

Review

WILDLIFE, PEOPLE AND DEVELOPMENT: VETERINARY CONTRIBUTIONS TO WILDLIFE HEALTH AND RESOURCE MANAGEMENT IN AFRICA

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SUMMARY

Human population pressures, habitat loss, environmental degradation and illegal hunting in Africa have resulted in the loss of biodiversity and near extinction of certain wildlife species. The dilemma for Africa is the balancing of conservation and development. If wildlife is not to become a relic of the past then it must have more than just aesthetic value. It must contribute materially to the well being of people who live close to the resource. In fact, appropriate management of biodiversity would lay the foundations for a more positive future for the rural people of Africa, with the key being the adoption of an active adaptive management philosophy. This paper reviews the issue of sustainable use of wildlife resources and how the Veterinary profession contributes positively to wildlife health management in Africa. These contributions have been through increasing veterinary inputs into wildlife management and research, disease surveillance and prevention, training and education. Wildlife and ecosystems are increasingly having to be managed in order to save and maintain biological diversity. Veterinarians have a crucial role to play towards the maintenance of wildlife health as part of a multi-disciplinary wildlife management team.

INTRODUCTION

Historically in Africa there has been occasional antagonism between veterinarians and wildlife managers/ecologists. This stems from the fact that the veterinarian's traditional role has been the prevention of disease in domestic livestock, thus maintaining a lucrative overseas market in beef and protecting local markets in countries like Zimbabwe and Botswana. One of the diseases in livestock that would have an adverse effect on marketing beef overseas is foot-and-mouth disease (FMD) and wildlife has been blamed for many devastating outbreaks. Consequently, veterinarians have been associated with unnecessary slaughter of a variety of wildlife species in the name of disease prevention/eradication; specifically buffalo (*Syncerus caffer*) with FMD, and tsetse fly eradication programmes. Wildlife in general has, therefore, been considered a threat to the livestock industry, but this has been based on prejudice and inadequate research data as to the roles of wildlife, domestic livestock and disease. Indeed, these prejudices have been encountered historically with Directors of Veterinary Services actively discouraging veterinary involvement in wildlife. Within the last decade this perception of veterinarians and their role in the wildlife field has changed. This has been due, in part, to a recognition of the need for increasing professionalism in the wildlife management field, as well as to

significant efforts by veterinarians to bridge the gaps, eliminate antagonism and improve dialogue between veterinarians, wildlife managers and ecologists.

Increasingly, wildlife conservation in Africa cannot be viewed in isolation from other larger economic and social factors (Makombe, 1994). The dilemma is to balance conservation with development. As conservation cannot ignore the needs of human beings, neither can development ignore environmental limits. It is in this context that the value of veterinary inputs into wildlife management has become important and necessary for the people of Africa. African wildlife conservation increasingly faces complex social and economic issues that require innovative and diverse management strategies (Martin, 1993, 1994a,b; Makombe, 1994).

The sustainable use of wildlife resources is an essential component of wildlife conservation, with social and economic factors paramount (Thomson, 1992; Martin, 1993). The protection and utilisation of a valuable natural resource requires that wildlife management practices be of the highest professional standard. Veterinary involvement with wildlife in Africa is most often within government agencies and universities, but there is an increasing level of involvement with the private sector. Thus, veterinarians must consider their professional involvement to be complementary to other disciplines, as part of a team tasked with management of and support for wildlife conservation in national parks, buffer zones, communal lands and private ranches.

This paper will examine some key conservation issues and attempt to demonstrate the increasingly important role the veterinary profession must take, outside traditional veterinary medical practices and within an adaptive wildlife management framework. The key areas that will ultimately promote wildlife health include wildlife capture, care and relocation, population medicine, disease investigation, surveillance and prevention, training and education.

Conservation, preservation and sustainable use

In 1991, the International Union for the Conservation of Nature and Natural Resources (IUCN) produced a revised version of its mission statement, the World Conservation Strategy, entitled "Caring for the Earth: a Strategy for Sustainable Living". Within this document the 3 objectives are:

1. To maintain essential ecological processes and life support systems
2. To preserve genetic diversity
3. To ensure the sustainable utilisation of species and ecosystems

Although the strategy deals with sustainable use (utilisation) of all living things, veterinary inputs tend to be limited to wildlife. These inputs need to address and consider the influence of ecological factors on disease, and include the increasingly important social and economic factors that influence wildlife conservation. This paper will examine those aspects that support the third strategy objective.

Wildlife conservation in Africa encompasses the basics of conservation, preservation and sustainable use. These are key concepts that are interpreted differently in the developed world. Conservation implies that a resource should be used (this can be for either non-consumptive or consumptive use) and inherently recognises that the resource has a value, both aesthetic and economic. Preservation implies that the resource should not be used, but preserved for future posterity, and is valued solely for its aesthetic appeal. Within the African context, and particularly the southern African context, preservation has no major role to play in the future of wildlife and wild areas, although it may be important in other geographical areas and with

particular species (Robinson, 1992). This is because of preservation's protectionist message which is inappropriate in light of Africa's social and economic problems. Conservation (in the southern African context) is utilisation, which is synonymous with the maintenance of biological diversity and the key to the success of this ethic is sustainability (Zimbabwe Trust, 1992; Thomson, 1992, Makombe, 1994). This emphasises the need for people to manage biological diversity as an essential foundation for the future, maintain wildlife populations for their benefit and use species sustainably to enhance quality of life (Makombe, 1994). Veterinarians have a vital role to play in the wise use of this resource as it implies "hands on management" within an adaptive management framework, to maintain and promote wildlife health and create tangible benefits for people.

Wildlife health and conservation biology

Veterinary training provides unique problem solving skills. Investigations into disease problems in wildlife populations require the integration of these skills with ecological considerations and veterinarians must approach these problems on a population level. Environmental/natural systems' viability or the maintenance of biological diversity with regards to veterinary intervention can only be examined by looking at wildlife health holistically in relationship to conservation biology (Boyce *et al.*, 1991; Kock, 1994) (Fig. 1). Conservation biology is an emerging field and may be one of the most important non-traditional areas that offers new opportunities and challenges for wildlife veterinarians. It is defined by the Society for Conservation Biology as "The protection, maintenance and restoration of life on this planet—its species, its ecological and evolutionary processes, and its particular and total environment ... by developing the scientific and technical means to achieve this". There is a considerable overlap between the fields of conservation biology and wildlife

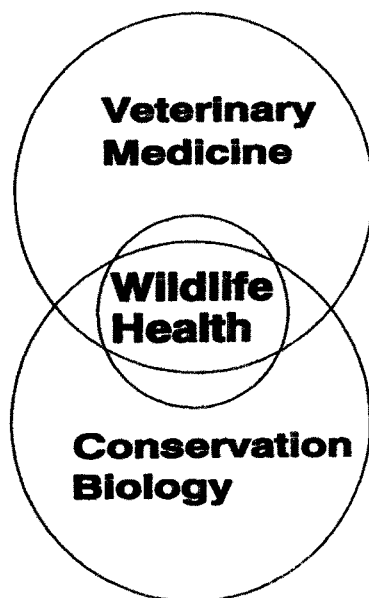


FIG. 1. Holistic relationship between conservation biology, wildlife health and veterinary medicine.

management/ecology (Boyce *et al.*, 1991), but unfortunately this definition fails to specifically incorporate economic and social considerations. No definition that looks at the maintenance of biological diversity can fail to consider people and their social and economic situation. Veterinary intervention, as part of a multi-disciplinary wildlife team will complement this holistic relationship by providing both a scientific input and specialised technical skills.

The following veterinary intervention strategies play a crucial role in the maintenance of wildlife health:

1. Disease investigation and diagnosis, clinical, ante- and post-mortem cases
2. Prevention of disease
3. Treatment of disease
4. Disease surveillance
5. Animal welfare considerations in wildlife capture, care and relocation, including:
 - a) prevention of stress and trauma
 - b) reduction in mortalities
 - c) maintenance of health during confinement and transport by preventive medicine practices/medical management
 - d) successful relocation/translocation of healthy animals able to reproduce successfully and be kept free of disease.

The management of wild areas and wildlife will become more intensive in the face of habitat loss, environmental degradation, human population expansion, illegal hunting and continued environmental apathy (Thomsom, 1992; Martin, 1994a,b). Wildlife health is essential if the sustainable use ethic is to succeed. Healthy wildlife will provide better economic returns through trophy quality animals for hunting, better prices at wildlife auctions (both local and export sales) and good quality protein/skins and other by-products for rural communities, as well as contributing to preservation of endangered species for non-consumptive use.

Adaptive management: an innovative wildlife management philosophy

"A system that isn't innovating is a system that is dying"

John W. Gardiner

Adaptive management is a goal orientated wildlife management and research philosophy which is increasingly recognised by wildlife professionals as a solution to the perennial problem, within wildlife management authorities, of antagonism between research and management (Bell, 1984; Martin, 1994b). It is considered by some (Martin, 1994b) that the only way to learn about sustainability is to exploit the resource. The antagonism between scientists and field managers reflects the battle between the "science and art" of managing natural resources. Historically, management has tended to look upon scientists' recommendations with scepticism, especially when management personnel lack scientific training. In reality, without research, management does not have a barometer to monitor the results of management programmes. Adaptive management addresses this by developing several pertinent strategies (Bell, 1984), (Fig. 2) all based on common sense. Conservationists and wildlife managers often operate in situations where the outcome of their actions is uncertain, therefore this type of philosophy is suitable for the African situation.

Adaptive management is adaptive, and need not necessarily be confined to ecological issues but can encompass politics, economic, veterinary and social effects. The veterinary profession is well suited to this approach, especially with epidemiological training

ADAPTIVE MANAGEMENT

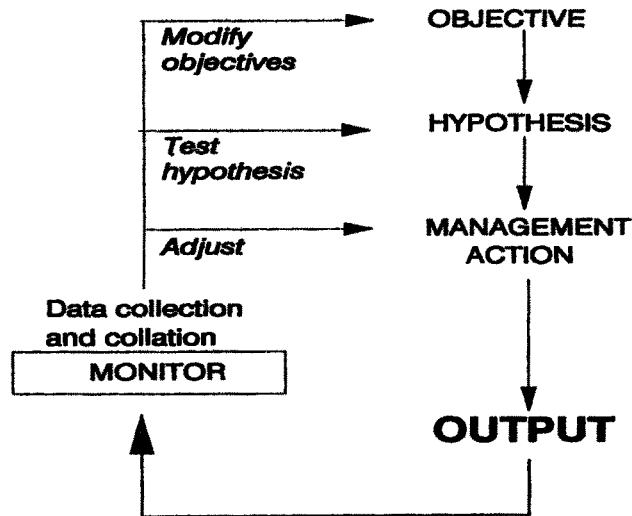


FIG. 2. Adaptive management, a goal orientated wildlife management philosophy.

as objectives, hypotheses, causal factors and data analyses are all goal orientated and often require a trial and error approach (Schwabe, 1984a). Appropriate veterinary training aids in introducing applied science into wildlife management programmes.

Health management and preventive medicine inputs: crocodiles and ostriches

Crocodile ranching and ostrich farming represents the commercial use of wildlife by the private sector.

Crocodile ranches

Nile crocodile (*Crocodilus niloticus*) eggs are harvested from the wild and incubated. Hatching is under controlled conditions, survival is much better than in the wild and a percentage of the young crocodiles are returned to the wild (although this has not been necessary for several years). In 1991, over 58,000 eggs were collected in Zimbabwe, the industry earned US\$2 million in hide sales and crocodile meat was also marketed (Makombe, 1994). The results of the commercial use of this wildlife resource is that the crocodile (which is a Specially Protected Species in Zimbabwe) is thriving in rivers, lakes and dams throughout the country. Crocodile ranching through its intensive nature requires a major preventive veterinary medical input including husbandry and health management recommendations, nutrition, disease research etc.

The major diseases affecting crocodiles include pox and adenovirus infections, chlamydiosis, salmonellosis, coccidiosis, nutritional deficiencies etc. The industry has benefited tremendously from research carried out by veterinarians. For example, projects in Zimbabwe include examining and comparing growth rates and feed conversions of crocodile hatchlings fed on different meat/fish sources, trials with the use of an autogenous vaccine for the control of pox, studies on polyarthrititis caused by mycoplasma etc. (C. F. Foggin, pers. comm.).

Ostrich farming

The development of the ostrich (*Struthio camelus*) industry has been marked by 3 phases, feather production at the turn of the century, skin and leather production and more recently, meat production (Hallam, 1992). Further developments include the live sale of young birds to overseas markets. In South Africa there are estimated to be about 150,000 birds in captivity and in Zimbabwe the industry is growing rapidly and is economically viable. Areas in which veterinary input is vital include reproduction and its management, egg storage and incubation, nutrition particularly in the growing bird and disease investigation and research. There are many veterinary problems associated with ostrich farming and infectious and nutritional diseases are some of the major constraints to a viable ostrich production operation (Foggin, 1992). Due to the rudimentary knowledge of ostrich diseases, an adaptive management approach is an important component of veterinary intervention. Management deficiencies in incubation and chick rearing are common and mortalities greatest during the first 6 weeks of a chick's life. Disease syndromes seen are varied but include, for example, avian pox, several bacterial diseases (including infections with *E. Coli*, *Klebsiella*, *Salmonella*, etc.) and developmental abnormalities associated with poor or unbalanced nutrition (e.g. manganese deficiency resulting in limb deformities) (Foggin, 1992). Veterinary input includes post-mortem evaluation, treatment and advice on preventive medicine. The rapid growth of this industry lends itself well to a herd health approach to disease and production. Current research projects in Zimbabwe include, effect of probiotic or antibiotic growth of young chicks, use of different fibre sources fed to growers/finishers (i.e. veld hay, cotton hulls, wheat/barley straw) and serological surveys for different viral diseases (C. F. Foggin, pers. comm.).

Advances in wildlife health management: capture, medical care and anaesthesia

From an historical perspective, veterinarians were involved in the early development of many of the immobilising drugs (Jessup, 1992; Harthoorn, 1976) that are essential components of wildlife management today. Tremendous progress has been made in the last decade in improving the way wild animals are captured and handled and veterinarians have played an important and essential role (Clark and Jessup, 1992; Jessup, 1992; McKenzie, 1993). Despite the fact that the earliest use of drugs to chemically immobilise wild animals was pioneered by veterinarians, they tended to be regarded as the scientists who provided the scientific/medical information for others to use, specifically wildlife managers and biologists. In some African countries it is only recently that veterinarians have been employed full-time in wildlife departments. As a result, veterinarians now have a larger role to play in the development of improved wildlife capture methods, in testing and refining sedative and anaesthetic drugs and in improving the way wild animals are medically treated and managed during and after capture (Jessup, 1992; McKenzie, 1993). There are specific examples of how veterinary training can enhance the field of wild animal capture and therefore improve wildlife health.

Black and white rhinoceros conservation in Zimbabwe

In 1989 Zimbabwe was considered to have the largest remaining population of black rhinoceros (*Diceros bicornis*) in Africa and a significant white rhinoceros (*Ceratotherium simum*) population. The population of black rhinoceros has been subjected to increasing illegal hunting pressure since 1984, mainly from illegal hunters crossing from Zambia, north of Zimbabwe. Several strategies have been adopted by

the Zimbabwean Government to try to stem the loss of black rhinoceros including improved law enforcement, capture and relocation, and dehorning (ZBRCS, 1992). Veterinarians have been involved in refining and improving chemical immobilisation methods with this species. Over 450 rhino immobilisations have been carried out using combinations of etorphine (M99) and xylazine or detomidine for dehorning, translocation and radio-collaring purposes since 1989 (Kock and Atkinson, 1993). Modification of drug doses has resulted in induction times of <4 minutes (Kock, 1992) for the majority of black rhinos which is in marked contrast to induction times of >10 minutes reported in other studies (Booth and Coetsee, 1988). Improvements in husbandry methods have reduced the likelihood of trauma and stress to recently captured black rhino held in bomas, and improved long term survival through medical and nutritional management (Kock and Morkel, 1993).

Training programme in chemical and physical capture of wild animals

Due to human population pressure, habitat loss, environmental degradation and loss of migration corridors, wildlife in Africa requires more intensive management in order to ensure survival. Management can take many forms, but increasingly involves capture and relocation. Since 1986, over 17,000 large wild mammals have been captured in Zimbabwe (John White, Wildlife Producers Association, pers. comm.). Capture involves both chemical and physical restraint methods. With this intensive form of management and the increasing economic value of wild animals, there has been an increasing need for the maintenance of high professional standards in both chemical and physical capture. Veterinarians are at the fore-front of conducting training programs for wildlife managers who are involved in wildlife capture and relocation (Clark and Jessup, 1992; R. Kock, pers. comm.). It is imperative that veterinarians take the lead in this field in the future, as this will help dispel concerns of animal welfare that are essential components of modern animal care (McKenzie, 1993). Also, the sustainable use ethic places an economic value on individual wildlife species, and wildlife health associated with capture is a prerequisite for economic success with trade in wildlife (both local and export).

Use of long-acting tranquillisers in wildlife

One of the greatest contributions in recent years to the welfare of wild animals associated with capture and relocation has been the development of long-acting tranquillisers. These were pioneered by veterinarians in South Africa (Ebedes, 1989; H. Ebedes and R. Burroughs, pers. comm.) and have had a profound affect on the survival of wildlife species that have historically suffered significant mortality associated with capture. Capture and translocation mortalities have been unnecessarily high with particular species such as springbok (*Antidorcas marsupialis*), nyala (*Tragelaphus angasi*) and roan antelope (*Hippotragus equinus*). Tranquillisers such as zuclopenthixol acetate (Clopixol-Acuphase, 50 mg/ml, A/S Lundbeck, Copenhagen, Denmark), and perphenazine enanthate (Trilafon, 100 mg/ml, Sherag, Isando, Tvl, RSA) have become an extremely useful tool in relieving anxiety and stress and for manipulating translocation procedures to decrease injuries and mortalities (Ebedes, 1989).

Disease surveillance

“Here’s good advice for practice: go into partnership with nature; she does half the work and asks for none of the fee”

Martin H. Fischer

Historically, veterinary involvement in wildlife has centred around disease

investigations and research. The publication of *Infectious Diseases of Wild Mammals* (Davis, Karstad and Trainer, eds) in 1970, with a second edition in 1981 reflected this involvement. Disease investigations and surveillance have become increasingly important parts of epidemiologic work with wildlife (a population based approach) and should become an essential component of adaptive management. There are several examples of veterinary inputs that have improved wildlife health by disease management. For example, a wildlife disease epidemiology project established in Zimbabwe in 1989 (E. C. Anderson, pers. comm.) has removed many prejudices and added essential information to previously inadequate data on the role of wildlife in the wildlife/disease/domestic livestock triangle (Anderson *et al.*, 1993; Anderson, 1993).

During the period November 1989 to the end of 1993, more than 7,000 blood samples for serological and stress evaluation have been collected during animal capture, relocation and research programmes (Anderson, 1993 and pers. comm.). FMD is an example of a particular disease that has constrained the development of the wildlife industry in many parts of Africa. Research carried out by this project has improved the understanding of the role of wildlife in the epidemiology of FMD. This research has demonstrated that wild species other than buffalo play little part in the maintenance of FMD infection (Anderson *et al.*, 1993; Anderson, 1993), but with a better understanding of the epidemiology of FMD in buffalo, FMD-free buffalo herds have been established in previously restricted areas. These developments have allowed the wildlife industry to expand dramatically, with wildlife auctions and movement of certain wildlife species into historic ranges. Other diseases under current investigation include African swine fever in warthogs (*Phacochoerus aethiopicus*) and bushpig (*Potamochoerus porcus*), bovine virus diarrhoea in eland (*Taurotragus oryx*) and cowdriosis in rhinos, etc.

Elsewhere in southern Africa, active research by veterinarians on parasites and infectious diseases have assisted greatly in wildlife management decisions, e.g. the Kruger National Park in South Africa is a world leader in applied wildlife research. Crucial to this is challenging the myth that disease is a problem in the wild. Wildlife generally are healthy and if disease becomes a problem, this often indicates an ecological imbalance, whether natural or man-induced. In the future, veterinarians will continue to play a key role in defining the disease relationships between wildlife and livestock (e.g. FMD in Zimbabwe, TB in buffalo in the Kruger National Park, South Africa) and in integrating these findings into an adaptive management framework.

Education and wildlife health

Veterinary education has tended to favour domestic animal medicine and especially livestock medicine. This is a legacy brought by colonialism to Africa with the implementation of a traditional European approach to livestock production. Changes within the profession are occurring in response to the need for a professional input into the wildlife management field. There is a need within the veterinary profession to ensure that students and recent graduates are able to positively pursue interests in wildlife medicine. There are encouraging signs of a broader based outlook towards veterinary training and the adoption of a population based approach to health problems of both domestic animals and wildlife (Schwabe, 1984a). For example, a Wildlife Health Instruction Program (WHIP) was recently established (1991) at the University of California, Davis, and the University of Wisconsin in the USA with support from the Pew National Education Program (PNVEP) (W. N. Boyce, pers.

comm.). This program was strengthened by a Wildlife Health Workshop (Boyce *et al.*, 1991) held in Fort Collins, Colorado, USA. It became apparent from this workshop that the emerging field of "wildlife health" draws upon a wide range of veterinary and non-veterinary disciplines. Crucial questions that were asked included:

1. How can veterinary medicine and conservation biology be integrated to promote wildlife health through appropriate management strategies?
2. What are the current and future needs and roles for veterinarians in wildlife health management?
3. What issues must be addressed to train and employ veterinarians to meet these needs?

It is within the context of these questions that the veterinary profession must recognise the need for a multi-disciplinary approach to wildlife management and research. Veterinarians and other health professionals must become integral parts of the team. In order to achieve this, veterinary medical curricula must recognise the need for a broader based approach to veterinary training, which includes some resource management training with exposure to social and economic factors. Ecological principles should be understood as well as principles of conservation and sustainable use. The veterinary profession must beware of certain concepts that have recently been suggested in the scientific literature that indicate a failure to recognise the role of veterinarians in disease work and modern day wildlife management. For example, suggestions that "until we have professional wildlife disease biologists with a goal of understanding the ecological aspects of wildlife diseases . . ." (Spalding and Forrester, 1993) should be challenged strongly. Disease investigation and surveillance are essential components of veterinary training and veterinarians should be at the fore-front of disease management and research (Schwabe, 1984a); this should *not* be the prime preserve of biologists. This requires more of a holistic approach to disease investigation by veterinarians with a strong ecological (or conservation biology) component.

Involvement of veterinarians in wildlife management will always be constrained by limited numbers of appropriately trained individuals and positions available. Therefore, it is essential that those actively involved in this field, train and impart knowledge to selected non-veterinarians. For example, this should include training staff in the elementary use of drugs and veterinary practices (including post-mortem techniques) in order that they may better understand the value of veterinary contributions, assist veterinarians in the field and collect valuable data if veterinarians are unavailable.

Wildlife: resource of the future or relic of the past?

"Every creative act in science, art or religion involves a new innocence of perception liberated from the cataract of accepted beliefs"

Arthur Koestler

Zimbabwe is regarded by many conservationists as one of the most innovative African countries with regards to wildlife management. One of Zimbabwe's most important goals is to conserve its biodiversity, its entire range of indigenous animals, plants, habitats and ecosystems (Zimbabwe Trust, 1992) for the benefit of future generations, a principle embodied in Zimbabwe's National Conservation Strategy. It is recognised that conservation can be influenced by a range of factors including cultural and social background, economic circumstances and sectoral interests. It is

due to this recognition that a philosophy of sustainable use with its potential economic returns to rural people has been adopted by Zimbabwe. The development of CAMPFIRE (Communal Area Management Program for Indigenous Resources; Zimbabwe Trust, 1992) a community based resource programme, is an example of this philosophy. More than 12 district councils in Zimbabwe have control of their resources in the communal lands under CAMPFIRE, and land area of some 40,000 km² (almost equal to Parks and Wildlife Estate land) is now under an adaptive wildlife management and resource use programme. The philosophy of land owners (be they communal peasants or commercial ranchers) deciding the future of wildlife and wild areas on their properties has resulted in over 18% of Zimbabwe's land under some form of adaptive wildlife management, which, combined with Parks and Wildlife Estate represents 30% of Zimbabwe's land mass (Martin, 1993).

With exciting developments such as this in some parts of Africa, what is the role of the veterinary profession in resource management? Concern for animal welfare and wildlife health (including the maintenance of health with multi-species production systems involving both wildlife and domestic livestock) is an essential component of adaptive resource management. Healthy wildlife contributes to sustainable development. If veterinarians are to be regarded as an essential part of the professional wildlife management community, they must develop a broad view of conservation, expand their problem solving skills and go beyond traditional boundaries of veterinary medicine (Boyce *et al.*, 1991; Schwabe, 1984a). A population based medical approach is absolutely necessary and the individualism that is a common trait within the profession must be integrated into a team philosophy, multi-disciplinary in nature.

Veterinary inputs must be geared to convincing farmers and ranchers of the value of a herd health approach in preventing management problems, with the additional development of minimum standards throughout the wildlife industry. Veterinarians must also be at the forefront of research both within the communal land programmes and private commercial sector, offering an extension service to complement other appropriate disciplines (Schwabe, 1984b). If wildlife does become a relic of the past in Africa it will represent an enormous failure in our ability to manage and conserve one of the world's most important renewable resources. As veterinarians we must be at the forefront in promoting the concept of sustainable use and supporting the IUCN World Conservation Strategy "Caring for the Earth".

"The final objective of veterinary medicine does not lie ... in animal species that the veterinarian commonly treats. It lies very definitely in man, and above all humanity".

M. Martinez Baez, M.D.

Veterinary training is about caring and we must translate this into action, recognising the realities of the "real" world of Africa. The future of wildlife and wild areas in Africa lies very definitely in the hands of man, and it will be people who are part of the resource who will ultimately decide the future of the resource, be it fauna or flora. The veterinary profession must expand their influence with appropriately trained individuals and get on with the job of assisting others in the goal of preserving biological diversity globally.

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FAUNE SAUVAGE, POPULATION ET DEVELOPPEMENT: CONTRIBUTION A LA SANTE DE LA FAUNE SAUVAGE ET A LA GESTION DES RESSOURCES EN AFRIQUE

Résumé—La pression démographique humaine, la perte d'habitat, la dégradation de l'environnement et la chasse illégale ont eu comme résultat, en Afrique, une perte de la biodiversité et une quasi extinction de certaines espèces. Le dilemme pour l'Afrique est l'équilibre entre conservation et développement. Si la faune sauvage ne doit pas devenir une relique du passé, elle doit avoir plus qu'une valeur esthétique. Elle doit contribuer aux mieux-être des populations qui vivent près de ces ressources. En fait, une gestion appropriée de la biodiversité jetterait les bases d'un futur plus positif pour les populations rurales d'Afrique, la clé étant l'adoption d'une philosophie de gestion adaptative. Cet article fait la revue de l'utilisation renouvelable des ressources en faune sauvage et de la contribution positive de la profession vétérinaire au maintien de la santé de la faune sauvage africaine. Ces contributions ont porté sur les aspects vétérinaires de la gestion et de la recherche sur la faune, la surveillance épidémiologique et la prophylaxie, la formation et l'éducation. Faune sauvage et écosystèmes devront être de plus en plus gérés en vue du sauvetage et du maintien de la biodiversité. Les vétérinaires ont un rôle crucial à jouer dans le maintien de santé de la faune sauvage au sein d'une équipe multidisciplinaire de gestion faunistique.

FAUNA, POBLACION Y DESARROLLO: CONTRIBUCIONES DE LA PROFESION VETERINARIA A LA SANIDAD DE LA FAUNA Y A LA GESTION DE LOS RECURSOS NATURALES EN AFRICA

Resumen—La presión demográfica, la pérdida del hábitat, la degradación del medio ambiente y la caza ilegal han causado en Africa la disminución de la biodiversidad y la práctica extinción de algunas especies de la fauna. Africa se enfrenta al dilema de equilibrar conservación y desarrollo. Para que la fauna salvaje no se convierta en una reliquia del pasado es necesario que su valor no sea tan solo estético. La fauna salvaje debe contribuir al bienestar material de la gente que vive junto a ella. En realidad, una gestión adecuada de la biodiversidad sentaría las bases de un futuro mejor para los habitantes del medio rural de Africa y el punto clave consistiría en adoptar una filosofía de gestión activa y adaptada a la situación. En este artículo se hace una revisión del uso sostenido de la fauna salvaje y de como la profesión veterinaria contribuye positiva-

mente a la gestión sanitaria de la fauna en Africa. Estas contribuciones se han realizado base de incrementar los aspectos veterinarios en la gestión e investigación de la fauna, mediante la prevención y vigilancia de enfermedades, y a través de la educación y formación técnica. Cada vez más, la fauna y los ecosistemas deben ser gestionados para salvar y mantener la diversidad biológica. Como parte de un equipo multidisciplinar de gestión de la fauna, los veterinarios tienen un papel crucial en el mantenimiento del status sanitario de la fauna.

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Further information can be obtained from Professor David W Taylor, Director of the Centre for Tropical Veterinary Medicine, Easter Bush, Roslin EH25 9RG, Midlothian, Scotland.