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Where there is no data:

Participatory approaches to veterinary epidemiology in pastoral areas of the Horn of Africa

Andy Catley and
Jeffrey Mariner

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About the authors

Andy Catley works for the Feinstein International Famine Centre, Tufts University and is presently seconded to the Community-based Animal Health and Participatory Epidemiology (CAPE) Unit, Pan African Programme for the Control of Epizootics, Organization of African Unity/Interafrican Bureau for Animal Resources in Nairobi, Kenya. He has been working on community-based animal health services and participatory research in pastoral areas of the Horn of Africa since 1992, most recently with Vetwork UK and IIED. He can be contacted at: CAPE Unit, PACE Programme, OAU/IBAR, PO Box 30786, Nairobi, Kenya. Fax: +254 2 212289. Email: andy.catley@oau-ibar.org Website: http://www.cape-ibar.org

Jeffrey Mariner currently works as a consultant on veterinary epidemiology and participatory development for RDP Livestock Services. A veterinarian by training, he has been active in the development of appropriate methods for surveillance and control of infectious livestock diseases in pastoral areas of Africa since 1987. He can be contacted at: RDP Livestock Services, PO Box 523, 3700 AM Zeist, The Netherlands. Fax: +31 3069 19830. Email: jeffreymariner@yahoo.com

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Contents

1. Introduction

For many years, veterinary services in pastoral areas of the Horn of Africa have been in decline. Restructuring of State Veterinary Services (SVS) has been associated with a virtual collapse of basic animal health care and reporting systems. Attempts to privatise veterinary services have been focussed in 'high potential' farming areas or urban centres. Typically, veterinary privatisation programmes have regarded pastoral areas as unable to support private veterinary clinics or pharmacies, although data to substantiate this view is rarely available. Furthermore, relatively few veterinary graduates originate from pastoral areas and veterinarians are often unwilling to accept the less comfortable living conditions away from the main towns (RWA International/Vetwork UK, 2000).

Increasingly, countries wishing to export livestock are required to demonstrate their animal health status. International standards are set by the Office International des Epizooties (OIE) according to the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) of the World Trade Organisation. To comply with the SPS Agreement, a SVS in a developing country must be able to:

- demonstrate national animal health status by means of scientifically-based surveillance efforts;
- draft regulations based on international standards and develop transparent means to divulge them to the public and international community;
- develop risk analysis capabilities;
- recognise and apply the concept of regionalisation;
- develop control, inspection and approval methods that are transparent, non-discriminatory and scientifically-based (Zepeda, 2000).

For many developing countries, these conditions are major challenges. In particular, the special constraints and limited private or public sector veterinary activities in pastoral areas of the Horn of Africa raise profound problems for countries wishing to enter international livestock markets. From a livelihoods perspective, although pastoralists are becoming more commercially minded, livestock markets are still poorly developed in pastoral areas. Livestock diseases such as foot and mouth disease (FMD) and contagious bovine pleuropneumonia (CBPP) are thought to be endemic, but there is very little ‘hard data’ available to inform the development of realistic and affordable disease control strategies.

Despite these problems, veterinarians with experience of pastoral communities have noted a wealth of local livestock knowledge, including good diagnostic skills and awareness of modes of disease transmission. Consequently, a key question for veterinarians is how to make best use of this knowledge and develop appropriate livestock disease surveillance systems in pastoral areas. Ideally, such systems should be action-orientated and result in disease control activities that are designed in partnership with livestock keepers.

This paper provides an overview of recent experiences with the use of participatory approaches and methods to understand livestock diseases in pastoral areas. These experiences include the emergence of participatory epidemiology as a distinct branch of veterinary epidemiology, and most recently, studies on the validity and reliability of participatory methods. The paper discusses how participatory assessment can compliment conventional systems of veterinary inquiry and outlines plans to integrate participatory epidemiology into national veterinary epidemiology units.

2. Why a participatory approach to veterinary epidemiology in pastoral areas?

2.1 Indigenous knowledge as epidemiological intelligence

Pastoralists have a rich and detailed knowledge about significant health problems affecting their animals (see box 1). This indigenous veterinary knowledge is based on oral tradition, shared information and the life experience of individuals. The core of this knowledge is clinical, pathological and epidemiological[1] observations that serve to organise disease information into recognisable entities described by a traditional terminology. This information is valuable intelligence for veterinary epidemiologists. Each term has a consensus definition that can be explained during participatory enquiry (for example, see Figure 2 p.10). From an epidemiological perspective, these definitions can serve as 'case definitions'. In pastoral and agro-pastoral societies regular, even daily meetings are held to discuss the health of livestock and decide how they should be managed. In part, decisions on livestock management are based on a constant reassessment of the animal health situation, including exposure to parasites on pasture, or proximity to diseased herds or wildlife. Livestock topics, including animal health, form a substantial part of everyday conversation in such communities.

2.2 Constraints facing conventional epidemiological approaches

National veterinary epidemiology units and researchers working in pastoral areas have usually tried to apply conventional epidemiological methods. Typically, quantitative and data driven approaches are attempted but prove to be untenable in large pastoral areas with relatively small and mobile human populations, limited modern infrastructure and frequently, insecurity. Other problems include lack of baseline data to inform random sampling procedures and the difficulty of following herds during longitudinal studies. Rather than asking the question, '*What is*

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1. Veterinary epidemiology is the study of disease in animal populations and factors that determine its occurrence. Therefore, epidemiological observations relate to populations. Clinical observations are visible signs of disease in a live animal or signs detected using basic instruments such as a thermometer or stethoscope. Pathological observations usually relate to dead animals (post mortem examinations). Unlike epidemiological observations, clinical and pathological observations can be seen in individual animals.

Box 1. The indigenous knowledge of pastoralists in the Horn of Africa: some views of veterinarians

Working in the Somaliland Protectorate in the 1950s, the veterinarian Robert Mares noted that,

"... it is surprising to find that the (Somali) nomad recognises the flies that spread trypanosomiasis; that he has a good idea of the infective nature of disease and knows that cattle with rinderpest are dangerous to other cattle; and that he has learnt logical and effective, though very primitive, methods of immunisation" (Mares, 1954).

Some years later, a British veterinary team working in northern Somalia between 1969 and 1972 also realised that herders possessed useful knowledge related to animal health. For example, when discussing trypanosomiasis in camels it was concluded that despite the team's laboratory facilities,

"...the best diagnostic tool was probably the camel owners own opinion. This is not something to be dismissed lightly because a camel owner knows his animals and the disease intimately" (Edelsten, 1995).

Further south, it was the Maasai who suggested that wildebeest were associated with the epidemiology of malignant catarrhal fever. In Maa, the words for wildebeest and MCF are the same (Barnard et al., 1994). The Maasai recognised that the wildebeest calving season was a high-risk period for the transmission of MCF and protected their cattle by avoiding wildebeest during the calving season.

Also working with the Maasai, Plowright suggested that,

'... nomadic cattle owners could give uninitiated professionals a firm diagnosis of rinderpest and even husbanded mild strains purposely to immunise their young stock" (Plowright, 1998).

the minimum data required to take action?' epidemiologists have tried to design studies and data collection activities according to the relatively easy operational environment of settled farming communities.

In addition, most animal health data collection systems or research projects have lacked commitment to feedback information to pastoral communities. Not surprisingly, this creates frustration among herders and unwillingness to collaborate with future efforts. In contrast to reports of pastoralists' indigenous veterinary knowledge, there are also frequent accounts of herders' lack of co-operation with animal health surveys and attempts to mislead researchers. These constraints are sometimes compounded by the veterinary profession's bias against pastoralists. Veterinarians undergo a lengthy university education that tends to reinforce attitudes of superiority in animal health matters. Pastoral production systems are commonly regarded as backward and inefficient and because pastoralists have limited access to formal education, their knowledge is undervalued.

3. Participatory epidemiology

3.1 Principles

The approach and methods of participatory epidemiology are drawn from rapid rural appraisal. Key features are summarised in Box 2.

Although participatory epidemiology is essentially a qualitative process, it is useful to note that the core conventional veterinary diagnostic methods are also qualitative. Procedures such as history taking, clinical examinations and post mortem examinations are common diagnostic tasks performed by veterinarians, and are largely subjective. The process of triangulation, central to participatory inquiry, is performed routinely by veterinary diagnosticians as they mentally combine and cross-check information provided by livestock keepers with observations of the environment and animals in question. Even laboratory examination and the interpretation of laboratory results involves subjective interpretation by veterinarians.

With these issues in mind, participatory epidemiology can be viewed as a natural extension of the veterinary diagnostic process. Specific participatory methods that relate to a conventional diagnostic approach are illustrated in Figure 1.

In our view, a veterinarian wishing to use participatory epidemiology requires three main attributes:

- The right attitude – including a willingness to listen and learn from livestock keepers, and patience. While local knowledge and skills should be respected, gaps in knowledge and apparent anomalies compared with professional views need to be explored.

- Good background knowledge – including a thorough and critical understanding of the scientific and social literature for the areas and diseases in question. This awareness of secondary data informs the probing and triangulation processes.

- Willingness to learn, practise and apply participatory methods – including adaptation of methods according to the field situation.

Box 2. The principles of participatory epidemiology

Attitudes and behaviour

Practitioners are required to assess their own professional and cultural biases. Essentially, they need to be genuinely willing to learn from local people, not lecture to them but actively and patiently listen. This requires respect for local knowledge and culture.

Combined methods and triangulation

Participatory epidemiology uses a wide range of interviewing, scoring, ranking, and visualisation methods. Of these, interviews are the most important group of methods because they are used alone but also complement and formed the basis for other methods. The visualisation methods include mapping (natural resource maps, social maps, service maps), seasonal calendars, time-lines, transects, Venn diagrams, flow diagrams. Scoring methods include matrix scoring and proportional piling. These methods are combined with conventional veterinary investigation and epidemiological tools.

The use of key informants

Although pastoral communities generally are recognised as knowledgeable about animal health matters, certain people are known to possess special livestock knowledge and skills. These local experts are important key informants for participatory epidemiologists.

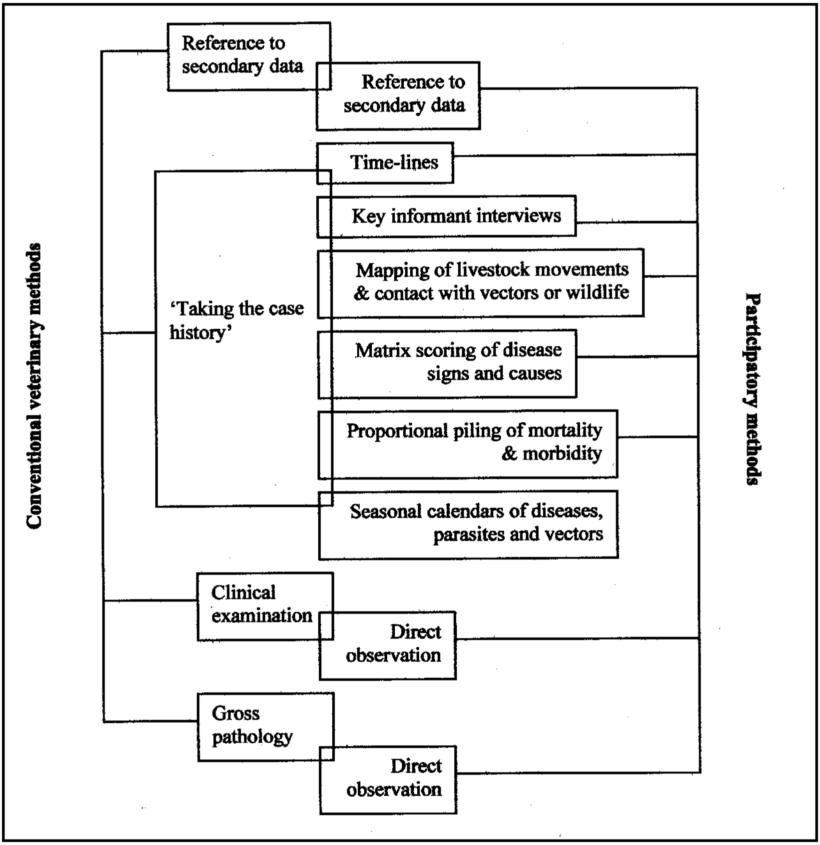
Action-orientated

Participatory epidemiology aims to generate information that can be verified with communities and leads to agreement on appropriate action. Initially, the aims of a particular study or investigation should be clearly explained to avoid raising expectations. In some situations, further laboratory results will be required and the mechanism for transferring these results back to the community should be defined.

Methodological flexibility, adaptation and development

Participatory epidemiology is a relatively new branch of epidemiology that is still developing. The approach is based on qualitative inquiry and complements the quantitative nature of standard veterinary investigation procedures such as owner interviews, clinical observation and gross pathology. According to the needs of a given community or organisation, participatory epidemiology can also combine the benefits of participatory approaches and methods with quantitative inquiry. Methodological adaptation is encouraged.

Figure 1. Qualitiative methods in veterinary investigation and participatory inquiry



3.2 Reliability and validity

Although professionals in a wide range of disciplines regularly use participatory approaches, veterinarians have been slow to adopt participatory ways of working. In 1999, the Participatory Approaches to Veterinary Epidemiology (PAVE) Project at IIED conducted a survey of veterinarians working in Africa in order to assess understanding and uses of participatory appraisal (PA) (Catley 2000a).[2] This survey indicated that although veterinarians recognised the value of PA for addressing local concerns

2. The term 'participatory appraisal' is used to encompass approaches and methods drawn from Rapid Rural Appraisal (RRA), Participatory Rural Appraisal (PRA) and Participatory Learning and Action (PLA).

and building relationships with livestock keepers, its qualitative nature of inquiry was perceived as a key constraint. Many veterinarians considered qualitative data to be unreliable, invalid and difficult to incorporate into official disease information systems.

In response to these concerns, the PAVE Project reviewed the objectives and methods of quantitative verses qualitative inquiry from a veterinary perspective, and with a focus on conditions in pastoral areas (Catley, 1999). One section of the review criticised the use of questionnaires in animal health surveys, and noted the scarcity of surveys following best practise guidelines. Although commonly perceived by veterinarians to be 'objective' and 'quantitative', questionnaires were often poorly designed and administered with no consideration of enumerator bias or non-sampling areas. The review also provided two options for assessing the value of PA in veterinary epidemiology. The first option highlighted the need to understand the aims and scope of qualitative investigation and, in particular, the context-specific and inductive nature of this approach.[3] Therefore, it was suggested that a 12-point system of assessing trustworthiness, as proposed for Participatory Learning and Action (Pretty et al., 1995), could also be applied to qualitative veterinary inquiry.

The second approach to understanding reliability and validity of PA focussed on objective measures.

The PAVE Project implemented a series of livestock disease investigations in pastoral areas of the Horn of Africa designed to compare data derived from participatory and objective assessment of specific livestock diseases. Research was conducted in three study sites (Table 1) and livestock keepers identified the diseases as priorities. Their requests for advice and investigation were channelled through field-level NGOs or other agencies to the PAVE Project. The basic methodology for these investigations involved a comparison of livestock keepers' perceptions with the results of conventional veterinary inquiry. Also, 'standardised' PA tools were developed and repeated in order to assess reliability.

The standardised PA methods included matrix scoring, seasonal calendars and proportional piling. By 'standardised', we mean that for each study

3. An inductive approach is open ended. Answers to one set of questions induce new questions.

Table 1. Reliability and validity of PA methods for veterinary epidemiology: summary of field studies conducted by the PAVE Project, 1999-2001

Date	Description	Main partners
May 1999 to August 2000	Studies on *liei*/chronic wasting disease in cattle Western Upper Nile, Upper Nile and Bahr el Ghazal, with Nuer and Dinka communities, southern Sudan. Local characterisation of diseases and comparison with veterinary opinion, pathological examination and laboratory investigation.	• Operation Lifeline Sudan (Southern Sector) Livestock Programme • VSF Switzerland • Save the Children (UK)
November 2000	Studies on gandi/bovine trypanosomiasis with Orma communities in Tana River District, Kenya. Local characterisation, incidence estimates and preferences for control methods.	• Kenya Trypanosomiasis Research Institute (KETRI) • Catholic Relief Services • Diocese of Malindi
April to August, 2001 (and ongoing)	Studies on suspected chronic manifestations of foot and mouth disease in cattle with Maasai and Wasukuma communities, Morogoro, Mwanza and Shinyanga regions, Tanzania.	• Faculty of Veterinary Medicine • Sokoine University of Agriculture • Mwanza Veterinary Investigation Centre

the diseases, indicators, seasons and scoring systems were kept constant for each method, thereby enabling comparison of results from different informants. Through the use of scoring-type procedures in these methods,[4] numerical data arose directly from informants at an early stage in the method. This data was summarised using statistical methods, as outlined in the examples in Figures 2 to 4. Although these methods were standardised, the methods also included the use of open and probing questions to cross check and follow up interesting responses. Also, other PA methods such as semi-structured interviews and mapping were used in an ad hoc manner as part of the triangulation process.

4. For example, the division of piles of counters (seeds or stones) against disease-signs, disease-causes, disease incidence, seasons or other indicators.

Figure 2. Example of a summarised matrix scoring of disease-signs versus diseases in Nuer areas of southern Sudan

Disease-signs	Diseases: *Liei* Mixed parasitism	*Dat* FMD	*Maguar* Parasitic gastroenteritis	*Doop* CBPP	*Macueny* Fascioliasis
Chronic weight loss (W=0.51***)	10 (6.0-16)	1 (0-2.5)	3 (0-3.0)	1 (0-2.5)	1 (0-2.0)
Animal seeks shade (W=0.88***)	0 (0)	20 (17-20)	0 (0)	0 (0-3.0)	0 (0)
Diarrhoea (W=0.52***)	4 (0-8.5)	0 (0)	11 (6.0-16)	0(0)	4 (0-7.5)
Reduced milk yield (W=0.51***)	2 (0-4.0)	13 (7.0-20)	3 (0-9.0)	1 (0-2.5)	0 (0-1.0)
Coughing (W=0.76***)	0 (0-0.5)	0 (0-0.5)	0 (0-2.0)	19 (16.5-20)	0 (0-0.5)
Reduced appetite (W=0.54***)	0 (0)	13 (7.0-20)	0 (0)	5 (0-10)	0 (0)
Loss of tail hair (W=0.89***)	20 (16.5-20)	0 (0)	0 (0-3.5)	0 (0)	0 (0)
Tearing (W=0.28*)	6 (3.0-13)	2 (0-6.5)	4 (0-8.5)	0 (0-1.5)	3 (0-8.0)
Salivation (W=0.50***)	2 (0-3.0)	14 (7.0-20)	3 (0-6.5)	1 (0-2.0)	0 (0-0.5)

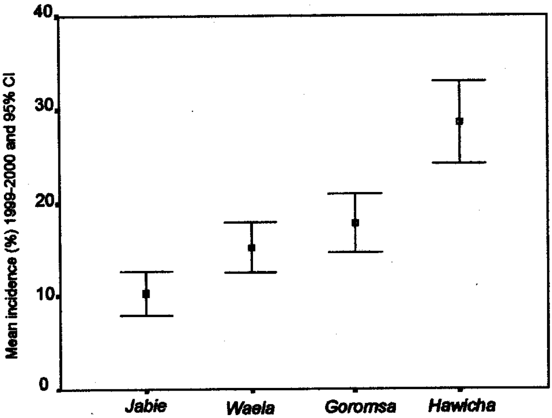
This method was used to answer the question, 'How do people diagnose the disease called liei relative to other diseases?' The method includes 2 'control diseases' called dat and doop, that had already been diagnosed by vets as FMD and CBPP respectively. These controls were used to check that informants understood the scoring procedure.

Number of informant groups = 12, group sizes varying from 4 to 11 individuals. The black dots represent the scores (number of seeds) that were used during the matrix scoring. Medians are presented (95% confidence limits). A high number of dots indicates a relatively strong association between a sign and a disease whereas a low number of dots indicates a weak association.

W = Kendall's Coefficient of Concordance (*p<0.05; **p<0.01; ***p<0.001). This is measure of the level of agreement between the 12 informant groups for each disease-sign. High agreement between groups indicates good reliability of the method.

Source: Catley et al., 2001

Figure 3. Estimated incidence of gandi/trypanosomiasis by age group in Orma cattle, Tana River, Kenya



This graph was derived from the results of proportional piling of important cattle diseases during 1999-2000, by cattle age group, with 50 informants. Mean incidence and 95% confidence intervals are illustrated.

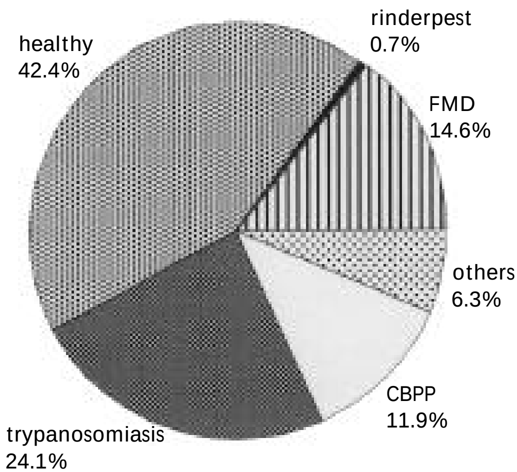
Orma classification of cattle age groups was used as follows:

Jabie	0-2 years
Waela	2-3 years
Goromsa	3-4 years
Hawicha	> 4 years

The increasing pattern of disease incidence with age fits conventional veterinary thinking.

Source: Catley et al., 2001

Figure 4. Summarised estimates of disease incidence in Tana River, Kenya



This pie chart is based on results from the same proportional piling method used in Figure 3. The method required informants to consider each age group of cattle in turn, and divide stones to show the relative incidence of diseases. The pie chart summarises the results for all age groups of cattle.

To some extent, this information can be cross checked against conventional veterinary investigations methods, such as laboratory detection of disease agents or antibody.

Source: Catley et al., 2001

Inherent in the standardised PA methods were procedures intended to improve quality of data. For example, methods required informants to compare the features of numerous diseases, not only the disease of particular concern. This approach was used to prevent exaggerated responses to mortality and morbidity estimates (Figure 3). Also, matrix scoring methods to visualise and score disease signs and causes included 'control diseases' (Figure 2). These diseases were already well known by the researchers and local disease names were associated with specific western disease names. Consequently, the control diseases were used to determine whether informants understood the matrix scoring procedure.

In the case of the studies in southern Sudan and Kenya,[5] research findings showed that PA methods produced reliable and valid information when used with pastoral informants. Interestingly, the research also highlighted the limitations of the comparative participatory-verses-objective methodology. In theory, the validity of pastoralists' diagnosis of disease, as expressed in local languages, and their perceptions of proportions of animals affected can be cross-checked using modern veterinary techniques to give the 'scientific' or 'objective' answer. These modern techniques include laboratory tests that detect either a causal organism (such as a virus, bacteria or parasite) or evidence of ongoing or previous infection (by detection of antibody). However, there are numerous constraints when considering this approach to validation.

For example, the value of a laboratory test is determined by the sensitivity and specificity of the test. Sensitivity is the ability of the test to detect infection and not miss those animals that are infected (i.e. 'positive' cases of infection). In a herd of 100 cattle all infected with parasite X, a highly sensitive test might detect parasite X in 98 cattle and miss 2 cases. Such a test would be described as 98% sensitive and the number of false negatives is low (only 2%). Specificity is the ability of the test correctly to identify non-diseased animals and relates to the ability of a test to identify accurately the correct disease agent. 3 In a herd of 100 cattle not infected with parasite X, a highly specific test might classify 1 cow as positive and correctly identify the other 99 as negative. In this case, the test would be said to be 99% specific and the rate of false positives would be 1%.

5. Research in Tanzania was still ongoing during the preparation of this paper.

In the PAVE research, there were important limitations in the diagnostic tests available. For trypanosomiasis, the best diagnostic test for field investigations was only approximately 50% sensitive, meaning that 50% of positive, infected animals are missed by the test. For another important disease, fascioliasis (liver flukes), laboratory tests were only approximately 30% sensitive (i.e. 70% of positive cases were missed by the test). These features of diagnostic tests meant that a 'true' estimate of disease presence was difficult to obtain. In cases where pastoralists cannot make a firm diagnosis of a disease, or appear to group a collection of disease signs into a vague syndrome, state-of-the-art diagnostic tests developed by veterinarians are not necessarily more reliable than herders' opinion.

3.3 Uses of participatory methods in veterinary epidemiology

Different types of veterinary worker now use participatory approaches and methods for a wide variety of reasons. Some of the most common uses in pastoral areas are outlined below and specific methods are described in RRA Notes No. 20 (1994), Catley (1999) and Mariner (2001).

Animal health surveys, needs assessments and action plans

Probably the most common use of PA has been during animal health surveys conducted by NGOs as part of community-based animal health projects. ITDG began using PA-type methods in 1986 when a base-line survey in Kamujini, Kenya included the use of methods such as wealth ranking, progeny histories, ethnoveterinary question lists and informal interviews. Over the next few years other methods such as transect walks, mapping, and ranking exercises were also used. Maranga (1992) described how ITDG used wealth ranking, disease ranking and success ranking in projects in Zimbabwe and Kenya. In these projects, PA was used during the initial needs assessment or feasibility surveys and was intended to provide a rapid overview of key issues, relationships and services in communities, and locally-prioritised livestock diseases. By the late 1990s, numerous NGOs in Kenya, Uganda, Tanzania, Ethiopia and Somalia were using PA routinely in animal health projects. Similarly, the use of PA was central to the community-based programmes established by the Operation Lifeline Sudan Livestock Programme (Leyland, 1996) and the Pan African Rinderpest Campaign (Mariner, 1996).

Monitoring, impact assessment and evaluation

Although PA has been widely used during the initial stages of project implementation, its use in project monitoring and evaluation has been less extensive. In pastoral areas of the Horn, ActionAid-Somaliland used PA methods as part of a participatory and soft systems approach in programme reviews in 1994 and 1998 (ActionAid-Somaliland, 1994, 1998). A review of Oxfam UK/Ireland's community-based animal health project in Karamoja, Uganda (Catley, 1997) also used PA methods and scoring tools were incorporated into a questionnaire-based assessment of Oxfam UK/Ireland's project in Wajir, Kenya in 1998 (Odhiambo et al., 1998). Participatory impact assessment approaches and methods were also developed and tested by VSF-Belgium and VSF-Switzerland in southern Sudan (Catley, 2000b).

Ethnoveterinary studies

Specific studies to collect and document indigenous veterinary knowledge have, to varying degrees, used PA methods. In comparison with the various PA methods used in the development of community-based animal health services, ethnoveterinary studies have tended to use a narrow range of interviewing methods. Often these methods have been more formal than informal, with questionnaires and structured owner interviews forming the basis for data collection. Working with ITDG in Kenya, Wanyama (1997) also used various ranking and scoring methods in a more participatory ethnoveterinary research approach.

Participatory disease searching

The later stages of animal disease eradication programmes require the final remnants of disease to be sought out and removed from a population. Participatory disease searching (PDS) evolved in the Pan African Rinderpest Campaign and used pastoralists' knowledge of rinderpest to locate disease outbreaks in remote areas. The approach was based on participatory methods such as semi-structured interviews and in particular, the use of probing questions to delve deeply into local knowledge about rinderpest. Also, mapping and time-lines were used to build an historical picture of rinderpest outbreaks in a given area (Mariner and Flanagan, 1996; Mariner, 2000). These methods were used in combination with conventional veterinary investigation methods such as clinical and laboratory examination. When the searching team actually located a rinderpest outbreak, the involvement of livestock keepers during the disease search meant that discussion on the action required to control the outbreak was easily initiated. At the time of writing, PDS was likely to become increasing important as Horn of Africa countries sought to identify remaining foci of rinderpest in remote areas.

Participatory research

The research activities conducted by the PAVE Project and outlined in Table 1 can be described as participatory research. In each research location, the diseases under investigation were identified by livestock keepers as priorities and they requested local veterinary workers to advise them regarding disease control or treatment. In each case, participatory diagnosis followed by discussion on appropriate control measures was the main field-level activity. In southern Sudan, research findings were presented to the Operation Lifeline Sudan Livestock Programme and refresher training for animal health workers was planned. A further proposal was also formulated to involve livestock keepers in assessing various treatment options for the disease in question. In Kenya, research findings were presented to community representatives and an action plan for further work was agreed with the KETRI (Catley et al., 2002).

Disease modelling

Computer simulations of disease transmission can assist epidemiologists to develop disease control strategies. By understanding the way a disease moves between animals in a population, appropriate methods to interrupt disease transmission can be identified. Disease modelling often makes use of expert opinion provided by technicians to estimate parameter values where hard data is limited or too expensive to collect. A common criticism of disease models has been that the people actually developing the model or providing the expert opinion are isolated from the realities on the ground. Frequently, this means that the validity of the available field data used to run the model is not fully understood and therefore, inappropriate conclusions are drawn. Similarly, recommendations for disease control should be informed by knowledge of local preferences for different control options.

In southern Sudan, participatory methods were used to generate basic data for a rinderpest disease model (Mariner, 2001). The key parameter for developing the model was a measure of rinderpest transmissibility, called the basic reproductive number (R_0)[6]. The basic reproductive number is both a characteristic of the infectious agent and the structure of the population harbouring the agent. Constructing a model requires an understanding of herd age structure and mortality rates due to rinderpest in different age groups of cattle. Participatory methods such as proportional piling can be used to produce this kind of data. Development of the model also requires understanding of livestock population structure and the degree of contact between herds. This herd-to-herd contact is directly related to spatial, temporal and social relationships between adjacent communities. Participatory methods are ideal for studying linkages between communities. Methods such as mapping can be used to quantify contact between communities and herds as well as seasonal variations in contact levels. Participatory methods are ideal for studying community structure. Methods such as mapping can be used to quantify contact between communities and herds as well as seasonal variations in contact levels.

After R_0 had been estimated, a model was developed to show the effect of vaccination on rinderpest presence in a given population. This model was used to predict the level of vaccination coverage required for stopping transmission of rinderpest within and between herds in southern Sudan. Although work is still in progress, this 'participatory modelling' approach combines herders' expert opinions with sophisticated mathematics and conventional diagnosis to develop better disease control strategies. Furthermore, disease models can be developed with relatively small data sets provided that the reliability of the data is known.

3.4 Problems with participatory approaches

In common with the use of participatory approaches and methods by workers in other technical sectors, veterinary uses of PA are affected by various difficulties. For example, the survey of veterinarians working in Africa conducted in 1999 showed that the number of vets using PA exceeded the number of vets who had received training in PA (Catley, 2000a). Furthermore, a commonly cited complaint was 'negative attitudes among colleagues and superiors' and insufficient training courses

6. R_0 is defined as the number of secondary cases that arise from one infectious index case in a totally susceptible population. For example, a disease agent of low transmissibility may have $R_0 = 0.8$ and such an agent would not be maintained in a population. A more transmissible disease agent may have $R_0=10$. This agent would spread quickly through a susceptible population.

and manuals. When people were able to attend training courses, the quality of training was extremely variable. For example, when conducting refresher training in participatory methods for researchers from KETRI, one of the authors asked participants to describe the key experiences from their previous training in PRA. A typical response was 'Its really just like a questionnaire survey'. This confusion over PA is very apparent in the increasing number of veterinary research papers and proposals originating from Africa and claiming to use participatory approaches and methods. In our experience, it is rare to find a report or proposal that uses methods other than structured interviews or, proposes training in PA for researchers followed by methodology development and testing in the field.

Although not yet a serious problem, we're also aware of the dangers of developing standardised PA methods such as those used by the PAVE Project. At worse, this approach could encourage a 'fixation with methods' as described by workers in other sectors (e.g. Guèye, 1999). However, while PAVE standardised certain aspects of methods such a matrix scoring, a crucial part of the method was 'interviewing the matrix', cross checking the scores and asking open and probing questions to prompt further discussion. A problem arises because while some researchers readily grasped the concept of open-ended inquiry and enjoyed asking further questions, other researchers focussed solely on recording the scores of the matrix and regarded this as the main output of the method. This experience has much in common with reports from other workers viz. attitude, behaviour and a certain mindset are central to effective participatory inquiry.

4. Future directions

Although participatory epidemiology is used by only a handful of veterinarians in Africa, there are opportunities to promote its wider development and application. In particular, the Pan African Programme for the Control of Epizootics (PACE) covers 32 countries and aims to eradicate rinderpest from Africa, improve control of other epizootics and develop the capacity of national veterinary epidemiology units. Regarding rinderpest eradication and epizootic disease control, these diseases are particularly difficult to control in pastoral and agropastoral herds. When combined with conventional veterinary diagnosis, participatory approaches can assist veterinarians to gain a better understanding of disease dynamics in pastoral areas and simultaneously, develop better working relationships with pastoral communities.

Within the PACE, the Community-based Animal Health and Participatory Epidemiology (CAPE) Unit is planning to encourage key regional and national-level veterinary agencies to learn more about participatory approaches in pastoral areas of the Greater Horn of Africa region. Some of the main activities of the CAPE Unit are as follows.

- Dissemination of experiences in participatory epidemiology via academic and informal publications, and workshops.
- Training in participatory epidemiology for senior-level epidemiologists in government veterinary services, veterinary schools and research institutes, followed by application in the field e.g. as a component of disease surveillance systems and research in pastoral areas.
- Encourage veterinary epidemiologists to become involved in the design, monitoring and impact assessment of community-based animal health programmes in pastoral areas; create links between government epidemiologists and NGO programmes.
- With veterinary schools, explore options for incorporating community-based animal health and participatory epidemiology into undergraduate or postgraduate curricula; support postgraduates to conduct participatory research in pastoral areas.

Ultimately, these activities aim to improve animal health information flow both from and to pastoral communities, enable wider application of community-based animal health services and reduce the isolation of pastoralists from national and international livestock markets.

References

ActionAid-Somaliland, 1998. Programme Review by the Sanaag Community-based Organisation. ActionAid, London.

ActionAid-Somaliland, 1994. ActionAid Somaliland Programme Review/Evaluation October 1994. ActionAid, London.

Barnard, B.J.H., Van der Lugt, J.J. and Mushi, E.Z., 1994). Malignant catarrhal fever. In: Infectious Diseases of Livestock: with special reference to southern Africa. Coetzer, J.A.W., Thomson, G.R. and Tustin, R.C. (Eds). Oxford University Press, New York. pp. 946-957.

Catley, A., 2000a. The use of participatory appraisal by veterinarians in Africa. *Office International des Epizooties Scientific and Technical Review,* 19 (3), 702-714.

Catley, A., 2000b. The use of participatory appraisal to assess the impact of community-based animal health services: experiences from southern Sudan. IXth Symposium of the International Society for Veterinary Epidemiology and Economics, Breckenridge, Colorado, 7th-11th August, 2000.

Catley, A., 1999. Methods on the Move: a review of veterinary uses of participatory approaches and methods focussing on experiences in dryland Africa. International Institute for Environment and Development, London.

Catley, A., 1997. A Review of the Oxfam UK/Ireland Kotido Livestock Development Project (Animal Health Component), Kotido District, Karamoja. Consultancy Report for the Renewable Natural Resources Sector, Overseas Development Administration (UK), Uganda, March 1997. Vetwork UK, Edinburgh.

Catley, A., Irungu, P., Simiyu, K., Dadye, J. Mwakio, W., Kiragu J. and Nyamwaro, S.O., 2002. Participatory investigations of bovine trypanosomiasis in Tana River District, Kenya. *Medical and Veterinary Entomology*, 16, 1-12.

Catley, A., Okoth, S., Osman, J., Fison, T., Njiru, Z., Mwangi, J., Jones, B.A. and Leyland, T.J., 2001. Participatory diagnosis of a chronic wasting disease in cattle in southern Sudan. *Preventive Veterinary Medicine*, 51/3-4, 161-181.

Edelsten, R.M., 1995. Livestock Diseases in the Northern Regions of Somalia. A Report of the British Veterinary Team, 1969-1972. 1994 Condensed Version. VetAid, Midlothian.

Guèye, B., 1999. Whither participation? Experience from the francophone West Africa. Drylands Programme Issue Paper no.87. International Institute for Environment and Development, London.

Leyland, T., 1996. The case for a community-based approach with reference to southern Sudan. In: The World Without Rinderpest. FAO Animal Health and Production Paper 129, 109-120.

Maranga, S., 1992. Participatory Information Collection in Kenya and Zimbabwe. In: Livestock Services for Smallholders. Proceedings of an International Seminar held in Yogyakarta, Indonesia 15-21 November 1992. Daniels, P.W., Holden, S., Lewin, E. and Sri Dadi (Eds). pp. 137-139.

Mares, R.G., 1954. Animal Husbandry, Animal Industry and Animal Disease in the Somaliland Protectorate, Part II. *British Veterinary Journal* 110, 470-481.

Mariner, J.C., 2001. Report on a consultancy to assist in the development of a rinderpest eradication strategy in West and East Nile Ecosystems. Community-based Animal Health and Participatory Epidemiology Unit, Pan African Programme for the Control of Epizootics. Organization of African Unity/Interafrican Bureau for Animal Resources, Nairobi

Mariner, J.C., 2000. Manual on Participatory Epidemiology. FAO Animal Health Manual No.10. Food and Agriculture Organisation, Rome.

Mariner, J.C., 1996. The World Without Rinderpest: Outreach to Marginalised Communities. In: The World Without Rinderpest. FAO Animal Health and Production Paper 129, 97-107.

Mariner, J.C. and Flanagan, F., 1996. Epidemiological Intelligence on the Incidence of Rinderpest in Somalia and North Eastern Kenya. Food and Agriculture Organization, Rome.

Odhiambo, O., Holden, S. and Ackello-Ogutu, C., 1998. OXFAM Wajir Pastoral Development Project: An Economic Impact Assessment. Oxfam UK/Ireland, Nairobi.

Plowright, W., 1998. Professional Commitment to the Success of the Global Rinderpest Eradication Campaign. Technical Consultation on the Global Rinderpest Eradication Programme, 28-30th September, 1988, FAO, Rome.

Pretty, J., Guijt, I., Thompson, J. and Scoones, I., 1995. Participatory Learning and Action: A Trainers Guide. Sustainable Agriculture Programme, International Institute for Environment and Development, London.

RWA International/Vetwork UK, 2000. Pastoral Livelihoods Appraisal Mission Final Report. Department for International Development (United Kingdom), London.

Wanyama, J.B. 1997. Confidently Used Ethnoveterinary Knowledge Among Pastoralists of Samburu, Kenya. Book One: Methodology and Results. Intermediate Technology Kenya, Nairobi.

Zepeda, C., 2000. The challenge to veterinary services to comply with the Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organization. In: Salman, M.D., Morley, P.S. and Ruch-Gallie, R. (Eds.), Proceedings of the 9th Symposium of the International Society for Veterinary Epidemiology and Economics, Breckenridge, Colorado.

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Drylands Programme

The Drylands Programme aims to contribute towards more effective and equitable management of natural resources in semi-arid Africa. It has a particular focus on decentralised management of natural resources, pastoral development, land tenure and resource access. Key objectives of the programme are to strengthen local capacity for sustainable resource management, by building effective and accountable local institutions; identify and promote national policies that legitimise and enable local-level decision making and authority; argue and lobby for global policies and institutions that support the development needs and priorities of dryland peoples.

It does this through four main activities: collaborative research with a range of partners in dryland African countries, training in participatory methods, policy advice to donor organisations, and information networking promoting links and learning between French and English-speaking Africa.

International Institute for
Environment and Development
3 Endsleigh Street
London WC1H 0DD
UK

Tel: (+44 20) 7388 2117
Fax: (+44 20) 7388 2826
E-mail: drylands@iied.org
Website: www.iied.org

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