SOCIO-ECONOMIC ASPECTS OF ANIMAL DISEASES IN SOUTHERN AFRICA: RESEARCH PRIORITIES IN VETERINARY SCIENCE

R C KRECEK*, S T CORNELIUS** and C M E McCRINDLE***

ABSTRACT
During May 1995, members of organisations with a vested interest in the socio-economic aspects of animal diseases in southern Africa met for a one-day workshop. This was the first activity of a proposed three-year Forum and programme in this area under discussion. The workshop was sponsored by the Foundation for Research Development, the Agricultural Research Council and the University of Pretoria. The individuals who attended were representatives of academic and government institutions and included veterinarians, veterinary scientists, animal health officers, administrators from the region and abroad, economists, sociologists and animal welfare experts. The aims of the workshop were fourfold: 1. to define what is meant by socio-economic aspects of animal diseases in southern Africa; 2. to identify the socio-economic factors which influence occurrence and consequences of animal diseases; 3. to learn of methods which are used to assess socio-economic needs, and 4. to initiate an ongoing network and research programme in this area.

Two key questions were considered and discussed by the participants, and a consensus reached for each. The first question considered the link between community development and socio-economic aspects of animal diseases. This included the role of production animals, companion animals and game in developing communities and factors influencing these roles, as well as constraints to this development. The second question concerned the gaps in our understanding of the socio-economic aspects of animal diseases in southern Africa which would lead to research opportunities. Six areas identified were the collection of disease information, education and communication, policy, economics, community needs and technology.

The participants recommended and nominated a 6-person Working Committee who represent 6 institutions. The mandate which they were given was: to comment on this workshop report, develop research programmes based on this report and its recommendations, solicit a response from relevant institutions, network with other institutions concerning socio-economics and respond accordingly.

INTRODUCTION
"Socio-economic aspects of animal diseases in southern Africa" is a topic currently under review in South Africa. Changes which are taking place in the country demand a revised approach to meet broad national development requirements in terms of socio-economics.

In the 24-month period preceding this workshop a need became evident for those with a vested interest in this area to meet and define what is meant by the socio-economics of animal diseases and identify research priorities within the veterinary context. Within the Forum a 3-year programme to address research priorities in this field has been proposed. The first activity was a one-day workshop referred to in this report.

The aims of the workshop were: 1. to define what is meant by socio-economic aspects of animal diseases in southern Africa; 2. to identify the socio-economic factors which influence occurrence and consequences of animal diseases; 3. to learn of methods which are used to assess socio-economic needs, and 4. to initiate an ongoing network and research programme in this area.

The aim of this information paper is to include the abstracts for the 4 keynote presentations at the workshop, summaries of the 2 key questions addressed by the participants and to include the "Conclusions and Way Forward".

The paper is condensed from the complete report in which full-length papers by speakers and further information is available1. A full report by the same name as this paper is available from the Foundation for Research Development at a nominal charge upon request (Ms Jenny Hale 012 8414846).

BACKGROUND CONSIDERATIONS
Participants
The individuals who attended the workshop were representatives of academic and government institutions and included, from the region and abroad, veterinarians, veterinary scientists, animal health officers, administrators from the region and abroad, economists, sociologists and animal welfare experts.

Programme
To establish a framework and stimulate thinking around the theme of the workshop, the programme included 4 speakers selected for their expertise and invited to act as
catalysts in addressing the topics of the day. A veterinary epidemiologist addressed the socio-economics influencing the occurrence of diseases, a medical parasitologist addressed the socio-economic consequences of animal diseases on individuals, communities and nations. The third speaker established a list of diseases which occur in domestic and wild animals in southern Africa.

Lastly, a sociologist presented techniques which can be used to assess socio-economic needs. Abstracts are included. Following this, participants divided into groups addressed 2 key questions and presented their findings. Brief summaries are included.

ABSTRACTS OF KEYNOTE PRESENTATIONS

The socio-economic factors influencing the occurrence of diseases in animals

B D Perry and A W Mukhebi

International Livestock Research Institute (ILRI), P O Box 30709, Nairobi, Kenya

Socio-economic factors have a strong influence on the distribution, dynamics and significance of animal diseases, particularly in developing countries where there are wide differences in the socio-economic status of their inhabitants. Socio-economic factors operate at different levels of resolution, between which their importance often varies; the most important of these resolutions are household, community and nation.

In this paper, we will discuss examples of socio-economic factors affecting disease occurrence in sub-Saharan Africa, with particular reference to 3 different categories of disease; firstly, those affecting farm-level livestock productivity (with the example of the tick-borne diseases), secondly those affecting public health (with the example of rabies) and thirdly those affecting trade in livestock and livestock products (with the example of rinderpest). We will illustrate how factors operate at different levels of resolution, and how different sectors of society (particularly public and private) can play a role in disease control interventions.

What do we mean by socio-economic factors? These are generally taken to mean the non-physical properties or characteristics of human environments, which can greatly influence the natural environment. So in broad terms we mean the economic status of a human population, and all the other characteristics which can be influenced by that, such as level of education, access to resources, including capital, land and services.

In addition to the economic status, anthropological characteristics may also influence attitudes towards education, attitudes towards technology adoption, attitudes towards land tenure, etc., and many of these characteristics enhance or diminish the effect of economic factors, exerting their greatest influence in the more impoverished communities.

As far as animal diseases are concerned, the varying distribution, dynamics and significance of some of the tick-borne diseases in southern Africa provide some clear examples of the differing role of socio-economic factors. Let us first take the case of thileriosis (caused by Theileria parva infection) in Zimbabwe, considering its distribution. The tick vector, Rhipicephalus appendiculatus, requires suitable climatic, habitat and host availability conditions to survive. The climatic and host availability requirements are met in much of the highveld of the country, and in broad terms, this is where most of the cases of thileriosis occur. However, within the highveld, the distribution of the tick differs dramatically between the two socio-economic divisions of land use, namely the commercial farming areas and the communal lands. In the commercial farming areas, the relatively low cattle stocking density, high standards of pasture management, and adequate tree cover ensure a near perfect environment for the tick. In contrast, the high population density, poor pasture management, and scarcity of tree cover in the neighbouring communal lands means that although they occur within a climatically suitable environment in terms of rainfall and temperature, the tick cannot survive, and is absent from most of the communal lands of the highveld.

As far as impact of tick-borne infections under differing socio-economic conditions is concerned, eastern Africa, particularly Kenya, has some excellent examples. In the Lake Victoria Basin, where T. parva infection of cattle has undoubtedly existed for centuries, indigenous zebu cattle, kept by most peasant households and communities, experience few or no losses from the infection where it is endemically stable. As farmers move up the socio-economic ladder, they wish to exploit opportunities to enhance their productivity by investing in more productive livestock. However, these improved breeds of livestock are much more susceptible to the effects of tick-borne infections, and considerable investment in disease control technologies, such as acaricides and chemotherapy, is required. This may be out of range, economically, of such farmers, who may experience heavy losses. A major breakthrough in the region that has allowed improved taurine dairy breeds of cattle to be kept has been the quite widespread adoption of so-called "zero grazing" management, where cattle are kept in a stall of varying simplicity, and fed specifically cultivated or opportunistically gathered fodder crops. With the absence of direct exposure to ticks on pasture, and with the occasional use of acaricides administered by hand pumps, thileriosis occurs with a moderate frequency, and may not be the priority constraint to increased productivity for many of these farmers. This method of management is one of the few viable ways of maintaining livestock under conditions of high human population density. At the other socio-economic extreme are the large beef herds run under commercial conditions, requiring high levels of inputs, such as very regular acaricide use and experienced management, to achieve the high outputs of beef. These operate under conditions of low disease incidence but high disease risk, which can only be sustained with high economic investment.

Dog rabies is endemic throughout most of sub-Saharan Africa, but as with tick-borne diseases, socio-economic factors strongly influence the incidence of the disease. The disease is often most prevalent in the high human (and dog) density areas of the region occupied by low-income sectors of the community; dog densities are high, facilitating disease transmission, and vaccination coverage is low. Rabies control strategies in many countries of the region are outdated, relying on high levels of owner compliance in dog vaccination programmes which come from days of considerably smaller
human and dog populations, and stronger infrastructures in government veterinary services. The supply of vaccine is often inadequate due to budgetary constraints in the public sector. The traditional methods of regular dog vaccination by the local private veterinarian work only in small sectors of the population at the upper end of the socio-economic scale. The control of diseases of public health importance is clearly in the interest of governments, but in many countries of the region, government veterinary departments have increasing difficulty controlling the disease. As a result, the most effective control is often achieved only in the more affluent sectors of the community, with access to private veterinary services; in the sector of society at greatest risk from rabies, the disease is poorly controlled.

The socio-economic factors affecting the occurrence of rinderpest are complex. The disease is, in theory, one of the most straightforward to control and even eradicate, similar to measles in humans. It is most difficult to control where veterinary infrastructures are weakest, and where they are disrupted by civil disorder and war. It followed Napoleon’s armies in Europe, complicated the Vietnam war, and remains endemic in certain areas of Africa, in particular southern Sudan and the Horn of Africa. As with measles, it can only be controlled when an adequate portion of the cattle population is immunised to prevent transmission. However, with much of the rest of the continent, and indeed the rest of the world, free of the disease, and therefore highly susceptible to its effects should it be introduced, it has become a political disease, with particular significance to the international trade in livestock and livestock products. The socio-economic factors affecting it are thus multiple and varied; the socio-economic consequences of its presence are enormous, and can result in ostracism by potential market partners from regional trade in livestock and their products. This has the effect of constraining the potential for foreign exchange earnings, which itself also constrains the provision of adequate financial allocations to government veterinary services. As such, it is the fear of the disease which is most important, keeping it firmly on the agenda of all the governments within the eastern and southern African region.

How can the socio-economic factors influencing disease occurrence be measured? A general understanding can often be gained by rapid rural appraisals, surveys and standard descriptive epidemiological studies, with potential causal relationships identified in observational studies. In order to meet the needs of decision makers, it is important to extend beyond the identification of relationships and causal factors, to quantify the impact of diseases on communities and countries in socio-economic terms, and to assess the relative impacts of different disease control interventions.

The socio-economic consequences of animal diseases on individuals, communities and nations

C N L Macpherson

Director, Windward Islands Research and Education Foundation, Grenada, West Indies

In order to examine the socio-economic consequences of animal diseases it is necessary to briefly examine the definitions and context of this area of investigation. The prefix socio- refers to whole societies or to individuals. Sociology includes the study of customs, traditions, patterns of historical development, and institutions that have evolved within societies. These include the type of government or legal system, regulations of property ownership, educational arrangements, veterinary or medical arrangements, family structures and marriage. Sociology looks at the nature and behaviour of social groups and how they are similar and how they differ from each other. Branches of sociology examine diverse groups within a society, such as women, ethnic groups, refugees, different occupational groups, poverty, the working class, etc. Socio-economic refers to both social status and economic position. Socio-economic status usually relates to levels of education, income or occupation. Throughout the world, public health research demonstrates that people in the lowest socio-economic group have the highest rate of morbidity and mortality. Although the fact that socio-economic status is a well-recognised and important risk factor for disease, the reasons for its importance have not been well researched and documented. This may be due to the difficulty of altering socio-economic status at individual, community or national level. This is especially true if income or occupation is the dominant factor, but, if education is the most important cause, then appropriate, sustainable, cost-effective measures can be developed.

Public health workers are usually concerned with the broad patterns of disease, including the distribution, prevalence and intensity of infection by age and sex, together with estimates of morbidity and mortality and the economic impact; all are aspects of macro-epidemiology. This information is sometimes supplemented by mathematical models which are developed to describe the dynamics of transmission of disease, determination for the requirement for disease control, and subsequently for developing the best design and method of evaluation of control programmes. Micro-epidemiology examines the heterogeneity of susceptibility due to genetic, immunological and nutritional differences, aspects of variation in the parasites and their distribution and survival of the environment and aspects of human behaviour. All too often aspects of micro-epidemiology are ignored, yet changing human behaviour, to avoid transmission, is one of 3 main methods of control of parasitic diseases, along with the elimination of parasites by chemotherapy and the elimination of vectors using insecticides, acaricides, or by modifying the environment. Micro-epidemiology provides the framework for examining the socio-economic and socio-cultural factors which affect the distribution and importance of parasitic diseases and their method of control where health education and community involvement are essential features of the programme.

The occurrence and prevalence of parasitic infections in a given locality are reflections of a complex interaction between the environment and the host species that are present. The ability to monitor the impact of these diseases depends upon the setting and facilities that are available. Throughout the world this varies from the extreme, the extensive grazing practices of nomadic or transhumant peoples, to intensive and non-intensive systems in
developed areas. Nomads live in areas where veterinary, medical and communication systems are usually non-existent and prevalent diseases often go unrecognised. In more developed countries, facilities normally exist for recording input and output criteria, and benefit-cost analysis can be carried out.

Effective drugs are available for the treatment of most parasitic diseases; a great deal is known about the control of vectors and appropriate technology for this is available, but few rigorous scientific studies have been conducted on the anthropoplogy of disease transmission. Consequently, we know much less about how animals, including humans, disseminate and acquire infections. Methods for changing human behaviour are not refined and have had little impact on parasitic disease programmes, especially in developing countries.

The socio-economic impact of different parasitic infections at the individual, community and national level can be examined by a number of factors, including the effect on morbidity, mortality and on international and domestic trade: these factors will be reviewed. A comprehensive review will be presented of the parasitic infections of animals in Africa, including zoonoses, which are of major economic and public health importance. Research requirements, especially in micro-epidemiology, which need to be carried out in order to better understand the socio-economic consequences of parasitic diseases and their control, will be highlighted.

Diseases of domestic and wild animals that may have a significant socio-economic impact on communities in southern Africa

J A W Coetzer

Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, Private Bag X04, 0110 Onderstepoort, Republic of South Africa

For the purpose of this discussion, southern Africa is defined as the region south of the northern borders of Angola, Zambia, Malawi and Mozambique. Diseases that may have a socio-economic impact on communities in South Africa are emphasised and only the major diseases (most of which are not present in South Africa) that occur in the other southern African countries are listed.

Diseases do not respect national boundaries and will occur wherever circumstances are favourable. Particularly in Africa, nomadism and cross-border movement of stock play a very important role in the spread of diseases. The disease status and therefore also the socio-economic impact of diseases in an area, country or subregion (such as southern Africa) are never static and are influenced by numerous factors. As a result, priorities pertaining to veterinary research and services should regularly be reviewed.

The socio-economic impact of diseases is determined by loss to the community of benefits and products derived from animals. These include food (e.g. milk, meat, eggs); clothing (e.g. wool, hides); work (e.g. draught or traction power, transport, racing); monetary (e.g. capital wealth, investment); social (e.g. lobola, ceremonial, companionship, recreational); manure (e.g. fertiliser, fuel); and others (e.g. feathers, bonemeal, soap production). Zoonotic diseases (e.g. rabies, brucellosis, tuberculosis, cestode infections, schistosomiasis, Rift Valley fever) may also have a direct bearing on the well-being of communities. Diseases that require costly control or prevention programmes (e.g. foot-and-mouth disease) have an even greater socio-economic impact on communities.

Other factors which may have a bearing on the socio-economic impact of diseases include: behaviour of the disease (e.g. morbidity and mortality rates, effect on production, performance and reproduction); farming system (e.g. extensive versus intensive); climatic conditions (e.g. good rainy seasons versus droughts); ecosystem (e.g. changes in ecosystem, presence of specific vectors, reservoirs of infection, presence of toxic plants); endemic stability (e.g. tick-borne diseases); breed resistance to diseases (e.g. indigenous versus exotic breeds); resistance to antiparasitic remedies (e.g. haemonchosis, ticks); costly control or prevention programmes (e.g. foot-and-mouth disease); national and international trade (e.g. African horsesickness, equine babesiosis, foot-and-mouth disease, equine influenza, African swine fever); standard of veterinary services and research (e.g. high versus low standard); national policy and political stability; zoonotic diseases (e.g. rabies, brucellosis, tuberculosis, cestode infections); and economic status and anthropological characteristics of the human population.

Methods in socio-economic impact assessment: The use of Participatory Rural Appraisal (PRA)

H van Vaalender

Department of Psychology, Rhodes University, Grahamstown, Republic of South Africa

It is not a coincidence that during the last few months I have been invited to address a group of agriculturists, ecologists and veterinary scientists on socio-economic issues related to their field of study, whereas this kind of interdisciplinary communication had, until very recently, been largely absent.

The change in the country as well as important changes in development theory and practice at international level are instrumental in this new phenomenon. The notion of the currently popular people-centred development which promotes improvement in the standard of living of the majority, rather than an increase in economic growth per se, and which encourages people to take charge of their own lives, and locally the Reconstruction and Development Programme (RDP) which is strongly encouraging people-driven programmes, has obviously had an impact on the activities of all people in South Africa, including scientists and professionals in all fields. Besides the broad change in policy at national level, more pragmatic factors have forced researchers and professionals to focus on the "human factor" in their disciplines. Today, considering "participatory" or "human factors" has become important and at times almost a prerequisite for succeeding in securing funds for research and project proposals. The need for communication and co-operation between social science practitioners and other disciplines has become obvious, and social scientists are increasingly being included in multidisciplinary project teams to address issues such as socio-economic impact assessment, participatory approaches, and evaluation procedures. This paper will deal with Participatory Rural Appraisal as a technique in socio-
economic procedures.

A socio-economic impact assessment can be defined as a study of the socio-economic effects (or impact) of a specific intervention or environmental factor on the affected people. The assessment should provide information about the positive and negative influences of the environmental factors or planned intervention on the people concerned. Although, strictly speaking, impact assessment can refer to the impact of an already existing factor on the lives of the affected people, it is usually referred to as studying the probable impacts of a planned future intervention. However, the methods that will be addressed here can be applied to both situations.

A participatory approach. Participatory Rural Appraisal is situated within a broader participatory approach. A participatory approach can be defined here as a 3-pronged process involving the gathering of data with the active participation of all involved in the process and simultaneously an educational and mobilisation process for development. It is believed that combining data-gathering with education and capacity building and involving the affected people as participants in the process will lead to the collection of valid and reliable data and will enhance the sustainability of processes and programmes. There will be a strong link between baseline data and the development of programmes.

In adopting a participatory approach to impact assessment it is important to take the following principles into account: 1. The participatory approach should involve all participants and should be problem centred. 2. The participatory approach should involve all the affected in a collective identification and description of the research topic or problem, ensuring a full understanding and commitment of the people involved in the research or development process. The active participation of all participants should continue throughout the whole process, from data gathering to analysis and eventually use of the results.

The importance of local knowledge. The participatory approach assumes that communities have traditionally well-established knowledge systems and carefully developed techniques, which over many years allowed them to survive in harsh conditions. An analysis of the local community history forms the basis for any research and intervention. The researcher or professional should tap the local knowledge, indigenous technologies, survival strategies and resources which will serve as a foundation for the development of appropriate action. It is believed that building on indigenous knowledge will enhance sustainability.

Appropriate methods. The methods used should be compatible with the local dynamics of the people studied and they should allow the local knowledge to be tapped. The methods should also equip the people studied with tools to collect and analyse data in the future, as well as to solve their own problems. Self surveys in which the people themselves assist in drawing up a questionnaire and in administering and analysing the data are often omitted in a participatory approach. Focus groups in which a small group of people under the guidance of a trained facilitator engage in a focused debate around a chosen issue is another popular tool in participatory work. Other participatory methods are the generative teams of P Freire and the workshop method. This paper, however, will confine itself to the PRA techniques.

PRA as a method in impact assessment. PRA was developed as a quick and relatively cheap, insightful and multi-disciplinary method of data gathering and analysis in response to rural development and agricultural challenges in Third World countries. One of the stated aims of PRA is to assess feasibility and impact on planned interventions. Besides impact assessment, it is also used to assess development needs of communities, to implement and monitor programmes.

PRA optimises trade-offs, it aims to find out only what it needs to know and does not measure more accurately than necessary (thereby saving resources), it attempts to learn with the people as you go along, and it offsets biases of the professional who is an outsider. PRA also serves as an educational tool for the people involved in the PRA process.

PRA is basically a collection of data-gathering and data-analysing techniques, which are used within a participatory framework (based on the above principles).

The following are the main PRA techniques: Secondary data review, direct observation, semi-structured interviews, analytical games, stories and portraits, diagrams (amongst which are maps, time-lines, seasonal calendars, transects and flow- and venn-diagrams), workshops (illustrations of the techniques and their uses will be provided). The use of any of the above techniques or a combination thereof will depend on the particular issue under research.

Although PRA has become very popular and its use is becoming more and more widespread, it is important to remember that it remains only a collection of techniques and that one needs to apply those techniques in a professional manner in order to obtain valid and reliable results.

SUMMARIES OF GROUPS’ FEEDBACK FOR QUESTIONS 1 AND 2

Summary of groups’ feedback for Question 1: What is the link between community development and socio-economic aspects of animal diseases? (Fig. 1)

Summary of groups’ feedback for Question 2: What are the gaps in our understanding of the socio-economic aspects of animal diseases in southern Africa which would lead to research opportunities?

Broad research gaps identified:

(1) Collection of disease information: Demography; Disease Incidence/Prevalence; Relative importance and priorities.
(2) Education and Communication: Extension methodology; Technology Transfer at all levels; Research methodology.
(3) Policy: Production systems: land use; Effective lobbying: policy makers; Environmental impact.
(4) Economics: Socio-economic profiles; Production systems viability; Economic viability of control; Relative importance of disease; Credit/markets.
(5) Community needs: Anthropological/social profiles; Infrastructure; Access to resources.
(6) Technology: Appropriate technology and transfer; Multi-disciplinary and interdisciplinary teams.

CONCLUSIONS AND THE WAY FORWARD

The objectives of the workshop were
achieved. Firstly, a definition of socio-economic aspects of animal diseases in southern Africa was proposed. Secondly, those socio-economic factors which influence occurrence and consequences of animal diseases were outlined. The third objective, which was to learn of methods used to assess socio-economic needs, was met with emphasis given to the participatory rural appraisal method. Finally, the fourth objective was to initiate an ongoing network and research programme in this area. The network process was furthered with activities throughout the day and research gaps were broadly outlined. A recommendation was made to develop multidisciplinary and interdisciplinary research teams comprised of a sociologist, an economist, a veterinary epidemiologist and appropriate scientists.

To further the objectives, during the final discussion the participants proposed formation and nomination of a Working Committee. The individuals nominated to this committee include: Prof Tammi Krecek (University of Pretoria): Convenor; Dr Durr Bezuidenhout (Onderstepoort Veterinary Institute); Dr Gideon Brückner (Directorate of Animal Health); Mr James R Mgosorho (Agricor); Dr Dumisani I Mtshali (Department of Agriculture, KwaZulu-Natal); and Prof Colin Stewart (Medical University of Southern Africa).

The mandate of the Committee is to: 1. comment on the workshop report to be drawn up by the Organising Committee, 2. develop research programmes based on the report recommendations, 3. solicit a response from relevant institutions, 4. network with other institutions, concerning socio-economics and 5. respond accordingly.

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