African Local Knowledge: Livestock Diseases and Treatments in South Africa[1]

Karen Brown and William Beinart (African Studies Centre, University of Oxford)

1. Summary and Distillation of Findings to be published in a book

2. Recommendations

General overview: The Dynamics of Local Knowledge

Understanding local knowledge has become a significant academic project amongst those interested in Africa and developing countries more generally. This book explores a central body of rural African knowledge about livestock diseases. It draws on the small but expanding field of ethnoveterinary research but attempts to move beyond this literature.[2] Firstly, while we examine the legacy of traditional ideas, we try to explore changing patterns of local knowledge. Secondly, we analyse the relationship between local and scientific knowledge. Thirdly, we try to explore an overarching set of ideas and practices that includes analysis of environmental understandings of disease, plant medicines, supernatural interpretations as well as new biomedicines.

Our informants are largely rural African livestock owners - the descendants of communities that were colonised well over a century ago. Our older informants especially have grown up in a context where the government imposed practices, such as dipping and inoculation, rooted in scientific conceptualisations of disease causation and control. State veterinary institutions and policies have touched the lives of all African stockowners. Yet we have not found that their ideas have been completely transformed by such interactions. To a surprising degree, we found that rural African livestock owners worked with older but dynamic understandings of disease and treatment that interacted vigorously with changing scientific ideas and conceptions of modernity.

We record African understandings of disease and the degree of acceptance of biomedical explanations. We also discuss a wide range of treatments from dipping with chemicals, to herbal potions and the doctoring of space. Our analysis encompasses environmental and natural, as well as biomedical and supernatural, approaches to livestock disease. Overall our findings suggest relatively limited penetration of biomedical ideas about germs, or parasites such as ticks, in the explanations of disease. The dominant form

---

[1] Report completed September 2012. Project funded by the ESRC and researched 2008-12. See also Karen Brown, Andrew Ainslie and William Beinart, 'Animal Disease and the Limits of Local Knowledge: Dealing with Ticks and Tickborne Diseases in South Africa', *JRAI*, 19 (2013), 319-337; William Beinart and Karen Brown, *African Local Knowledge and Livestock Diseases: Diseases and Treatments in South Africa* (James Currey, Oxford and Wits University Press, Johannesburg, 2013), forthcoming.

[2] Constance Marie McCorkle, Evelyn Mathias, T. W. Schillhorn-van-Veen, *Ethnoveterinary research and development* (London : Intermediate Technology Publications 1996); Edward C. Green, 'Etiology in Human and Animal Ethnomedicine', *Agriculture and Human Values*, 15 (1998), 127-131; P. J Masika, W. van Averbeke and A. Sonardi, 'Use of herbal remedies by small-scale farmers to treat livestock diseases in central Eastern Cape Province, South Africa,' *Journal of the South African Veterinary Association,* 71, 2 (2000), 87-91.

of understanding rested in seasonal environmental changes - such as the impact of fresh spring grasses and their impact on animal health. Nutritional concerns were at the heart of medical ideas; 'the grave of the cow is in the stomach', as one informant said.

Livestock remain important for a significant segment of the rural population in the villages where we interviewed. We found that even where smallholder cultivation was dwindling, interest and commitment to cattle and goats thrived. For this reason, we argue that this field of local knowledge is one of the most significant and widespread amongst African communities nationally. Moreover, state provision of veterinary services has ebbed at the very moment that land reform has provided new opportunities for African smallholders. On newly acquired land, as well as the old communal pastures, livestock rather than crops have been the priority. In the absence of a national veterinary service, most African stockowners have been left to find their own treatments and remedies.

Research Sites

We discuss African approaches to livestock diseases in South Africa during recent decades. African veterinary medical knowledge remains largely unrecorded and this book makes an important contribution in capturing its diversity, as well as its limits. We aimed to find a number of diverse sites so that we could develop a national picture of knowledge amongst African livestock owners. In total we interviewed over 200 people. Karen Brown researched in the North West Province especially at Mabeskraal, Mafikeng and Garankuwa. She worked with Barbara Kgari, an assistant and translator who opened up many paths in the province. This area is composed of flat highveld lands, with a mixture of savannah and bushveld, becoming progressively drier to the west. As a contrast Brown also interviewed in the former homeland area of QwaQwa (now in the eastern Free State). It is a mountainous zone, lying in the shadow of the Malutis (Drakensberg). Tumisang Mohlakoana, a zoology student at the Free State University in Phuthaditjhaba, acted as research assistant. Her final destination was the small northern Free State town of Koppies, where she interviewed white commercial farmers as well African livestock owners from the adjacent township of Kwakwatse. The librarian at Onderstepoort Veterinary Institute (Pretoria), David Swanepoel, provided support in this area. This district provided a strong contrast regarding local understandings of diseases, in the sense that white Afrikaner farmers and African stockowners, who had formerly worked on white owned farms, generally espoused a biomedical approach to animal health.

William Beinart went back to Mpondoland in the former Transkei (Eastern Cape), where he had researched on rural history and resistance in earlier years. He interviewed in the village of Mbotyi, on the coast, which contrasted with the highveld areas and was close to some of the largest indigenous forests in South Africa. The east coast is also notorious for its ticks. Sonwabile Mkhanywa proved to be an ideal research assistant. Additional information on local knowledge in the Eastern Cape came from a trio of other investigators who helped to supplement our range of research. Andrew Ainslie worked in the Peddie District of the former Ciskei. Mike Kenyon interviewed in Masakhane near Alice and Vimbai Jenjezwa in the Kat River valley north of Fort Beaufort. This is a particularly interesting area socially because it has contiguous white-owned commercial farms, coloured smallholders, and African communities.

Our material is therefore drawn from nine different sites. Collectively we interviewed about 100 people in the Eastern Cape, 40 in QwaQwa and 100 in the North West Province. In addition we could draw on the published field work of Patrick Masika and his colleagues at Fort Hare for the Eastern Cape and Deon van der Merwe's thesis on the Madikwe district of the North West Province.[3] Tony Dold and Michelle Cocks, working in the Eastern Cape, have also highlighted the significance of local plant knowledge.[4]

In explaining our research findings, we should emphasise that none of those who worked on the project are trained vets or botanists. We are historians and social scientists. Our major interest is to understand the ideas and practices used by local people, and how these relate to scientific understanding of disease and treatment. This has necessitated some familiarity with local diseases, their ecology and their aetiology. But we have not applied scientific methodologies. Our particular contribution is to the historical and social science literature. We hope that our findings are nevertheless relevant to some key areas of scientific concern: the recording of Indigenous Knowledge (IKS); veterinary policy; interactions between scientists and farming communities.

Findings

1. Diagnosis and naming of disease:

African farmers monitored ill-health and closely observed the symptoms of disease in live animals. They also conducted post-mortems, often as part of the slaughtering process. In all but one research site, African communities had a wide variety of local names for diseases which did not always correlate with, or directly translate into, scientific terms. (See Appendix 1) The most common cattle diseases at many of our field-sites were tick-borne infections, particularly gallsickness. The local names (*gala* in North West Province, *nyoko* in

[3] P. J. Masika, A. Sonandi and W. van Averbeke, 'Tick Control by Small-Scale Farmers in the Central Eastern Cape Province, South Africa,' *Journal of the South African Veterinary Association* 68, 2 (1997), 45-8; P. J Masika, W. van Averbeke and A. Sonardi, 'Use of herbal remedies by small-scale farmers to treat livestock diseases in central Eastern Cape Province, South Africa.' *Journal of the South African Veterinary Association,* 71, 2 (2000), 87-91; O. T. Soyelu and P. J. Masika, 'Traditional Remedies used for the treatment of cattle wounds and myasis in Amatola Basin, Eastern Cape Province, South Africa,' 76, 4 (2009), 393-397; B. Moyo and P. J. Masika, 'Tick control methods used by resource-limited farmers and the effect of ticks on cattle in rural areas of the Eastern Cape,' *Tropical Animal Health Production*, 41 (2009), 517-23; P. J. Masika, A. Sonandi and W. van Averbeke, ' Perceived causes, diagnosis and treatment of babesiosis and anaplasmosis in cattle by livestock farmers in communal areas of the central Eastern Cape Province, South Africa,' *Journal of the South African Veterinary Association,* 68, 2 (1997), 40-44; D. van der Merwe, G. E. Swan and C. J. Botha, 'Use of Ethnoveterinary Medicinal Plants by Setswana-speaking people in the Madikwe area of the North West Province of South Africa,' *Journal of the South African Veterinary Association,* 72, 4 (2001), 189-96; Deon van der Merwe, 'Use of Ethnoveterinary Medicinal Plants in Cattle by Setswana-speaking people in the Madikwe area of the North West Province,' MSc Thesis, University of Pretoria (2000). See also Dowelani Edward Ndivhudzannyi Mabogo, 'The Ethnobotany of the Venda,' MSc Thesis, University of Pretoria (1990) and M. Hlatshwayo and P. A. Mbati, 'A Survey of tick control methods used by resource-poor farmers in the Qwa-Qwa area of the eastern Free State Province, South Africa,' *Onderstepoort Journal of Veterinary Research,* 72, 3 (2005), 245-249.

[4] A. P. Dold and M. L. Cocks, 'Traditional Veterinary Medicine in the Alice District of the Eastern Cape Province, South Africa,' *South African Journal of Science,* 97, 9 & 10 (2001), 375-79; Michelle Cocks, *Wild Resources and Cultural Practices in Rural and Urban Households in South Africa: Implications for Bio-Cultural Diversity Conservation* (Grahamstown, Rhodes University, 2006).

QwaQwa and *inyongo* in the Eastern Cape) sometimes included a wider range of symptoms than indicated by the scientific term anaplasmosis. Stockowners recognised many other key diseases such as heartwater – present in parts of the North West Province and the Eastern Cape but absent from QwaQwa - and to a lesser extent redwater. Many Tswana informants had encountered blackquarter, for which they had multiple local names, and some farmers from QwaQwa said it was the most common and dangerous livestock disease. Most were familiar with anthrax, a problem in the North West Province and the Eastern Cape but not in QwaQwa. Overall we found about 20 names for different diseases in most of the different sites (Appendix 1)

2. Environmental explanations:

African farmers attached great weight to observations and interpretations of environmental conditions when explaining the causes of many animal diseases. In their view, the condition of the veld could foster good health, but equally it could bring about diseases like gallsickness and blackquarter. Changes in the consistency of the grasses and natural seasonal transformations in the pastures affected digestive functions and the overall health of livestock. One interviewee stated: 'Disease does not spread between animals but it has its time or its season. It will come again in that season. Each disease has its own time.' Disease was consequently seen as part of the natural cycle, although its intensity, frequency and impact could change in different years shaped by unpredictable natural events and by the arrival of new scourges. Environmental relationships were at the heart of many discussions of disease. Managing the nutrition of livestock remained central for interpreting and coping with disease.

3. Transhumance:

In the past, African and settler livestock owners used transhumance – the movement of animals over some distance to new pastures - as a vital strategy to maximise nutrition and avoid diseases. Transhumance was curtailed by state veterinary controls during the twentieth century, as vets argued animal movements spread rather than limited disease outbreaks. Consequently, we found only remnants of such systems – largely in Mbotyi and QwaQwa. In Mbotyi, many stockowners took their cattle to the large, sparsely settled coastal plain of Lambasi during the wet summer months. They thought that it both optimised grazing and reduced tick infestations. In QwaQwa, stockowners used to send their animals into the mountains during the summer months for nutritional reasons. In both areas, the continuation of local transhumance is under threat. Informants cited stock theft as the most common factor in the demise of these older systems of pastoralism. Transhumance is no longer a significant route to reducing morbidity and maintaining animal health, although the transfer of animals to fresh pastures during the summer months still plays a part in optimising nutritional resources.

4. Dipping:

In the twentieth century, the state organised a national campaign of compulsory dipping against tick-borne diseases. During the homeland era, at the height of apartheid, from the 1960s to the 1990s, central control over veterinary services declined, and dipping became irregular in many

places. After 1994, the African National Congress (ANC) government curtailed national veterinary provision. Due to budgetary constraints, and other priorities, less money has been invested in regular dipping or systematic vaccination campaigns. We found that dipping in tanks was generally accepted, but relatively few communities were able to implement any regular dipping programme. This resulted firstly from stockowners' failure to appreciate the connection between ticks and tick-borne diseases. They were keen to control tick damage and tick worry, but did not see the need for frequent regular dipping in order to control tick reproduction and disease. Secondly, government policy has focussed on self-organised dipping committees in the Eastern Cape. But communities have not been able to find structures of local cooperation through which dipping could be continued, once state programmes collapsed. This has resulted in much more individualistic approaches to tick control. In the North West Province, dipping tanks are largely disused. In both sites, the majority of stockowners use sprays or pour-on acaricides, such as Deadline, when they can afford them. Overall informants complained that tick burdens had increased and they looked to the state to resurrect a more interventionist and coordinated strategy. Most of the people we interviewed had very few alternative remedies for ticks, although aloe infusions were used in the North West Province.

5. Plant medicines:

Detailed knowledge of local environments, gained over many generations has enabled African stock owners to identify plants which they regard as effective treatments for diseases.[5] A few plants stand out in some areas, such as aloes and *sekename* (Drimia spp.) in the North West Province. In QwaQwa farmers used *mositsane* (*Elephanthorriza elephantina*) as a treatment and tick repellent. In the Eastern Cape plant remedies are very diverse although two or three key species - particularly aloes in some districts and pittisporum in others - recur in treatments for gallsickness. Stockowners greatly value the laxative effect of plant remedies. Plants were also seen to provide analgesic and antiseptic effects. Although we have not done exhaustive research on this front, we noted about 60 plants in common use in the key research sites. (Appendix 2) Overall, curative strategies aimed to ensure that animals ate rapaciously and excreted well-formed and prolific dung.

Our evidence suggests that on the whole, different plants are used for healing named diseases and for protection against supernatural forces. There is some overlap, but particular combinations of plants are associated with specific conditions and it appears that these have been well-established for some time. Our older informants said they learnt them from their parents. Most of those we interviewed saw the key plant remedies as

[5] P. J Masika, W. van Averbeke and A. Sonardi, 'Use of herbal remedies by small-scale farmers to treat livestock diseases in central Eastern Cape Province, South Africa,' *Journal of the South African Veterinary Association,* 71, 2 (2000), 87-91; D. van der Merwe, G. E. Swan and C. J. Botha, 'Use of Ethnoveterinary Medicinal Plants by Setswana-speaking people in the Madikwe area of the North West Province of South Africa', *Journal of the South African Veterinary Association,* 72, 4 (2001), 189-96; Deon van der Merwe, 'Use of Ethnoveterinary Medicinal Plants in Cattle by Setswana-speaking people in the Madikwe area of the North West Province', MSc Thesis, University of Pretoria (2000); A. P. Dold and M. L. Cocks, "Traditional Veterinary Medicine in the Alice District of the Eastern Cape Province, South Africa," *South African Journal of Science,* 97, 9 & 10 (2001), 375-79; Michelle Cocks, *Wild Resources and Cultural Practices in Rural and Urban Households in South Africa: Implications for Bio-Cultural Diversity Conservation* (Grahamstown, Rhodes University, 2006).

performing a natural rather than supernatural function, and thought about their efficacy in relation to medicinal ends.

It is very difficult to judge the effectiveness of local plant medicines, especially because stockowners sometimes administered them along with biomedicines. We were not able to research this field. Many informants believed that the plant solutions that they administered did have a valuable role in relieving symptoms and curing diseases. Some stockowners claimed that medicinal plants worked better for particular infections – either because of the character of the ailment or because they had fewer dangerous side effects. They thought that some inoculations tainted the meat. But we also found that stockowners seldom administered standardised doses and the concentration of plant extracts in any particular mixture could vary greatly.

6. Biomedicines and plant medicines:

Informants from all of our sites used a mix of traditional plant remedies and biomedicines. A growing number saw biomedical treatments as quicker or more effective, but also believed that local plants were more suitable for certain conditions. In the North West Province and QwaQwa these conditions specifically related to the treatment of birthing problems, such as retained placentas, as well as the treatment of wounds. There were similar patterns in Mbotyi where a mix of three or four plants was widely used for *inyongo* (gallsickness) and others for birthing problems. Some informants, especially in QwaQwa, felt culturally committed to older practices as a statement about local Sotho identity.

Biomedical products were often used in a generalised way, to combat both named specific diseases and non-specific ailments. Terramycin LA, for example, has become something of a cure-all in the rural areas. Ivermectin and Dectomax were also popular products used to treat a range of diseases as well as worms. We noted that stockowners' choices of treatment were becoming more individualised. Most of those we interviewed mixed pharmaceutical products with local plants in different combinations for different diseases. Some felt that biomedicines improved the potency of medicinal herbs. Growing interest in biomedicines is, however, offset by incapacity on the part of poorer black livestock owners to afford them. Many were unable to use purchased medicines regularly.

7. Locally used Non-plant Medicines:

Stock owners not only used plants to heal wounds and diseases. Minerals such as salt, as well as detergents, motor oil, paraffin, copper wires, tar, coca cola, millipedes and animal dung were also part of the pharmacopeia. For example, a small amount of motor oil is either administered neat or mixed with liquid tick dip to spray cattle or smear on goats, to kill ticks. In parts of the North West Province and QwaQwa farmers used to insert a piece of wire or a nob of tar into the dewlap to ward off blackquarter. This practice continues in some villages and is said to be highly effective. However, we also came across instances where animals were damaged by such products. (Appendix 4)

The Limits of Local Knowledge

Literature on local or indigenous knowledge has tended to affirm its value and to validate such alternative ways of knowing. In the later decades of the twentieth century, it was offered both as a critique of top-down, coercive development strategies that were clearly failing in many contexts and as a route to understanding why rural communities in so many poor countries rejected elements of scientifically based policies.[6] Our approach has determinedly taken local knowledge seriously and has examined its diverse content and practices. However, in contrast to much anthropological writing, we also emphasise the limitations of local knowledge as a means of controlling diseases. [7]

1. Knowledge of diseases:

In the veterinary sphere, for example, our research suggests the limits of disease conceptualisation. South African scientists have identified a number of significant diseases that did not appear in our interviews - for example, lungsickness, mastitis, brucellosis, trichomoniasis and vibrosis. In the North West Province *lamsiekte* or botulism and redwater only appeared occasionally in testimonies – although the latter was more widely known in the Eastern Cape. Stockowners recognised poisonous plants as a notable problem in parts of the North West Province and QwaQwa; however, they were often familiar only with a single variety of toxic weed, rather the diversity of noxious flora identified by toxicologists. We were struck by the lack of recognition of a link between ticks and diseases despite a hundred years of dipping. According to one respondent: 'The ticks suck the blood from animals and they die; there is no particular disease that causes death but they suck the blood.' This was a common approach to ticks. Disease vocabularies and understandings of causation can be very localised and bounded. Although many stockowners have confidence in their diagnoses, we also came across considerable uncertainty.

2. Knowledge of local medicines:

While commitment to local knowledge is striking in some areas, informants also expressed uncertainty over its effectiveness. Transmission of knowledge is often restricted and we found a degree of secrecy about traditional remedies in some communities. Some respondents who wished to know more about medicinal herbs could not easily gain access to this information. For this reason, as well as the scarcity of key species in particular localities, the range of plant remedies available is probably declining. Many stockowners work with a fragmented and patchy understanding of both traditional remedies and biomedicines. In a few areas, notably Mbotyi, farmers consulted local specialists for a range of illnesses and called them in for difficult births. But by and large farmers treated their animals themselves.

3. Supernatural explanations:

---

[6] Paul Richards, Paul Richards, *Indigenous agricultural revolution: Ecology and food production in West Africa* (London, Unwin Hyman, 1985); James Ferguson, *The Anti-Politics Machine: 'Development', Depoliticisation and Bureaucratic Power in Lesotho* (Cambridge University Press, Cambridge, 1990).

[7] William Beinart, Karen Brown and Dan Gilfoyle, Experts and Expertise in Africa Revisited, African Affairs, 108, 432 (2009), 413-33; Karen Brown, Andrew Ainslie, William Beinart, 'Animal Disease and the Limits of Local Knowledge: Dealing with Ticks and Tick-borne Diseases in South Africa', forthcoming *JRAI.*

Although environmental and nutritional ideas emerged as the most important explanations for diseases, beliefs about the supernatural remained reasonably strong. Our interviews indicated that some stockowners made a distinction between supernatural and natural causes and the combination of these ideas could be very individualised. Only a limited number rejected supernatural explanations in their entirety. We noted that stockowners infrequently invoked witchcraft as a specific cause of death unless an animal died suddenly or in mysterious circumstances.

Nevertheless, a wider range of symptoms and deaths were attributed to a more ambient set of supernatural causes, expressed through concepts such as *umkhondo* in Mbotyi and *mohato* in the North West Province. *Umkhondo*, precipitating weakness and sickness in animals, was explained as the infectious traces of malevolent agents or natural forces surrounding the kraal. *Mohato* was especially associated with pollution and the danger that women posed to livestock. The Sotho had a particularly rich vocabulary for different types of pollution (Appendix 1). Pollution was often attributed to menstruation, recent widowhood and pregnancy. The alleged consequences of pollution varied. In the North West Province pollution was said to result in abortions, whereas in QwaQwa there was a greater emphasis on its ability to annul the powers of medicines used against witchcraft and stock theft.

Such concepts might be a way of bolstering patriarchy as much as interpreting diseases. Farmers who invoked such explanations were not always antipathetic to biomedical treatments. They could invest in the latest vaccines, anthelmintics for internal worms and pour-on acaricides to deal with ticks, at the same time as banning women from the kraal. Informants suggested that the use of plants would continue because biomedicines could not address such threats. Despite the legacy of patriarchal ideas, our interviews with women indicated shifting gender relations in a number of families. Older women especially could become livestock owners and break the internal boundaries shaping spatial and gender relations.

In general, our interviews suggested that supernatural explanations were fading slowly but unevenly. Nonetheless, they still affected livestock management - for example in limiting women's involvement in this critical economic sphere where labour is in short supply. In Mpondoland ideas about the supernatural also seem to discourage milking of cattle. There is a widespread belief in Mbotyi that if the calf is separated from the cow to allow milking by people, baboons would come at night to milk the cow and damage their udders. These multi-dimensional and rather general ideas about infections and infertility were manifest in the different research sites, but clearly took regionally specific forms.

4. Limitations in Access to Biomedical Knowledge:

Overall our impression is of a gradual shift towards biomedicine, hastened by stock owners' incapacity to deal with the chronic problem of ticks as well as some new scourges such as lumpy skin disease. However, informants indicated that biomedicines were no panacea. This could in part be attributed to inadequate storage facilities for vaccines and drugs, and inadequate information about dosing. It is likely that such medicines are not used in optimal ways and are sometimes administered at the wrong strength for the wrong

diseases. Information about biomedicines is often derived from retail outlets or from neighbours. Nevertheless, informants believe that they have made a significant impact on the health of local herds. A striking finding of our research was a greater openness to biomedical treatments than there was to scientific explanations of disease.

Recommendations

Our recommendations grow out of a concern to facilitate improvements in the way that livestock owners manage the health of their cattle and gain access to knowledge about diseases and treatments. We are also suggesting potential strategies for more effective state intervention and assistance. Support for individuals could involve the state, the private sector, NGOS and associations amongst stockowners themselves. We also feel that it is important that veterinary policy is informed by research that takes into account African ideas and the constraints on African stockowners.

Role of the State

1. Research

At present state veterinary policy operates largely through provincial governments. Expanding adequate research capacity at a provincial level, ideally in association with academic institutions, would be valuable. An example of effective research has been at the University of Fort Hare where Patrick Masika and his team are doing work that is highly relevant to state interventions and the recording of local medical knowledge. Tony Dold and Michelle Cocks at Rhodes have developed extensive records of local medicinal plants. The University of Pretoria and the Onderstepoort Veterinary Institute have sponsored phytochemical plant research drawing on local knowledge primarily from the northern provinces. We have used their publications extensively in our chapters. However, such researchers could communicate more across disciplines and make their work more easily available to government officers and smallholders. Such a strategy would require coordination between academics and local state officers. There is a major gap in research on the efficacy of administrative intervention.

2. AHTs and interaction with Communities

Veterinary services are provided at a district level with the veterinary surgeon serving as a fulcrum for policy implementation, regulation of diseases, as well as the circulation of information and treatment. A cluster of AHTs serve in each district office and provide a critical interface with the community. The system of AHTs emerged in the 1990s as an alternative to the more centralised implementation of policy through stock inspectors and dipping foremen. AHTs received better training than their predecessors so that they could be responsive to a much wider range of problems affecting the smallholder livestock sector.

This structure has considerable potential. AHTs in some areas are important in supervising dipping and helping with inoculation. Some also assist in the supply of biomedicines. Such activities, as well as stock days, bring them into regular contact with communities. Our experience in some areas, however, suggested that there were problems in maintaining

motivation and successful outreach. Capacity in the local language is important so that trust and communication can be improved. There should be more opportunities for AHTs to share their experiences and discuss best practice. State officials may be able to identify where there has been locally successful outreach through the AHTs and to find way of replicating this. AHTs are often the only route for more isolated communities, who also have very limited knowledge of biomedicines, to gain access to more specialised drugs. Although this opens opportunity for private benefit from public office, there is scope for discussion of this role by AHTs. They could also work with specialists in local knowledge to gather information on, for example, animal birthing practices and the preparation of plant remedies.

3. Stock Days

Stock days can be very effective as a route of communication and connection, although they do tend to be dominated by AHTs and representatives of pharmaceutical companies and can be directive in their pedagogy. The absence of common ground over naming of diseases is a strong manifestation of the divide between presenters and their audience. Stock days could be more hands-on occasions, focused around demonstrations and an exchange of knowledge, where local speakers can talk about their experiences and their methods. Our interviews suggest that people are open to learning more about biomedicines and biomedical explanations, but the transfer of knowledge would benefit from a more interactive context. The Eastern Cape Department of Agriculture has started an indigenous knowledge research group and this is one potential way of encouraging interaction. Stock days could also be a vehicle for disseminating written material in the local language.

4. Pamphlets

Fieldwork in the North West Province, in particular, revealed a thirst for leaflets and printed material in the vernacular. Even if people were illiterate they found the written word empowering as they could use leaflets to ask for help about specific diseases and treatments at drug retail outlets. Leaflets could be a vehicle not simply for directives about appropriate drugs or therapeutics, but also for recording the diversity of local naming systems and plant treatments.

A series of basic pamphlets has been published in English and Afrikaans by J. A. Turton and others. They are designed to communicate elementary scientific understandings of common animal diseases.[8] A limited number of them, especially those dealing with anthrax and rabies, seem to have been translated into some African languages, but there has been no provision for many of the key diseases we encountered. We did not come across any of these leaflets in the field and our informants were not aware of them. Moreover, it would be valuable if the Department's pamphlets dealt more effectively with local concepts and names for diseases. Confusion over words offered opportunities for misdiagnosis, and the prescription of drugs which could be at best unnecessarily expensive for stock owners, and at worst harmful to their animals.

[8] J. A. Turton, *Common and Important Disease of Cattle* (Department of Agriculture, Pretoria, 2001); *External Parasites of Cattle* (2001) – the full range is available on the web www.nda.agric.za/publications

Onderstepoort has also issued a leaflet indicating when farmers should inoculate their animals for particular diseases. We distributed these to some farmers in the North West Province; stockowners were particularly enthused by these worksheets and asked for them to be translated into the vernacular and to be more readily available. The willingness to accept inoculation as a prophylaxis demonstrated their openness to biomedicines, when affordable. Leaflets and vaccine programmes could easily be distributed at stock days and dipping days, and AHTs could take the time to explain the contents.

5. Social Scientists and Exchanges of Knowledge

Specialists tend to dismiss local environmental or supernatural ideas about disease causation. Education should be a two way discussion and specialists need to find a way to interact with supernatural ideas. For example, the question of milking in Mbotyi is likely to be resolved only if someone can take on the debate about the baboons publicly, however strange such local ideas of causation may seem to outsiders. Problems surrounding dystocia and abortions, which are a major concern of farmers in the North West Province, need to be addressed by interactive education on brucellosis and other reproductive diseases and disorders, if herds are to increase and notions of ritual pollution are to be further eroded.

There is a case for incorporation of social scientists into provincial veterinary departments, which employ largely scientifically trained staff at various levels. Social scientists could focus directly on questions of communication and liaison with communities. An analogy could be made with the National Parks Service, and the provincial environmental departments, which have specifically employed social officers to engage in community relations. In a number of places in the country there are university research groups and NGOS that are concerned with questions of local knowledge and community organisation.

6. Subsidies and management of dipping and inoculation

In earlier years the state took responsibility for the infrastructure of rural veterinary services - in particular, dip tanks and the associated record keeping. Dipping fees or other systems of local taxation partly covered the cost. The state also provided vaccines and their distribution through suitable storage facilities at the veterinary offices. Dipping in tanks is no longer a complete solution to the control of ticks and tick-borne diseases. It is now recognised that a combination of different strategies is necessary for this complex area of disease control. Many of our informants were enthusiastic about more regular access to dipping tanks as the prohibitive cost of pour-on acaricides undermined their ability to manage tick numbers. The problem is that the dipping infrastructure is eroded or absent and dipping committees are given responsibility for maintenance of tanks and procuring acaricides. The committees have some presence in the Eastern Cape, and there are similar more informal organisations in QwaQwa, but there appear to be no such structures in the North West Province where farmers bemoaned the loss of the dipping tank. Effective operation of a dipping also requires a pump or some other way of emptying and refilling the tank, which is time consuming and difficult to do by hand.

In the light of past difficulties in levying specialist taxes for dipping operations, there is a strong argument that the costs of maintaining dips should come out of central or provincial

government coffers. The counter-argument, which was attractive to the ANC government in its early years in office, was that dipping benefitted only a restricted number of people so livestock owners should take responsibility for themselves. However, there are so many families in South Africa with some livestock that this can be considered a general benefit. Localising responsibility for the maintenance of tanks and supply of dip has not generally been successful.

7. Nguni Cattle Schemes

Indigenous Nguni cattle are being promoted as a complementary strategy to address tick-borne infections because they appear to have developed resistance over centuries.[9] Some species of tick are less able to engorge on their hides. The University of Fort Hare Nguni Project, initiated in 1998, has bred herds of this strain and distributed animals in surrounding communities. The North West Province Provincial Government has encouraged farmers to join in its Nguni Cattle Scheme set up in 2007. Advocates of pure-bred Nguni see their re-dispersal in the African areas as a major route forward in developing disease control. The Bonsmara and Brahman breeds also share some of these characteristics and have the advantage of being larger. These are exciting initiatives but the present projects are small and restricted. Relatively few African livestock owners have the capital to invest in pedigree bulls nor could they control reproduction in communal areas. This problem has always undermined livestock improvement programmes. Nguni are also small, and prone to dystocia from copulating with larger bulls. At a grassroots level, we found that the clamour was for a return to state run dipping rather than efforts to transform their herds.

8. Census and information gathering

In our interviews with senior members of the Eastern Cape veterinary service, the question of a provincial livestock census was raised as an important element for strategic interventions and planning of veterinary services. Dr Ivan Lwanga-Igo at Dohne Agricultural Research Station felt that in recent years the state had not put sufficient resources into data collection and this undermined the possibility for planning. He sensed that many diseases were under-reported and mortality rates from specific diseases were unknown.[10]

The possibilities of finding the resources for a full count of animals on a specific day are remote and our interviews suggest that the historical suspicion of livestock censuses, associated with forced culling and other government interventions, remain. However, the old techniques for gathering statistics through inoculation and dipping days still provide potential for systematic collection of data on livestock numbers and even on incidence of diseases. State vaccination campaigns covering different animal diseases receive quite wide public support and, if space were made available for interaction and information gathering over the period of a census year, then a fuller epidemiological picture could emerge without significant extra expense.

[9] Arthur Spickett, factsheet 'Integrated Tick Management,' received 22 February 2011.
[10] Dr Ivan Lwanga-Igo at Dohne Agricultural Research Station, 30 March 2012

Facilitation of Private Sector, NGO and Individual initiatives

There are a number of areas where individuals rather than the state alone should take responsibility. All of these potential improvements are bound up with central problems of labour and costs.

1. Herding, Labour, Cleanliness and Surveillance of animals

One central question concerns the herding of livestock. For the most part, as we have mentioned, the pastures in the African-occupied communal areas are still relatively open with few effective fences. In North West Province and QwaQwa, most owners organised herding for their animals, but this was less common in the Eastern Cape, especially where the animals were left out at night in pastures. The absence of daily care is more conducive to straying, theft and a lack of attention to health – for example the early manifestations of disease or high tick burdens. In Mbotyi most owners leave their animals out in the pasturelands during the summer months and this is probably one reason why these cattle appear to have higher tick burdens than those in the North West Province. Patrick Masika, at Fort Hare, who has done most of his research in the Amatola Basin in the Eastern Cape, thought that there was diminishing emphasis on keeping animals clean of ticks.[11]

In earlier decades boys and youths were responsible for herding cattle. As an increasing proportion of boys went to school, herding duties within the family have generally fallen on the older men and sometimes women. Some employed herders, but this is perceived as an expensive option, especially as there is relatively little direct cash income from the herds and flocks. In the North West Province widows, in particular, engaged herders because they felt they lacked experience in managing livestock. However, they expressed uneasiness in leaving animals in the care of those outside the family, who may be involved in stock theft. As in the case of women's agricultural labour, wage work has not fully replaced family labour.

We have no direct recommendation as to how such problems can be overcome. But the difficulty of finding labour for the livestock economy, in a context where youth employment is so high, is striking. The work is isolating and we did not hear from youth of the camaraderie in herding about which older men fondly reminisced in their interviews. There is a crisis of kinds in the communal rural areas around the rejection of agricultural work amongst young people, but at the same time, the wages offered are also insufficient to attract them to it. This issue is little addressed in thinking about development in the rural areas.

[11] Patrick Masika, University of Fort Hare, 23 February 2011.

2. Maintaining Kraals (hygiene)

Many of the kraals and areas around the homesteads are piled with dung and are a breeding ground for worms and infections such as mastitis. In Mbotyi, even some of the better and bigger herds lived in conditions which were highly conducive to worm reproduction and infestation. Ever since the veterinary services were established in the 1870s, officers have fulminated against the condition of the kraals in South Africa and agricultural officers wept about the failure to use manure on the fields. We are joining this age old chorus!

3. Litter

The amount of litter in gardens and in the veld, especially in villages in the North West Province, is also damaging to animal health. Gardens and grasslands around settlements are strewn with plastic bags, bottles and food wrappers. Providing municipal services in rural and peri-urban areas remains an enormous challenge in South Africa. In Kwakwatsi (the township near Koppies) groups of volunteers collected rubbish. But the local state is essential for sustained refuse management even in the rural areas.

Practices such as more effective herding, as well as keeping animals and kraals cleaner, and removing litter from pastures, would all make a difference to animal health. Recommendations on this front are necessarily sensitive and problematic, because they are so deeply bound up with the availability and control of family labour, as well as attitudes to animals. However, they could also form part of the debate at stock days.

4. Livestock sales and turnover

For many years, state Departments of Agriculture advocated a higher turnover of African cattle as one of the keys to rural development. The idea was that this would both bring in additional income to rural communities and diminish the number of livestock on the veld. Officials perceived that sales would help to resolve the environmental crisis about overgrazing. The state encouraged smallholders to sell off a proportion of their herds every year in order to keep overall numbers at a lower and more stable level.

We found that most stockowners were still reluctant to sell cattle on a regular basis, though this applied less to goats, where there was strong demand for ceremonies and sacrifices. Access to markets also has a bearing on the willingness of stockowners to sell animals. In the case of Mbotyi, however, it is difficult to see how stockowners might increase external sales. Firstly the livestock are too strongly affected by disease to be of much interest to those selling through retail outlets such as supermarkets and butcheries. Secondly, the price of cattle in Mbotyi tends to be higher than in the heartlands of the Eastern Cape or KwaZulu Natal so there is relatively little incentive for those in the village to sell outside. For purchasers the costs of transport from such a remote area is an inhibiting factor. In effect meat supplies are provided at a reasonably high level by informal slaughtering and distribution through ceremonies and events.

In peri-urban areas such as Garankuwa in North West Province, where a lower proportion of the population own livestock and where supermarkets and retail outlets are more accessible, there are probably fewer opportunities for smallholders to sell their livestock despite the bigger market for packaged meat. Furthermore, Tswana smallholders also felt disadvantaged compared with commercial producers because they were unable to access abattoirs on the grounds, they claimed, that their meat was likely to be infested with tapeworms, or the animals had not received a full schedule of vaccines. Consequently they were forced to sell their livestock at auctions, for a lower return. Long advocated solutions like increasing auctions within the African rural areas are unlikely to provide a resolution in themselves. The possibilities of inclusion in a national retail market are likely to depend upon improved animal health and cleanliness.

5. Costs of medication

The question arises as to whether the state should supply free or subsidised medication. In the Eastern Cape, the dip is in theory provided gratis by the Department of Agriculture as are some key inoculations, such as anthrax, which can affect people, and blackquarter, which is included in a joint vaccine. In the North West Province, the administration of anthrax vaccination is patchy and in some villages, such as Mantsa, stockowners complained that no AHT or vet had inoculated their livestock for several years and human as well as animal deaths from anthrax were on the rise. Protecting people from zoonotic diseases such as anthrax, brucellosis and rabies, should be the function of the state and here there is an argument for free public animal vaccination campaigns to protect people as well as livestock. While not everyone is a livestock owner, everyone, especially in poorer communities, is susceptible to these serious infections. This is a universal benefit.

In the case of non-zoonotic diseases, there is an argument for individual stockowners to be responsible for medication because they benefit directly. However, poorer rural livestock owners, especially those with smaller herds, pay a disproportionately high cost for their medicines and have very limited access to adequate storage facilities. Their costs could be significantly reduced by cooperative purchasing systems, or the provision of key broad spectrum drugs such as Terramycin and Ivermectin, which are very widely used, at closer to their cost price. This is probably not an area for state involvement as it could provide an opportunity for corruption, but it is an area where the private sector suppliers, such as the big drug companies, could consider distribution at a fairer price. At present rural retail outlets charge a high mark up. We have illustrated some differentials in prices at various centres.

Some AHTs already play an informal role in the commercial distribution of medicines, and although this presents the potential for private gain by state employees, it may be that they are in the best position to provide drugs for specific diseases. They are sometimes in a position to buy in bulk and they are qualified to administer biomedical products. We saw this informal supply system operating in connection with lumpy skin disease. An AHT bought the vaccine in an urban centre where it was cheaper, and arranged with the community to inject their livestock for payment. While it may be unwise in some respects for AHTs to become involved in private deals, the state doesn't appear to be discouraging

such transactions. An alternative would be cooperative purchasing by communities themselves, but when we raised this possibility people suggested that there was not sufficient trust or they operated too individualistically.

6. Transmission of knowledge

One of our most striking findings concerned the constraints on transmission of knowledge within communities around plants remedies. Those with knowledge sometimes felt reluctant to share this with others. They were motivated by lack of trust, concerns about witchcraft or the desire to preserve the commercial value of their practices. In fact, most of plant remedies we discuss in this book are not secret. They have been recorded and published in a diverse range of texts, mainly academic. However, such materials are not generally available to a wider audience in the African rural areas. There is a strong case for disseminating information about the relevant plants and also the plant combinations used in combatting particular diseases – which are less generally recorded.

7. Promotion of and experimentation with local medicines

Scientists and Department of Agriculture experts may be uneasy about dissemination of local knowledge that has not been subject to systematic research or laboratory testing, and where issues such as dosing remain opaque. However, laboratory experiments have shown that some of the local plants in common use can have therapeutic properties, and they are frequently deployed. For example, Viola Maphosa, who researched *Elephantorrhiza elephantina* at Fort Hare, confirmed its value as an anthelmintic and advocated dissemination of this evidence to African rural communities. Broadcasting such findings might encourage stock owners to test plants and develop best practice. Poisonous plants are especially problematic, for example *sekename* (*Drimia spp),* used widely in the North West Province. It is unlikely to gain endorsement from scientists because of uncertainty about dosage. But more information about this plant would be helpful to the many that use it. By validating local knowledge, cooperation between specialist officers and African small holder farmers, could be expanded.

Scientific researchers have recorded some positive indications from local plants, but most experiments suggested that solutions in water released fewest of the active ingredients. All of our informants used only water in which to mix their muthis. Kobus Eloff, a phyto-chemist at the University of Pretoria, suggested that easily available and relatively cheap solvents such as acetone might be more effective than water in releasing medicinal properties from plants. This information could be made available to local farmers with instructions about drying, grinding and mixing.[12] A general problem with the scientific research on plant medicines, is that it has been done with one plant under laboratory conditions and not in the field at particular seasons, with a mix of plants in the same combinations that are deployed in local veterinary treatment. The effectiveness of such plant remedies cannot really be assessed until such field data are obtained.

[12] Discussion with Prof Kobus Eloff, University of Pretoria, 25 February 2010.

8. Overexploitation of plants and cultivation of medicinal species

Those researching plants used in traditional medicine have sounded alarm at the overexploitation of valuable species and a number of recommendations have been posited. On the one hand they advocate regulation of plant collection which is difficult to enforce; on the other they propose expanded cultivation of medicinal flora. There is clearly great potential in the latter strategy because it could provide both additional supply as well as a source of income.[13] A number of nurseries are already engaged in commercial production of species widely used in local medicine. Specialists often prefer wild plants, but as we have noted, some species are already grown in gardens, such as aloes.

[13] K.F Wiersum, A.P. Dold, M. Husselman and M. Cocks, 'Cultivation of Medicinal Plants as a Tool for Biodiversity Conservation and Poverty Alleviation in the Amatola Region, South Africa' in R.J. Bogers, L.E. Craker and D.Lange (eds), *Medicinal and Aromatic Plants* (2006).