillance because mass vaccination has only recently stopped. In the absence of conventional veterinary services in OLS southern sector areas it was necessary for the VSF-Belgium Rinderpest Project to develop a rinderpest surveillance system that could be carried out by the existing network of CAHWs, supervisors and field veterinarians, with support from the four Rinderpest Project veterinarians, and could generate surveillance information to be reported to PACE Sudan.

### **2.1 Baseline livestock and disease information**

Baseline livestock and disease information is collected whenever a community-based animal health project starts in an area. Field veterinarians carry out an initial baseline survey with the local animal health workers using a variety of conventional and participatory appraisal (PA) techniques<sup>3</sup>. The information is updated as the project continues. This baseline information has been drawn on by the Rinderpest Project to better understand the epidemiology of rinderpest in southern Sudan (Jones, 2001) and the project is constantly adding to this information during field visits. Livestock resource maps and seasonal calendars have been prepared for most areas using animal health workers and livestock keepers as informants. These are used to assess coverage, plan surveillance and as components of the local rinderpest outbreak contingency plan.

### **2.2 Reporting of outbreak rumours and outbreak investigation**

The OLS Southern Sector Livestock Programme has already developed a system for reporting disease outbreaks and the Rinderpest Project aims to strengthen this system through training and awareness raising. All animal health workers are responsible for reporting all disease outbreaks that they observe or that are reported to them. A CAHW receiving a report will carry out a basic investigation (history

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<sup>3</sup> Details of PA techniques that are useful for livestock activities can be found in various books and documents e.g. RRA Notes, 1994. Collection of baseline information is comprehensively discussed in Catley et al, 2002.

and clinical examination) and then provide a verbal report to the supervisor. The supervisor initially sends a radio message<sup>4</sup> with the first details of the outbreak report and then carries out a further investigation, which includes history, clinical examination, and sample collection if appropriate. He/she then fills in an outbreak investigation form (Fig 2), which is sent to the OLS veterinary laboratory in Lokichokio, Kenya, close to the Sudan border. At the same time he/she sends a second radio message summarizing the information, control measures being taken, and further assistance required. If there is a field veterinarian in the area, they provide support to the supervisor during this process.

Rinderpest reports receive special attention. Whilst CAHWs, Vet Supervisors and field veterinarians are responsible for the initial investigation, whenever possible a field investigation is carried out by a Rinderpest Project veterinarian to verify the findings. Outbreak sampling kits and rinderpest penside tests are provided in base locations for Vet Supervisors and field vets to collect samples, although the cold chain may not be adequate in some areas to support this. A \$500 reward is being offered to be shared amongst the key people involved in the reporting and investigation of the first confirmed case in a rinderpest outbreak, e.g. the livestock keeper, the CAHW, Vet Supervisor, and field veterinarian.

From January to July 2002, there were 33 disease outbreak reports of which 19 were rinderpest rumours. The 19 reports of suspected rinderpest came from 15 different counties or states (see Figure 3): 3 reports were made to the OLS veterinary laboratory by community members, 3 by Veterinary Supervisors, 7 by Veterinary Co-ordinators, 4 by field veterinarians and two came from OLS northern sector via FAO and an NGO. The action taken as a result of the 18 reports occurring within OLS southern sector is summarized in the Table 1.

**Table 1. Rinderpest Outbreak Rumours January-July 2002**

| Investigated by                | No. investigations | No. investigations where samples collected | Rinderpest vet made follow up visit | Samples collected by RP vet |
|--------------------------------|--------------------|--|-------------------------------------|-----------------------------|
| <b>Rinderpest veterinarian</b> | 4                  | 3  |                                     |                             |
| <b>Field veterinarian</b>      | 7                  | 3  | 3                                   | 2                           |
| <b>Veterinary Co-ordinator</b> | 5                  | -  | 3                                   | -                           |
| <b>Veterinary Supervisor</b>   | 2                  | 2  | 1                                   | -                           |
| <b>Total</b>                   | <b>18</b>          | <b>8</b>                                   | <b>7</b>                            | <b>2</b>                    |

<sup>4</sup> HF radio is the main method of communication in southern sector areas.

None of the investigations indicated an outbreak of rinderpest. Some were outbreaks of other diseases such as haemorrhagic septicaemia (HS), foot and mouth disease (FMD), east coast fever (ECF) or other causes of increased morbidity or mortality. Some reports were made due to a fear of rinderpest occurring in a neighbouring area and a desire for vaccination, and some were apparently false alarms made with the aim of drawing attention to a deficiency in animal health services.

### **2.3 Active Surveillance**

The Rinderpest Project has developed some methods for active surveillance that can be carried out by Vet Co-ordinators and Supervisors.

#### **2.3.1 Cattle camp visit**

The cattle camp visit (Figure 4) includes an interview with the livestock keeper with questions about diseases, deaths, movements and rinderpest, followed by clinical examination of the cattle and the recording of any clinical signs observed. The Vet Supervisors are asked to carry out this exercise in two different cattle camps every month and are paid 150/- Kenya Shillings (approximately 2 USD) for each visit. The method has been gradually introduced to most areas from May. Some results collected during May to September 2002 are summarized in Tables 2 and 3. Forms are still being received so the data is not complete.

*Table 2. Cattle Camp Visit Surveillance; reports received*

|   | <b>May</b> | <b>June</b> | <b>July</b> | <b>August</b> | <b>Sept</b> | <b>Total</b>        |
|---|------------|-------------|-------------|---------------|-------------|---------------------|
| <b>No. forms received</b>                           | 27         | 55          | 87          | 68            | 45          | <b>282</b>          |
| <b>No. supervisors sending forms</b>                | 18         | 29          | 47          | 44            | 27          |                     |
| <b>No. regions sending forms (total 6)</b>          | 4          | 5           | 6           | 6             | 6           |                     |
| <b>No. counties/states sending forms (total 34)</b> | 9          | 12          | 17          | 16            | 14          |                     |
| <b>No. cattle surveyed (total 6 million)</b>        | 9,403      | 37,830      | 64,825      | 52,218        | 9,543       | <b>173,819 (3%)</b> |

**Table 3. Main diseases affecting cattle**

| <b>Disease</b>                     | <b>% livestock keepers naming disease as a current problem</b> | <b>No. deaths reported</b> | <b>% total deaths</b> |
|------------------------------------|--|----------------------------|-----------------------|
| Contagious bovine pleuro pneumonia | 66   | 410                        | 14                    |
| Trypanosomiasis                    | 56   | 250                        | 9                     |
| HS                                 | 44   | 351                        | 12                    |
| Blackquarter                       | 39   | 674                        | 24                    |
| Ticks                              | 37   | 20                         | <1                    |
| Liver fluke                        | 29   | 60                         | 2                     |
| Anthrax                            | 28   | 295                        | 10                    |
| Worms                              | 28   | 42                         | 2                     |
| FMD                                | 24   | 31                         | 1                     |
| Skin disease                       | 17   | 75                         | 3                     |
| Lice                               | 15   | 7                          | <1                    |
| ECF                                | 11   | 164                        | 6                     |
| Diarrhoea                          | 8  | 99                         | 4                     |

The above data is generated from 282 cattle camp visits where 282 livestock keepers or groups of livestock keepers were interviewed and their herds or cattle camps clinically surveyed. These contained 173,819 cattle, approximately 3% of the estimated population of 6 million. When asked about the main diseases currently affecting their cattle only 3 livestock keepers mentioned rinderpest; later in the interviews it was clarified that they had not seen rinderpest in the last five or more years. During clinical surveillance no outbreaks of rinderpest-like disease were detected. The common clinical signs observed were external parasites, weight loss, lameness, eye discharge, skin disease, diarrhoea, coughing, and nasal discharge. In most herds the clinical signs of the stomatitis-enteritis syndrome were found, especially eye and nose discharge, salivation and diarrhoea. For southern Sudan, the FAO Global Rinderpest Eradication Programme definition of the stomatitis-enteritis syndrome seems to be too sensitive and may need to be refined.

### **2.3.2 Market surveillance**

An exercise similar to the cattle camp visit for use in livestock markets has been developed and is being field-tested. It is envisaged that where there is a regular cattle market Vet Supervisors will visit to carry out interviews and clinical surveillance for a small payment.

### **2.3.3 Community dialogue**

Community dialogue is used routinely by Vet Supervisors and NGO vets for communication on a variety of community-based animal health programme issues. They are encouraged to include rinderpest eradication as a regular topic in their dialogue and also as a surveillance opportunity by asking similar questions to those used in the cattle camp visit.

#### **2.3.4 Participatory Disease Searching**

Participatory disease searching (PDS) (Mariner, 2001) was used in some of the suspected rinderpest endemic areas during 2001 to improve understanding of rinderpest epidemiology in the area, and to help in the development of the strategy for rinderpest eradication (Mariner, 2001a). It is used by the Rinderpest Project veterinarians in areas where the rinderpest situation is not well known due to lack of access and/or there is no community-based animal health programme, and when carrying out rinderpest rumour investigation. In many situations the rinderpest rumour is very vague and there are no obvious clinical cases. PDS techniques are valuable for purposive surveillance to detect whether there have been any recent clinical cases in the area or whether the rumour is due to fear of possible introduction of rinderpest, other disease outbreak, or simply a demand for animal health services. CAHWs and Vet Supervisors play a valuable role in PDS as key informants, liaison with the community, and as translators and guides.

#### **3. Role of Stakeholders in Rinderpest Surveillance**

A major part of the work of the Rinderpest Project focuses on raising awareness and training so that all stakeholders can play their role in rinderpest eradication activities<sup>5</sup>. As the incidence of rinderpest has reduced, fewer people have direct experience of the disease so it is necessary to remind people of the clinical signs and the severity of the disease.

The community, including community leaders, livestock keepers, women, youth and children, need to be aware of the programme to eradicate rinderpest and the important role that they play. They should know the main clinical signs of rinderpest, the importance of reporting any cases of rinderpest-like disease and who to report to if they should see any cases. The Rinderpest Project has developed guidelines to be used by field vets and Vet Supervisors for carrying out community dialogue on rinderpest eradication, and has developed some communication materials to assist in passing the information, including cloth flip charts, photocards, t-shirts, posters, songs, stories, drama and role play.

The CAHWs are a crucial link between the livestock keepers and other animal health workers. It is important that they know the main clinical signs of rinderpest, the importance of reporting any cases of rinderpest-like disease to their supervisor, and the need to quickly investigate any reports. A CAHW training module for rinderpest eradication has been developed by the Rinderpest Project which is being used by NGO vets and Vet Supervisors.

The Vet Supervisors and field veterinarians should know the main clinical signs of rinderpest, their role in active surveillance, the importance of reporting all possible rumours of rinderpest-like disease to the OLS veterinary laboratory, and the need to quickly investigate any rumours and carry out a full investigation including sample collection. A training course has been developed by the Rinderpest

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<sup>5</sup> The Community-based Animal Health and Participatory Epidemiology Unit of AU-IBAR PACE supported much of the initial work during 2001 on training and awareness raising.

Project to train all supervisors and field vets in all of these topics. The training course also includes sessions on raising the awareness of the community, developing locally appropriate methods for communicating the information, and carrying out a community meeting. The training course is carried out in the field for groups of supervisors and vets from a given area. Most areas have now been covered.

#### **4. Discussion**

In the vast and remote area of southern Sudan the network of CAHWs is key to the identification of the last foci of rinderpest and the verification of freedom from rinderpest. Through their ongoing work of treatment and vaccinations for other diseases, the CAHWs are in continuous contact with the livestock keeper and therefore they will be the first to receive a report or detect a possible rinderpest outbreak. The CAHWs ensure that even the most remote and inaccessible areas and communities have access to animal health services and are able to report possible outbreaks of rinderpest.

In southern Sudan levels of literacy are very low, especially in the pastoralist areas, so the majority of CAHWs are illiterate. This does not affect their existing knowledge of livestock and livestock diseases or their ability to be trained in the diagnosis and control of the common local diseases. Many have first hand knowledge of rinderpest disease so they have an important role to play in detecting, reporting and investigating possible outbreaks of rinderpest, and can make verbal reports to their supervisors of their findings. The livestock programme has already developed pictorial forms for recording of treatments carried out. The Rinderpest Project plans to develop some pictorial reporting forms that could be used by CAHWs for recording active surveillance findings and allow their role in surveillance to be expanded.

The system for rinderpest surveillance is constantly evolving as the project continues. The Rinderpest Project plans to review the surveillance methods at the end of 2002 and will make changes as necessary. Once the different components of the surveillance system have been developed, performance indicators will be defined with appropriate targets so that the effectiveness of the system can be monitored. Rinderpest sero-surveillance will be introduced during 2004-5. Again CAHWs, Vet Supervisors and Co-ordinators will have key roles to play in this exercise.

Whilst the situation in OLS southern sector areas of southern Sudan might be considered to be unique with the chronic conflict and absence of conventional veterinary services, it has many characteristics in common with other pastoralist areas of Africa; nomadic pastoralists, strong traditional culture, lack of development and infrastructure, low levels of education, climatic extremes, remote and difficult to access. It is therefore likely that some aspects of the surveillance methods being used in southern Sudan using CAHWs and mid-level animal health workers might be applicable in other pastoralist areas.



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## **Acknowledgements**

Thank you to the CAHWs, Veterinary Supervisors and Co-ordinators, FAO-OLS and NGO veterinarians and livestock officers for their participation in the development and implementation of the rinderpest surveillance system described.

Fig 2.

**DISEASE OUTBREAK INVESTIGATION FORM**

USE THIS FORM TO REPORT DISEASE OUTBREAKS IN ANY SPECIES OF LIVESTOCK

County/District/Zone: \_\_\_\_\_ Payam/Parish/Omodia: \_\_\_\_\_  
 Village: \_\_\_\_\_ Cattle camp/herd/flock: \_\_\_\_\_  
 Location: \_\_\_\_\_ Livestock keeper's name: \_\_\_\_\_

1. Date reported to animal health services: \_\_\_\_\_ 2. Date of investigation: \_\_\_\_\_  
 3. (For cattle) is this a dry season cattle camp?  or a wet season cattle camp?

**HISTORY**

4. Approximate number of animals in the affected cattle camp/herd/flock: \_\_\_\_\_  
 5. When did the disease first start: \_\_\_\_\_  
 6. Number of sick animals: \_\_\_\_\_ 7. Number of animals that have died: \_\_\_\_\_  
 8. Affected population (tick where appropriate)  

|            |        |                          |            |                                      |                          |
|------------|--------|--------------------------|------------|--------------------------------------|--------------------------|
| <u>SEX</u> | male   | <input type="checkbox"/> | <u>AGE</u> | calves/kids, less than one year old, | <input type="checkbox"/> |
|            | female | <input type="checkbox"/> |            | yearling, one to two years           | <input type="checkbox"/> |
|            |        | <input type="checkbox"/> |            | adults, older than two years         | <input type="checkbox"/> |

9. When did you move your herd/flock to this place? \_\_\_\_\_  
 10. Where did you come from? \_\_\_\_\_  
 11. Are there any new animals in the herd? \_\_\_\_\_  
 12. Where did the new animals come from? \_\_\_\_\_  
 13. Are any other cattle camps/herds/flocks affected? YES / NO  
 Give their names or locations: \_\_\_\_\_  
 \_\_\_\_\_  
 14. Are wild animals affected? YES / NO  
 What types of wild animals? \_\_\_\_\_  
 15. What is the local name of the disease? \_\_\_\_\_  
 16. What is the English translation of the disease name? \_\_\_\_\_  
 17. Has the livestock keeper seen this disease before? YES / NO  
 When and where? \_\_\_\_\_

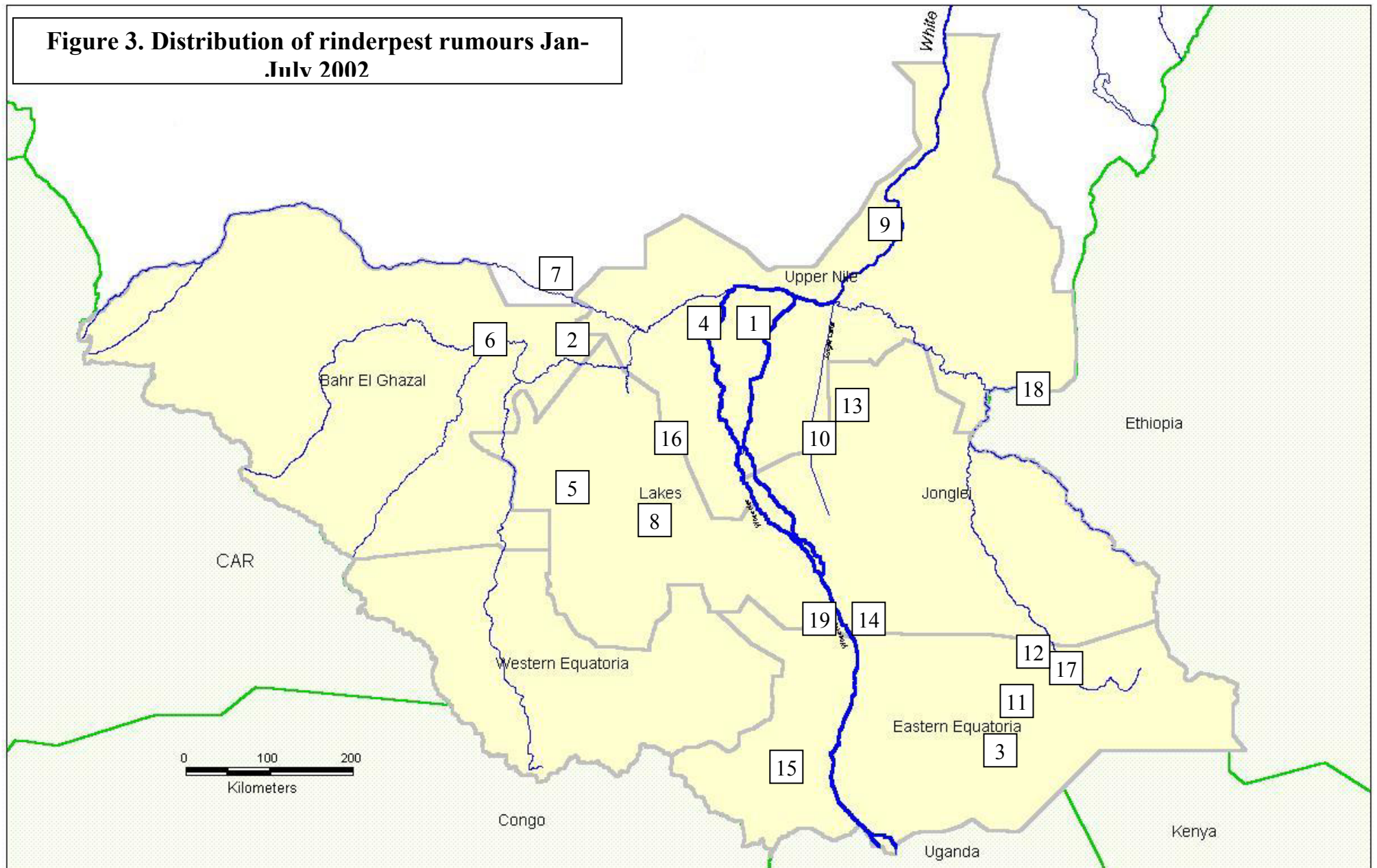
**CLINICAL EXAMINATION**

18. General appearance of animals: \_\_\_\_\_  
 19. Eyes: \_\_\_\_\_  
 20. Nose: \_\_\_\_\_  
 21. Mouth: \_\_\_\_\_  
 22. Faeces: \_\_\_\_\_  
 23. Lymph nodes: \_\_\_\_\_  
 24. Respiration: \_\_\_\_\_  
 25. Skin: \_\_\_\_\_  
 26. Body temperatures: \_\_\_\_\_  
 27. Any other clinical signs? \_\_\_\_\_

**POST MORTEM EXAMINATION**

28. General appearance of carcass: \_\_\_\_\_  
 29. Eyes, Nose: \_\_\_\_\_  
 30. Mouth: \_\_\_\_\_  
 31. Feet: \_\_\_\_\_  
 32. Abdominal organs e.g. intestines, large stomach, true stomach \_\_\_\_\_  
 \_\_\_\_\_  
 33. Respiratory organs: \_\_\_\_\_  
 34. Any other abnormalities noticed: \_\_\_\_\_  
 \_\_\_\_\_  
 35. When and where did they last see rinderpest in this area? \_\_\_\_\_  
 36. Do you think the disease is rinderpest? YES / NO  
 37. When was rinderpest vaccination done in this cattle camp/herd? \_\_\_\_\_  
 38. Have you collected any samples for sending to the lab? YES/NO  
 Signature of investigator: \_\_\_\_\_ Full name: \_\_\_\_\_

**Figure 3. Distribution of rinderpest rumours Jan-  
July 2002**



**Fig 4.**

**CATTLE CAMP VISIT  
FOR  
RINDERPEST SURVEILLANCE**

|                             |                     |
|-----------------------------|---------------------|
| County/District/Zone: _____ | Date: _____         |
| Payam/Parish/Omodia: _____  | Village: _____      |
| Cattle camp/herd: _____     | Location: _____     |
| Cattle owner's name: _____  | Investigator: _____ |

**1. Livestock Keeper Interview; interview the cattle camp leader and/or any livestock keepers**

1.1 What are the main disease problems affecting your cattle at the moment?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

1.2 Have any cattle in your herd died of disease in the last one month? *(ask for details)*

| Cause of death (local name of disease) | Cause of death (English name for the disease) | Number of deaths | Additional Information |
|--|---|------------------|------------------------|
|  |   |                  |                        |
|  |   |                  |                        |
|  |   |                  |                        |
|  |   |                  |                        |

1.3 **When** did you move your herd to this place? \_\_\_\_\_

1.4 **Where** did you come from? \_\_\_\_\_

1.5 **When** do you plan to move your herd again? \_\_\_\_\_

1.6 **Where** do you plan to move to? \_\_\_\_\_

1.7 **When** did you last see rinderpest in this area? \_\_\_\_\_

1.8 **Where** did you last see rinderpest in this area? \_\_\_\_\_

1.9 Have you ever seen rinderpest in your own herd? YES/NO When? \_\_\_\_\_ Where? \_\_\_\_\_

1.10 **When** were your cattle last vaccinated against rinderpest? \_\_\_\_\_

**2. Herd Examination; clinical surveillance**

- Walk amongst the cattle herd observing every animal.
- If you notice that an animal has signs of illness, make a mark in the table below against the type of clinical sign.
- If the clinical sign is not listed in the table, write it in one of the blank spaces at the bottom of the table.
- If you see an animal with salivation, examine inside the mouth for any mouth lesions.
- When you have looked at all the cattle in the herd, count up the number of marks for each clinical sign and put the totals in the boxes
- Any cattle with 3 or more signs of eye discharge, nose discharge, salivation/mouth lesions, or diarrhoea should be isolated and a full rinderpest case investigation should be carried out.

2.1 **Approximate number of cattle in camp/herd?** \_\_\_\_\_

2.2 **General body condition of the herd?** \_\_\_\_\_

| Clinical sign  | Number of cattle affected | Total | Remarks or Comments |
|--|---------------------------|-------|---------------------|
| Eye discharge  |                           |       |                     |
| Nose discharge   |                           |       |                     |
| Salivation   |                           |       |                     |
| Mouth lesions<br>(if you see salivation open mouth and check for wounds) |                           |       |                     |
| Diarrhoea  |                           |       |                     |
| Lameness   |                           |       |                     |
| Skin disease   |                           |       |                     |
| Ticks  |                           |       |                     |
| Lice   |                           |       |                     |
| Emaciation   |                           |       |                     |
| Wounds   |                           |       |                     |
| Coughing   |                           |       |                     |
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