Training Course in Participatory Epidemiology Ganyiel, Western Upper Nile, South Sudan

SUMMARY REPORT

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Contents

Acknowledgements
A 10-day training course in South Sudan, with participants drawn from different organisations and locations requires considerable organisation and logistical support. I'd like to thank Helen Laqua for assistance in Nairobi and Martin Barasa for very capable organisation of the training in Ganyiel. VSF CH logisticians and support staff also helped to ensure that the training ran smoothly. I'd also like to thank all the participants, and most of all, the people of Ganyiel who took time share their knowledge during the training.

1. Introduction

Participatory epidemiology (PE) is increasingly regarded as a useful approach to improving understanding of animal diseases and their impact on human livelihoods. The approach has been introduced into veterinary schools in Ethiopia, Uganda, Tanzania and Sudan, and is used in various ways by government veterinary services and national research institutes. A wide range of informal reports, peer-reviewed journal papers and postgraduate theses are now available which describe studies based on PE either as a stand-alone approach, or in combination with conventional veterinary investigation or epidemiological methods.

In South Sudan, PE studies include research on a chronic wasting disease in cattle called *liei*, impact assessment of community-based animal health projects, and the ongoing use of participatory disease searching for rinderpest.

In order to develop the capacity of livestock agencies in South Sudan to use PE, a training course was organized by VSF CH for 15 staff from VSF CH, VSF B, VSF G and FAO. The course lasted 10 days, from 26th June to 5th July 2005, and took place in Ganyiel, Western Upper Nile. The objectives of the course were as follows:

At the end of the training the trainees will be able to:

1. The describe the origins and current uses of PE
2. Demonstrate the key attitudinal and behavioural aspects of PE
3. Use a range of PE methods correctly, and analyse and present the findings
4. Design research and/or surveillance work based on PE

Therefore, the course aimed to introduce trainees to the main theoretical and methodological aspects of PE, allow testing and practise of specific PE methods, and show how to combine methods to design studies of interest to participants in their own project areas. In order to focus the training, we focussed on a specific topic of interest to VSF CH in Ganyiel – the impact of foot and mouth disease (FMD) in cattle. The course included a three-day period of PE application with livestock keepers in Ganyiel.

This report summarises some of the main issues discussed during the training and the main outputs. Further information is provided in Annexes.

2. Issues

Questionnaires

One of the influences on the origins with PRA was dissatisfaction with questionnaire surveys. During the training, questionnaires were critiqued by reference to various practical, resource and logistical issues, but also with regards to non sampling errors. Misinterpretation, mistranslation, poor phrasing, insensitive questions, enumerator bias and other sources of error were discussed, with recognition that non sampling errors are often of considerable relevance, but rarely measured in rural development surveys.

Attitudes

Professional attitudes are a major factor in PE. Drawing on the philosophy of PRA, PE requires practitioners to realise that they don't have all the answers, and that solutions to most livestock problems can only arise through joint analysis of problems with livestock keepers. Respect for local knowledge and critical self-reflections are central to PE.

In order to open up discussion on attitudinal aspects of PE the training used two main methods. First, a debate was organised with two debating teams defending or opposing the motion "Indigenous livestock knowledge is romanticised mumbo jumbo and has no place in modern veterinary medicine". The debate revealed the well-known arguments for and against local livestock knowledge, and was followed by a more specific exercise which required participants to categorise beliefs and practises in South Sudan as summarised below.

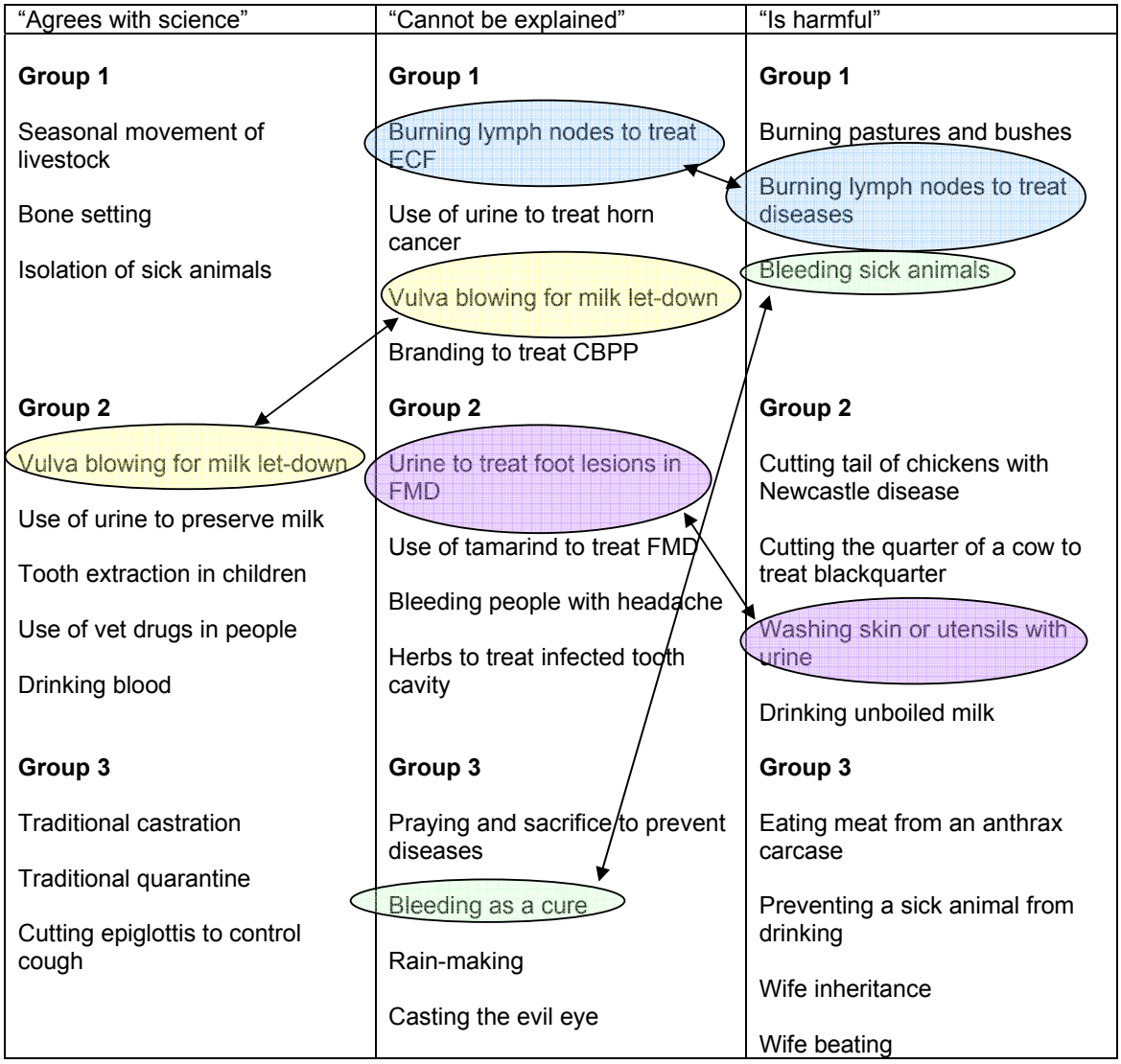
> Participants were divided into three groups and given the following task.
>
> In South Sudan describe three indigenous beliefs or practises for each of the following categories:
>
> 1. Beliefs and practises which are widely used and popular, and which agree with modern scientific knowledge.
>
> 2. Beliefs and practises which are widely used and popular, but which cannot be explained scientifically.
>
> 3. Beliefs and practises which are used but according to scientific knowledge are actually harmful.

The results from the three groups are presented overleaf and show how the three groups of professional livestock workers disagreed over the classification of at least four indigenous practises – bleeding sick livestock, cauterisation of lymph nodes, vulva blowing (to stimulate milk let-down), and the use of urine as a disinfectant. The point here is not whether a particular belief or practise actually works, but that the experts disagree. In each case, theories can be proposed to support or refute a belief or practise, but these theories remain unproven. Often, we simply don't know.

The exercise can be used to highlight the importance of open-minded study, and the need to explore new information and ideas even if they don't immediately seem to fit our professional training.

The final point on attitudes concerned behaviour. In essence, our attitude affects how we communicate, both verbally and non-verbally, and this in turn affects the relationship between researcher and informant, and the validity of information.

Fact or fiction? Categorisation of indigenous beliefs and practises by course participants



Validity and reliability

Early concerns about participatory approaches and methods such as PRA include the problem of validity and reliability. Here, researchers question the truthfulness of PRA-type work when methods are used only once, or are repeated only two or three times. Although triangulation is central to the validity of PRA, specific details on how information from different sources or methods agrees or differs is rarely presented in PRA reports.

Some PE studies overcome these concerns by repeating standardised methods with different informants. Although standardised, the methods also allow scope for open-ended discussion and probing. The pros and cons, and practicalities of different sampling methods in South Sudan were discussed, with recognition that some

stages of a PE study can involve the use of standardised PE methods with a random sample of informants. The use of participatory methods to generate sampling frames was also covered in the training.

In the absence of a gold standard test, the level of agreement between different informants is a measure of reliability. The repetition of methods such as matrix scoring and seasonal calendars allows assessment of agreement using simple statistical tests.

Regarding the validity of PE, it was emphasised that PE involves triangulation at two levels:

- First, different PE methods are triangulated e.g. comparing the results of livestock movement patterns on seasonal calendars with livestock movements as shown on maps.

- Second, information from PE can be triangulated with conventional veterinary investigation or epidemiological methods. Clinically, matrix scoring of diseases against disease-signs can be compared with typical textbook descriptions of diseases (with the proviso that these descriptions are often based on expression of disease in western livestock types and production systems). A better approach is to translate, provisionally, local disease-names into English names and cross-check the matrix against the opinions of clinicians in the field. This approach was used during the training (Annex 3, see Figures 1 and 2). At a herd or population level, estimates of disease prevalence from PE can be compared with serological and/or parasitological surveys (with the proviso that such surveys measure sero-conversion or parasite prevalence, not disease). The low sensitivity of most diagnostic test for livestock diseases in South Sudan was also discussed.

Validity and comparison of diseases

Studies using PE can also improve validity of data by avoiding a focus on the disease or diseases which are the main interest of the researchers. With this approach, informants describe and compare different diseases without prior knowledge of the research objective.

For example, the training course used the VSF CH interest in the impact of FMD to structure practise sessions and the field work. For each of the four PE methods used – matrix scoring, seasonal calendars, proportional piling and simple scoring – informants were asked about six cattle diseases – *liei*, *dat*, *yieth piny*, *kueluok*, *dop*, and *juol* (see Annex 3). At no time were informants told that the VSF CH was trying to determine the impact of *dat* and *juol* (acute and chronic forms of FMD).

Impact

During the training, participants were encouraged to think about impact not only in terms of impact of diseases on livestock, but also the subsequent impact of livestock deaths or reduced livestock production on people. Therefore, a simple scoring method was used to show local perceptions of impact in terms of livestock-derived

foods for people, income from sale of livestock or livestock products, and social benefits such as dowry payments and the traditional loans or gifts of livestock to relatives or friends.

Using the results to inform policy

An important aspect of PE is to include feedback and action within the overall PE study. Using FMD as an example, an agenda for a workshop with livestock keepers on FMD control options was outlined.

Day 1: Presentation of study findings, making use of visualisation (diagrams) and presented in the local language; verification of findings.

Day 2: Joint analysis of control options; recommendations

The activities in Day 2 of such a workshop include the use of role plays and/or other communication methods to explain the pros and cons of different control options to livestock keepers, bearing in mind that they are already familiar with concepts of vaccination, treatment, isolation of sick stock and quarantine. The process requires technical staff to first clarify their own positions regarding the feasibility of different control methods and a simple ranking exercise can assist here. Participants were divided into four groups and asked to rank various FMD control methods against sustainability indicators:

"this control option …

"… requires the livestock keeper to pay a lot of money"

"… requires a lot of specialist technical support from outside"

"… requires a new policy to be developed and enforced"

"… requires a lot of funding from donors or government"

"…has questionable effectiveness"

"… is complicated to design and implement"

"…requires the community to work together over time"

"…builds on existing indigenous knowledge, skills or other local resources"

"…may cause conflict"

The results of the ranking are shown overleaf.

With further elaboration of sustainability indicators and a weighting of the indicators, this type of exercise helps to identify the strengths and weaknesses of each option.

Summated ranks for possible FMD control options in South Sudan

Indicator	Ranks for control options						
	Vaccination	Isolate affected cattle	Quarantine	Movement control	Treatment	Slaughter and compensation	Do nothing
Cost to livestock keeper	20	4	8	4	18	6	4
Technical support	15	4	7	5	9	7	8
Policy	20	7	16	17	5	20	4
Funding	18	5	10	12	11	20	4
Effectiveness	13	10	13	12	17	13	13
Complexity	12	5	9	9	7	19	5
Collective action	15	11	17	16	8	14	4
Local know-how	15	10	12	12	8	12	5
Conflict	8	6	18	16	4	19	9
Total ranks	136	62	110	103	87	130	56
Overall rank	7th	2nd	5th	4th	3rd	6th	1st

Ranks presented are the summated ranks from 4 groups of participants. A low overall rank means a high preference.

3. Outputs

Participants were provided with a set of training handouts and a CD ROM with examples of PE publications.

The participants' evaluation of the course is shown in Annex 4. Overall the course objectives were achieved and participants expressed an intention to use PE in their future work. In addition to the VSF CH study on FMD (for which methods were tested and refined during the training – see Annex 3), Day 10 included time for people to draft research questions and a methodology for studies in their own project areas. These studies included FMD, brucellosis, ECF and CBPP.

Within the FMD study, a model for estimating the cost-benefit of FMD control was drafted. The model focussed on losses due to mortality (especially in calves) and reduced milk production; PE contributes to the measurement of both these variables. Absolute costs and milk losses were also considered.

4. Recommendations

In the course evaluation most participants expressed the need for further assistance with the analysis of PE data. VSF CH will need to consider if and how to provide this additional support for the FMD study. Such support should be PE-specific as most short courses in epidemiology, statistics or data analysis will not cover the statistical tests required for handling PE data.

The practical value of PE in South Sudan indicates that it should be regarded as a required skill for field veterinarians, working for government or NGOs. Policy makers will also need to understand the strengths and limitations of PE, and support PE-based work and combined PE-conventional studies.

Annex 1. Course participants

Martin Barasa, VSF CH
Bernard Mbwika, VSF CH
Douglas Machuchu, VSF CH
Cecilia N. Warero, VSF CH
Vincent W. Mauka, VSF CH
Bryony Jones, VSF B
Simon Mwangi Kihu, VSF B
Banak Dei Wal, VSF B
Nimaya Kenyi Mogga VSF B
Michael Esang'ire, FAO
Michael Ben Otto, VSF G
Jeremiah Akumu, VSF CH
William Olami Aba, VSF G
Wachira Kimunge, VSF G
Raphael Lotira Arasio, VSF B

Annex 2. Course outline

Date	Time	Topic/Activity
Day1 Sunday 25th June	am pm	Course opening, welcome and introductions; ground rules Origins of PRA and PE Triangulation in PE: cross-checking with other PE methods and conventional methods
Day 2 Monday 26th June	am pm	Attitudes and behaviour for PE Communication skills: verbal and non verbal communication Managing groups in PE
Day 3 Tuesday 27th June	am pm	Interviewing methods: theory and practise Participatory mapping: theory and practise
Day 4 Wednesday 28th June	am pm	Matrix scoring: theory and practise Seasonal calendars: theory and practise
Day 5 Thursday 29th June	am pm	Proportional piling: theory and practise Simple scoring of impact indicators
Day 6 Friday 30th June	am pm	Field work: participatory mapping and matrix scoring
Day 7 Saturday 1st July	am pm	Field work: seasonal calendars and simple impact scoring
Day 8 Sunday 2nd July	am	Field work: proportional piling
Day 9 Monday 3rd July	am pm	Handling the data: basic statistics; summarising non parametric and parametric data; assessing reliability and validity
Day 10 Tuesday 4th July	am pm	Handling the data: simple scoring Designing field studies and impact assessment using PE Current uses of PE Course evaluation and close

Annex 3. Presenting the information: results from the initial three-day field study for testing and refining PE methods

The three-day field work aimed to give participants an opportunity to practise different PE methods, and decide if and how to refine the methods for use in the VSF CH study on the impact of FMD.

The field work covered:

- participatory mapping
- matrix scoring of cattle disease-signs
- seasonal calendars of rainfall, cattle diseases, cattle movements and livelihoods indicators
- simple scoring of cattle disease impact indicators, with weighting of impact indicators
- proportional piling to estimate cattle disease prevalence and mortality
- semi-structured interviews were used with all the above methods

Training participants were divided into four teams. One team worked with a group of four women. The other three teams worked with groups of men, ranging between eight to around 12 individuals.

This section presents the results from the practice sessions which took place during the training. The aim is to show how the results can be summarised and presented, rather than draw conclusions about FMD. Further repetition of methods in representative areas of the VSF CH location is needed, as defined during the training.

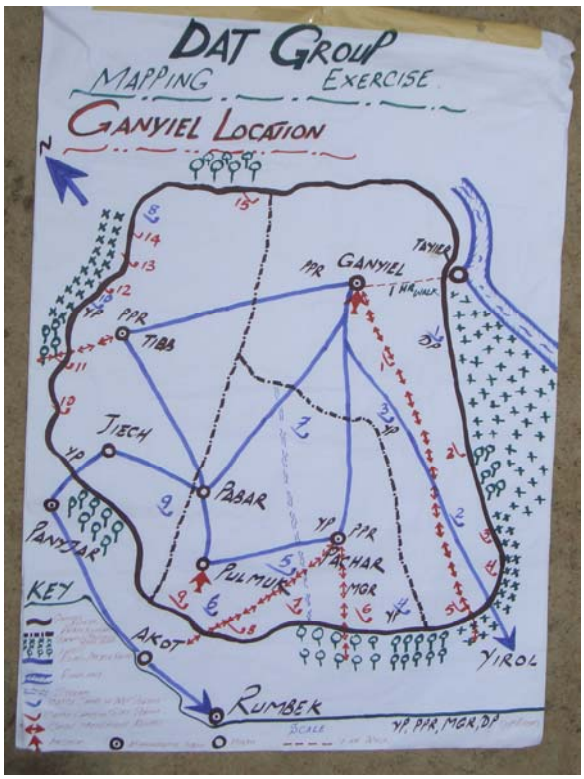
1. Spatial factors and cattle movements related to outbreaks of *dat*

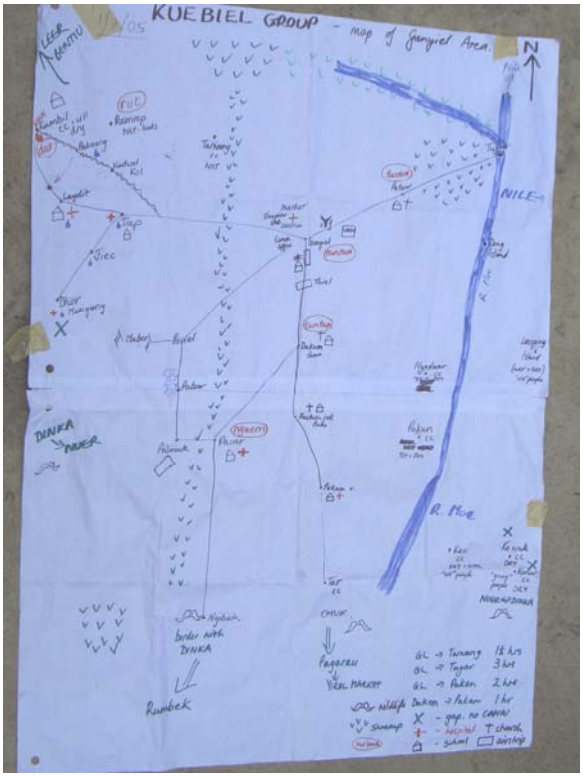
Participatory mapping was used to show positions of villages and cattle camps, dry and wet season grazing areas, shared grazing areas, cattle trade routes, locations of wildlife and other factors related to the possible introduction and maintenance of FMD.

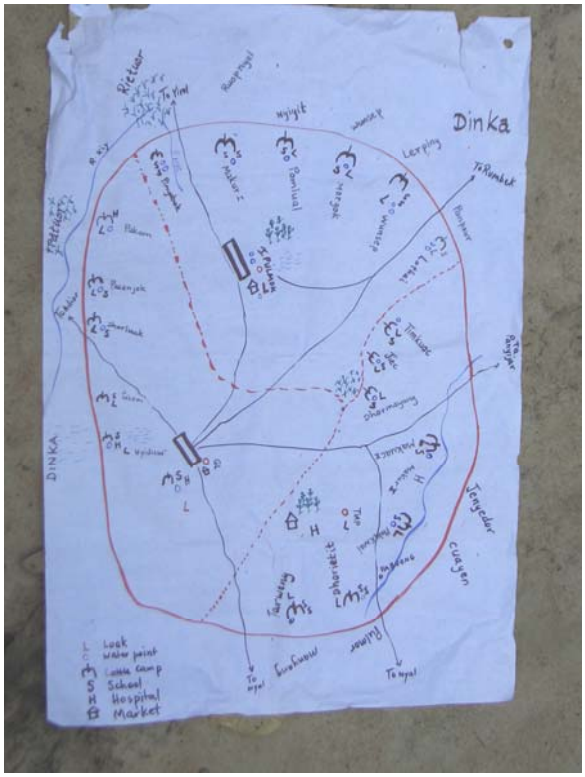
The four maps (from for the four different informant groups) are shown overleaf. VSF CH will draw information from each map to produce a composite map which captures all of the relevant information.

Over time, the precise positions of cattle camps, grazing areas and other relevant information can be defined using GPS (not currently allowed in South Sudan).

Maps produced during the three-day field work in Ganyiel







2. Local characterisation of diseases

Matrix scoring can be used to understand the relationship between local disease terminology and modern veterinary names for diseases. Such understanding helps to ensure that the study team and the informants are talking about the same disease.

The results of matrix scoring of cattle diseases from the field practise are presented below. Note that these results are from only four groups of informants; it is suggested that the method is repeated at least 10 times.

In the absence of a recognised standard, the reliability of matrix scoring can be assessed by considering the 'inter-judge reliability' or the level of agreement between informant groups using statistical tests such as the Kendal coefficient of concordance (*W*). Participants practised the calculation of this statistic during the training.

The results were also cross-checked against the participants own scoring of the presumed English veterinary names for the diseases. Comparison of the livestock keepers scoring and the participants scoring is one way of assessing the validity of the results in the absence of a 'gold standard'.

These results show a close overlap between the Nuer disease-names *dat* and the English veterinary disease-name FMD. The Nuer disease-name *juol* matches descriptions of chronic manifestations of FMD. There is no specific English term for this clinical syndrome, so the term "chronic FMD" has been used.

Notes for Figure 1
Number of informant groups = 4; *W* = Kendal coefficient of concordance ($^{*}p<0.05$; $^{**}p<0.01$; ***p<0.001). Medians (range) presented.

Notes for Figure 2
Number of informants = 15; *W* = Kendal coefficient of concordance (***p<0.001). Medians (range) presented.

Figure 1: Matrix scoring of disease-signs in cattle by livestock keepers in Ganyiel

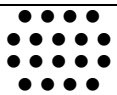
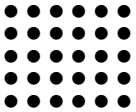
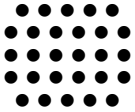
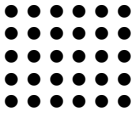
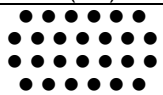
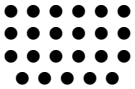
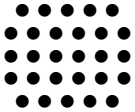
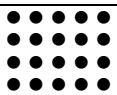
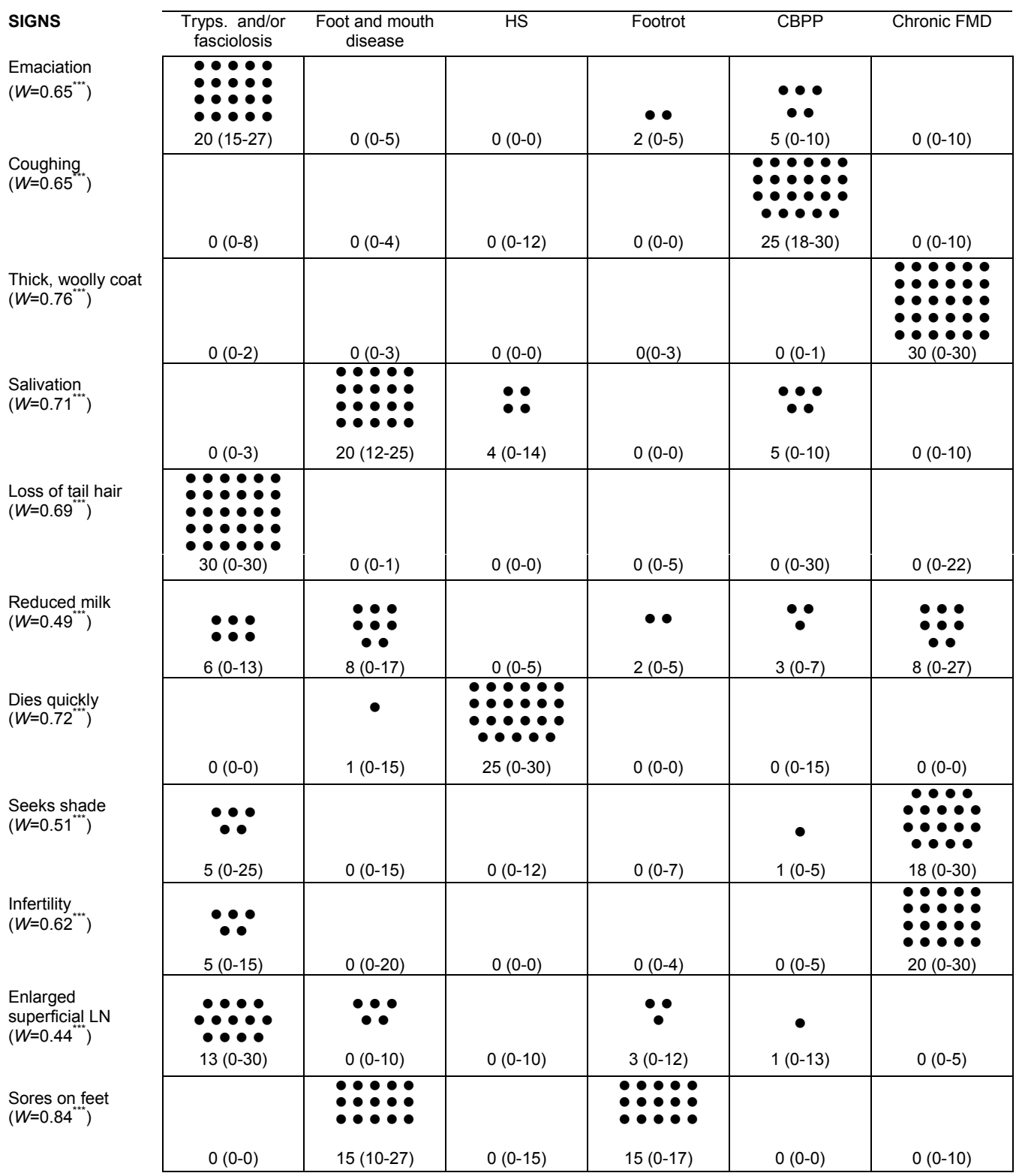
SIGNS	DISEASES					
	Liei	*Dat*	*Yieth piny*	*Kueluok*	*Dop*	*Juol*
Emaciation (W=0.76**)	 18 (13-27)	2 (0-4)	1 (0-2)	 2.5 (0-11)	 3.5 (0-7)	0.5 (0-1)
Coughing (W=0.89**)	0 (0-0)	0 (0-6)	0 (0-0)	0 (0-0)	 30 (24-30)	0 (0-10)
Thick, woolly coat (W=0.71*)	0 (0-4)	1 (0-4)	0 (0-2)	0(0-3)	0 (0-6)	 28 (14-30)
Salivation (W=0.47)	0 (0-5)	 10 (5-22)	 8 (0-17)	0 (0-0)	 3 (0-18)	 2.5 (0-6)
Loss of tail hair (W=1.00***)	 30 (30-30)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)
Reduced milk (W=0.57*)	 3 (3-4)	 9.5 (0-17)	0 (0-5)	0.5 (0-1)	 2.5 (0-4)	 10 (7-26)
Dies quickly (W=0.74*)	0 (0-3)	1.5 (0-8)	 26 (12-30)	0 (0-4)	0 (0-7)	0 (0-1)
Seeks shade (W=0.71*)	1.5 (0-3)	0 (0-5)	0 (0-1)	0 (0-1)	 3 (0-8)	 23 (19-30)
Infertility (W=0.74*)	2 (0-2)	 3 (0-14)	0 (0-2)	0 (0-1)	0 (0-1)	 28 (10-30)
Enlarged superficial LN (W=0.16)	 5.5 (0-30)	 4 (0-11)	0 (0-2)	1 (0-12)	 6 (0-30)	0 (0-2)
Sores on feet (W=0.86**)	0 (0-1)	 20 (14-30)	0 (0-1)	 9 (0-16)	0 (0-1)	0 (0-1)

Figure 2: Matrix scoring of disease-signs in cattle by PE training participants



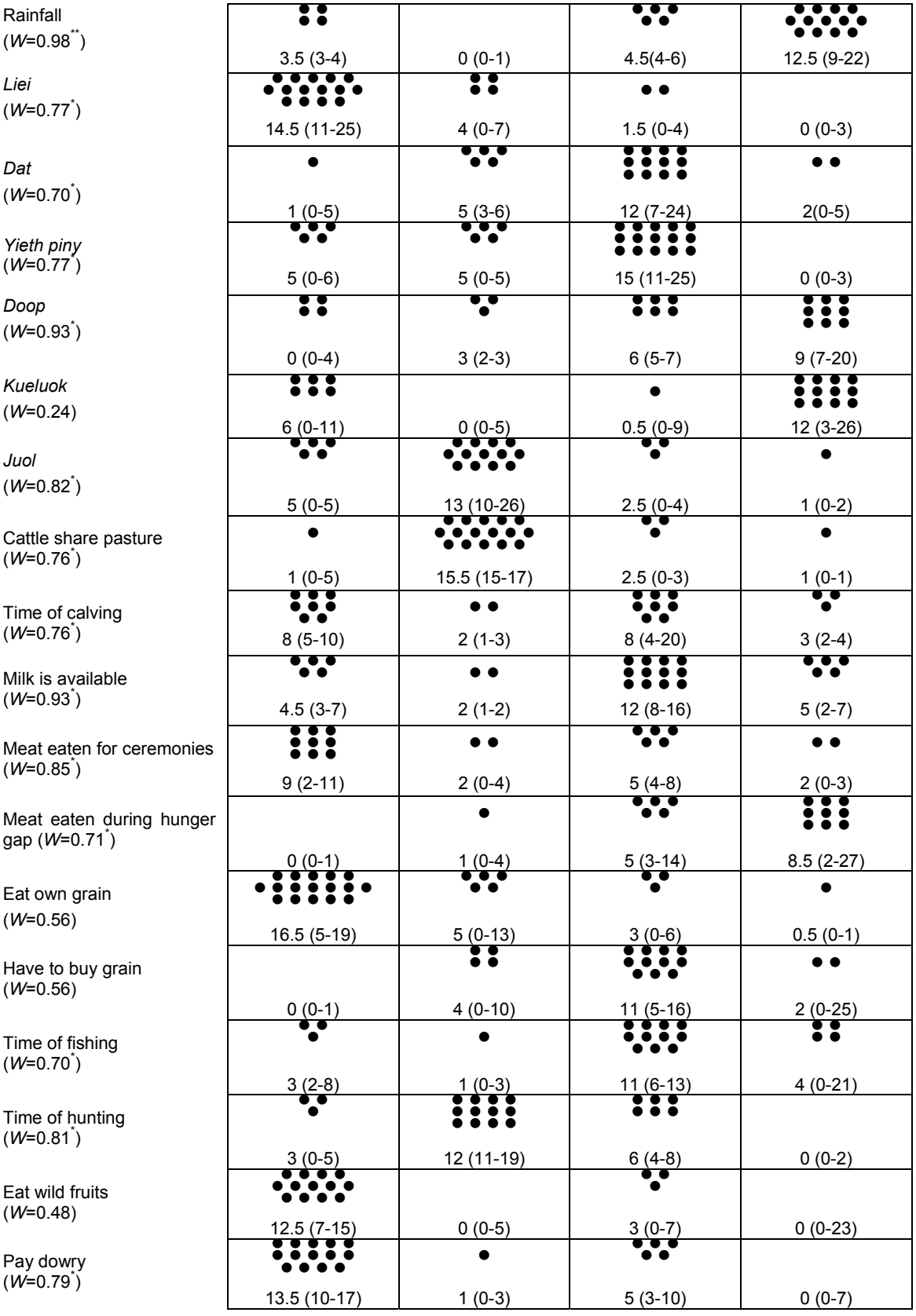
3. Seasonal trends and relationships

Livelihoods in Western Upper Nile have distinctive seasonal pattern, with periods of relative plenty followed by a stress period, often called the 'hunger gap'. Milk is an important food at certain times of year, particularly when grain supplies are dwindling. It follows that the impact of cattle diseases partly depends on seasonality. A disease which impacts on milk production will have greater impact if it occurs as an outbreak immediately before, or during, the period of highest need for milk as a food for people.

Initial findings on the seasonality of FMD and *juol* are shown in the summarised seasonal calendar overleaf.

Notes for Figure 3
Number of informant groups = 4; *W* = Kendal coefficient of concordance (*p<0.05; **p<0.01). Medians presented (range).

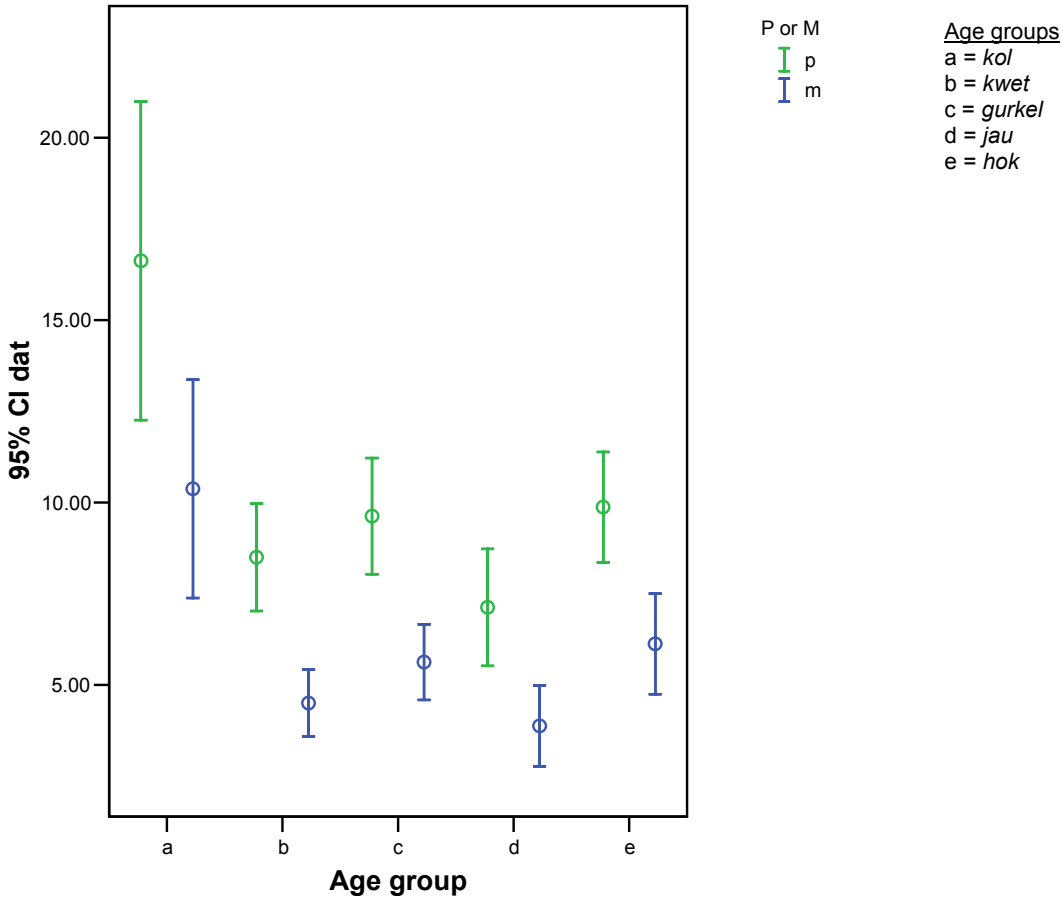
Figure 3: Seasonal calendar for rainfall, cattle diseases, indicators of cattle movement and livelihoods, Ganyiel



4. Prevalence and mortality of cattle diseases

Prevalence and mortality data from proportional piling can be tested for Normality (e.g. by using a P-P plot). Assuming a Normal distribution, the mean herd prevalence and mortality, and 95% CI can be calculated for each age group and shown graphically. A simulated graph, produced by replicating the first 8 sets of proportional piling data, is shown below as an example.

Figure 4: Mean annual herd prevalence and mortality of *dat* (FMD) using simulated data from 8 herds in Ganyiel (mean and 95% CI)



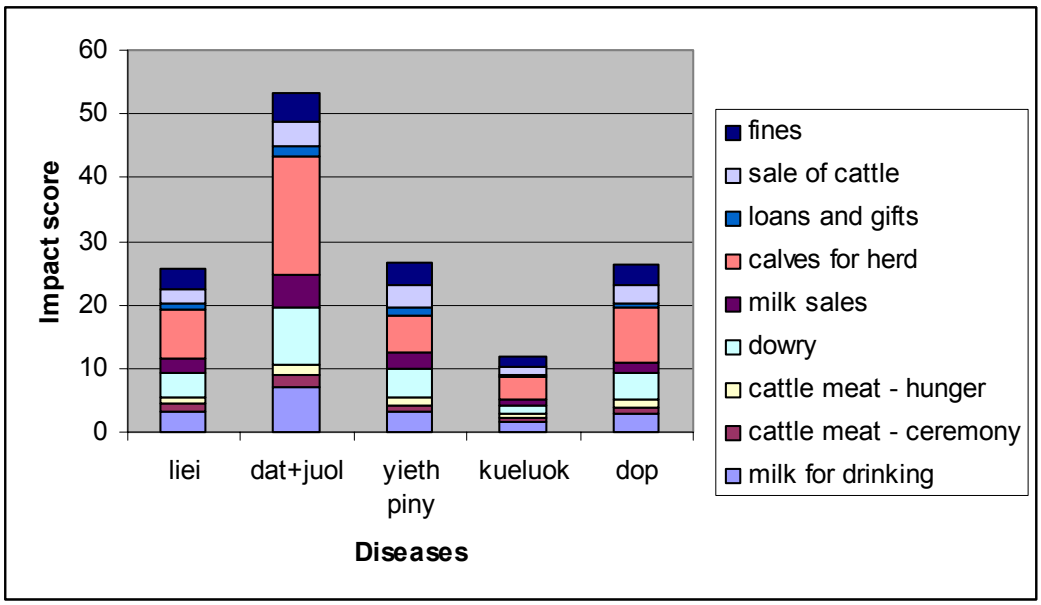
When generated from a representative sample of herds, this kind of data will assist VSF CH to calculate the cost-benefit of different FMD control options.

5. Impact of cattle diseases

A simple scoring method was used to understand local perceptions of the relative impact of cattle diseases using nine impact indicators. Informants were also asked to score the impact indicators in order to provide a weighting of the indicators.

Figure 5: Relative impact of cattle diseases in Ganyiel

This is one approach to presenting the data. The scale on the y-axis- the 'impact score' – is arbitrary. Scores for *dat* (FMD) and *juol* (chronic FMD) have been summated to give an impression of the overall relative impact of FMD in its acute and chronic forms. Note that at no time were informants told that the study teams had a particular interest in FMD or *juol*.



Annex 4. Course evaluation

Participants were asked to rank 10 statements using a ranking of 1 (disagree) to 5 (agree). The statements and average ranks are shown below.

Statement	Mean rank
"The PE course objectives were achieved"	4.7
"The food was delicious"	4.1
"The field location in Ganyiel was the right place for the training"	4.4
"The length of the training was OK"	4.5
The balance of time spent on theory and time spent on practise or discussion was right"	4.6
"The handouts and CD-ROM are useful"	4.8
"The accommodation was comfortable"	3.2
"I fully intend to use PE in my future work"	4.9
"I may need further help with PE data analysis"	4.3
"The logistics and organisation of the course was well done"	4.4

Participants were also invited to make any additional comments on the course as they wished.

"Arguably the most practical and intellectually stimulating course I have done in the last 5 years"

"Is it possible to get further on-the-job training and follow-ups, especially on the use of statistical packages?"

"Any room for mentoring/apprenticeship?"

"Q1 - thoroughly and effectively; Q 3 - has hosted last 3 LCM – accommodation available; Q8 - very aggressively; Q9 - to gain confidence; Q10 - all things on schedule. Bravo Andy"

"Difficulty to access follow-up on support"