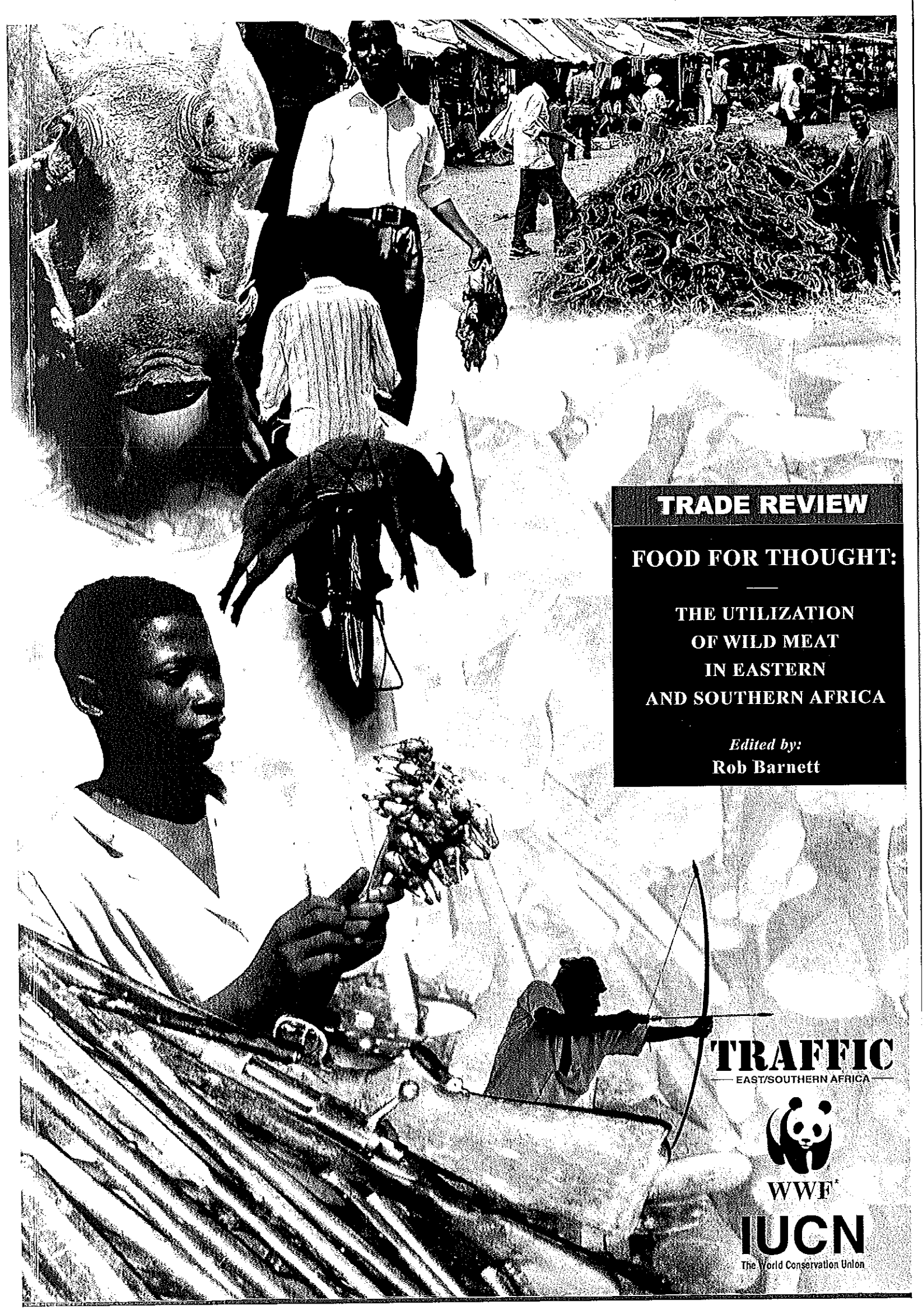

TRADE REVIEW

FOOD FOR THOUGHT:

THE UTILIZATION OF WILD MEAT IN EASTERN AND SOUTHERN AFRICA

Edited by:
Rob Barnett

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EAST/SOUTHERN AFRICA

WWF

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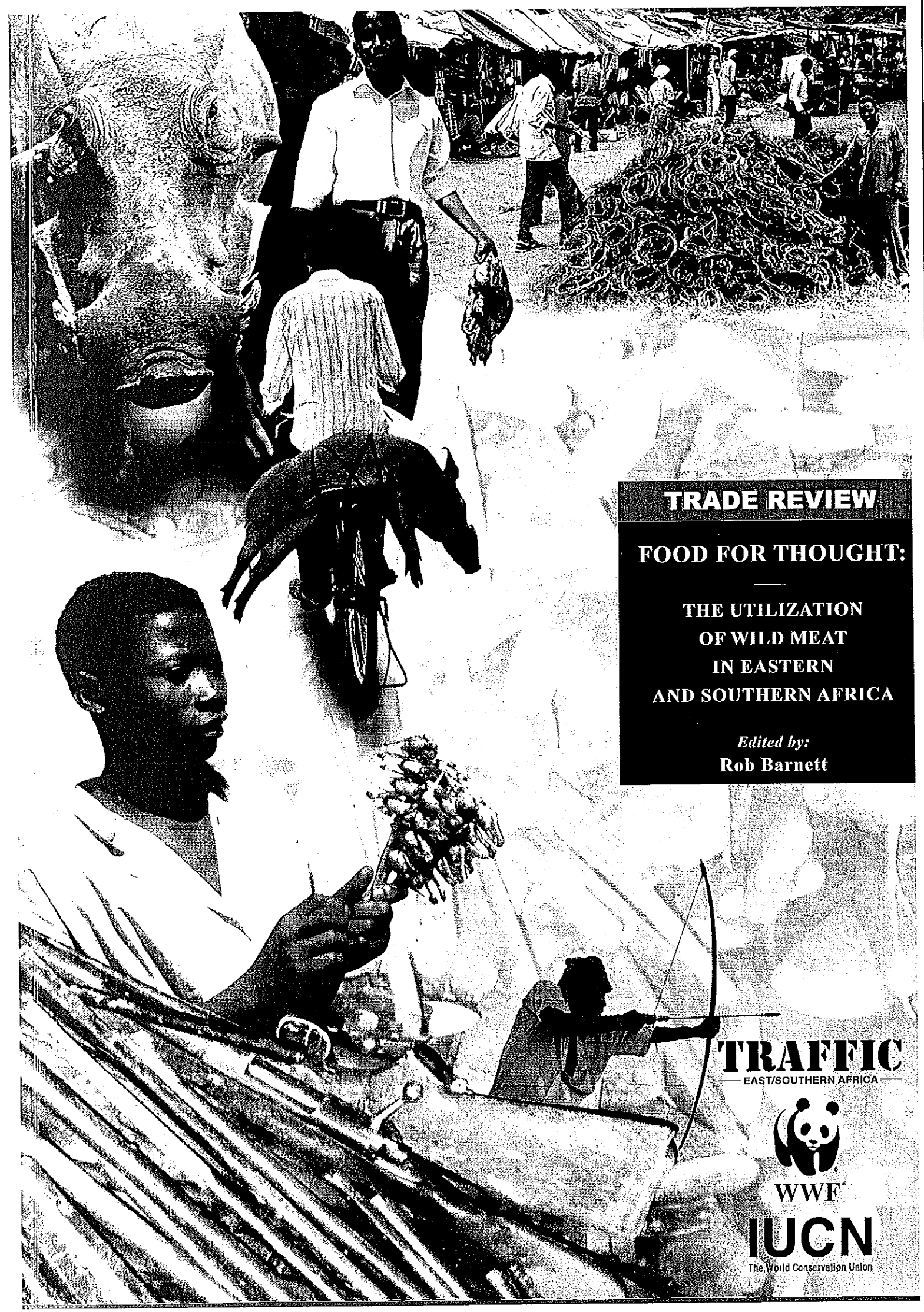

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Urban bush meat market.
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Seized bush meat wire snares.
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Seized muzzle loaders.
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Traditional bow and arrow bush meat hunter.
Rob Barnett-TRAFFIC

Roadside sales of bird *mpani*.
Rob Barnett-TRAFFIC

Bush pig being transported to market.
Simon Milledge-TRAFFIC

Warthog.
Nina Marshall-TRAFFIC

Problem animal control game meat auction.
Jo Traill-Thompson

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EXECUTIVE SUMMARY

The east and southern Africa region is facing a serious decline of most wildlife populations outside of protected areas. The illegal killing of wildlife for meat — the so-called use and trade of 'bush meat' — is believed to be one of the greatest direct causes of this decline.

Exacerbating the problem is the increasing human population. Wage earners are few, so most people rely directly on the land for hand-to-mouth livelihoods based on agriculture and livestock production. Most rural inhabitants depend on subsistence farming of maize as a staple diet, while the consumption of domestic meat remains prohibitively expensive. As much of the land is infertile or subject to erratic weather patterns, poor crop harvests and livestock yields are common. Many rural Africans struggle to eke out a living amidst endemic poverty and frequent famine. Basic survival compels people to use what naturally occurs around them. In this context, wild animals become an economic resource of major importance, particularly as food. Wildlife is critically important as a source of cheap protein for malnourished people and, when traded, as cash income where few alternative sources of income exist. But such use and trade is usually illegal.

At the same time, the formalised legal production of game meat through game ranching and cropping schemes is a growing activity with potential for increased wildlife management and poverty alleviation. Until now, however, an information void on the importance of the formal game meat industry and illegal bush meat use in the region has existed. To date, most research on bush meat has been conducted in west and central African countries, leading many to perceive bush meat use as a tropical forest phenomenon with great apes and other primates the major target species.

The lack of critical information in other parts of Africa led TRAFFIC to conduct a two-year review contrasting the informal (largely illegal) and formal (legal) trade and utilisation of wild meat in seven east and southern African countries. Chosen for their diversity and range of utilisation programmes, these countries were: Botswana, Kenya, Malawi Mozambique, Tanzania, Zambia and Zimbabwe. Specific objectives of the study, which was generously funded by the European Community's 'Environment in Developing Countries' Budget Line (Project B7-6200/96-04/ENV/VIII), included documenting the parameters of the utilization of wild meat, its economic value to rural communities, and the impact of harvest on protected areas and individual species valued in the trade. A total of 23 surveys were conducted during 1997 and 1998, of which 16 were focused on illegal use. These surveys targeted a diversity of rural and urban areas and involved the collection of baseline data from approximately 6,000 respondents.

Legal Game Meat Production:

All countries in the study legally produce game meat through ranching, farming, cropping/culling, licensed hunting or problem animal control initiatives. Such schemes collectively yield about 8,500 metric tonnes (mt) of meat annually, with an estimated local value of nearly USD 7.7 million. Although significant, such quantities are small compared to potential yields. Game meat production sectors in all countries suffer from veterinary restrictions associated with the transfer of wildlife borne diseases to domestic livestock. These favour domestic meat production and severely limit access of game meat to more lucrative markets. As a land use option, game meat initiatives also receive little in the way of government subsidies when compared to operations producing livestock.

Regardless, game meat production in some countries such as Zimbabwe (2,925 mt per year) represents a substantial and growing industry that economically competes favourably with other land uses such as farming and livestock ranching in semi-arid areas. This is due, in part, to the ability of wildlife to

adapt to harsh conditions, and the multi-use options wildlife offer in terms of photographic tourism, trophy hunting, and hide and meat production. Further, game meat production, especially through licensed resident hunting and cropping/culling schemes, plays an important social role in that much of the game meat produced is sold to local people at prices far cheaper than domestic meat. As such, total cash values are not necessarily indicative of the importance of game meat in the lives of many people in the study countries.

Collectively, in the formal sectors of the countries reviewed, game ranching (3,029 mt) supplies the greatest quantity of game meat, followed by resident license hunting (2,120 mt), safari hunting (1,381 mt), cropping schemes (1,184 mt) and, lastly, problem animal control (735 mt). Zimbabwe's game ranching industry is by far the most developed due to conducive wildlife ownership and land tenure policies that support active investment in the industry. In Zimbabwe, the onus to manage wildlife is firmly in the hands of land-holders who oblige because of the livelihood they can make through such consumptive wildlife uses as meat production. The result is a substantial game ranching (over 500 ranches), farming (over 700 ostrich, 45 crocodile farms) and cropping industry on Zimbabwe's large-scale commercial farms, as well as communal land areas, and institutionally these initiatives are supported by various wildlife producer associations and the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE).

In comparison, all other countries in the study have a negligible game ranching, farming and cropping sector due to unfavourable wildlife ownership and land tenure laws. In these countries, wildlife is government-owned with only limited and, in many cases, short-term user rights given to land-holders. Understandably, land-holders are reluctant to invest in costly start-up infrastructure such as vehicles, abattoirs, and fencing, when there is uncertainty from year to year about the retention of wildlife user rights. Some countries, such as Mozambique and Tanzania, also face fundamental problems of insecure land tenure that deters game ranching and farming as a serious enterprise. Countries such as Kenya, restrict marketing of game meat, advertising, and export to lucrative markets due to the misdirected belief that a legal game meat supply will stimulate demand for illegal bush meat. As seen in illegal bush meat studies in Kenya, bush meat demand is already excessive, but most ranches cannot access potential markets with the result that only about half of the annual cropping quotas are used. In a country characterised by unacceptable levels of human malnutrition due to the high cost of domestic meat (USD 1.71 per kg), it is astonishing that official policy forces ranches to sell over 51% of the game meat produced as dog food for less than USD 0.58 per kg.

In all communal land areas with the exception of those in Kenya, community-based cropping schemes have been undertaken to reduce numbers of animals that exceed the carrying capacity of the land. In the Luangwa Valley of Zambia, the Selous Game Reserve Buffer Zone in Tanzania, and the communal districts of Zimbabwe, for example, such schemes result in the provision of game meat to local people for free or at subsidised prices. Cropped meat is often one of the few benefits from wildlife these people receive, and is exceptionally important to inhabitants of tsetse fly areas where livestock is absent. Large-scale commercial cropping schemes have largely failed, however, due to logistical problems associated with transporting meat from supply area to market, and other factors such as resistance from domestic meat butcheries. Consequently, most cropping is now undertaken on a small-scale, community-based basis, such as under the CAMPFIRE initiative in Zimbabwe, Luangwa Integrated Resource Development Programme (LIRDP) in Zambia and the Natural Resource Management Programme in Communal Areas (NRMP) of Botswana. Still, problems with the equitable distribution of meat to residents or, as seen in LIRDP hippo cropping in Zambia's Luangwa Valley, the purchase of meat by urban traders for profit elsewhere has impeded achievement of some of the stated social objectives of these programmes, such as poverty alleviation among local residents.

Game meat is the primary product from game ranching, farming and cropping, but it also results as a by-product from licensed hunting, where sport or recreation is often the primary motivation, and from problem animal control culling, where solutions to wildlife crop raiding and property destruction are the ultimate goal. All countries in the study have legislation that allows low-cost licensed hunting by citizens. Many countries view the provision of affordable game meat to it's citizens as an important social objective, with legislation in Botswana, for example, acknowledging the right of all citizens to benefit from the game meat resource. As in Botswana, where over 1,400 mt of game meat is potentially produced each year, licensed resident hunting can play an important role in food security. There, many rural people heavily rely on this meat source to sustain their nutritional well-being.

Due to the subsidised cost of licenses, however, licensed citizen hunting can be open to misuse. In Tanzania, for example, the cost of a citizen license to hunt a Cape Buffalo is USD 10 in comparison to the animal's meat value of USD 211 or safari trophy hunting value of USD 800. The high-value of bush meat can result in many citizen hunters over-shooting their license quotas for commercial gain. In addition, high trophy hunting values also lead to a black market in citizen licenses. With the exception of Malawi and Kenya, all other countries in the study allow licensed safari hunting. The high cost of licenses to mainly foreign sport hunters results in a lucrative industry, which in Tanzania amounts to some USD 40 million annually. Safari hunting has contributed to making wildlife a more profitable land use than livestock production or farming in many areas of the study countries. Over 1,381 mt of game meat per year is provided as a by-product and, in most cases, is distributed to local residents of hunting areas as a tangible benefit from trophy hunting. Unfortunately, however, quantities are limited due to logistical problems associated with supplying meat from distant hunting areas to local villages. Problem animal control of crop-raiding or property-damaging animals also results in the distribution of some 735 mt per annum of game meat in the countries studied. In all countries, this meat is distributed for free, or at subsidised prices, to local communities who have incurred damage. As such, it plays an important role in appeasement, but unfortunately much of the meat is wasted due to pilferage and rotting. Still, the high-values associated with meat do, in many cases, motivate villagers to falsify reports of crop-raiding.

Problems encountered with achieving the social and economic objectives of game meat production stemming from cropping, licensed citizen hunting, trophy hunting and problem animal control initiatives have led many countries, such as Botswana, Zimbabwe, Zambia and Tanzania, to undertake community-based natural resource management programs. In such cases, communities are given user rights over the wildlife quota, and can decide whether to crop for meat, sell animals for trophy hunting or allow licensed citizen hunting. All benefits, whether meat or cash income, accrue directly to these communities where previously they were monopolized by the central government. Villages around the Selous Game Reserve in Tanzania, for example, can decide how best to utilise the wildlife quota allocated to them, either by cropping common species such as Impala for a critically-needed meat supply, or by selling high-valued trophy animals such as Cape Buffalo to

Seized wire snares being destroyed.
Friedkin Conservation Fund

foreign hunters for cash. Allowing citizen hunters from outside the area to hunt under license at a higher rate than local residents also reduces misuse and commercialisation of this hunting option. Whereas previously local opinion to cull a crop-raiding elephant would have been unanimous, now residents see the high-value that can be obtained from selling the right to shoot the animal to a foreign safari hunter. The diversity of options allows different species to be used to their maximum advantage, including their game meat value. These programs motivate villagers to value and protect their wildlife resources. Poachers are no longer welcome, and local game scouts are hired using village revenues to reduce illegal off-take.

Currently, in most countries of the study, the legal production of game meat is under-developed. Wildlife ownership needs to be transferred to land-holders, together with secure tenure rights, in order for the economic and social potential of the sector to be achieved. Where this has occurred, such as on the large-scale commercial farms in Zimbabwe, and NRMP in Botswana's communal areas, game meat production is contributing substantially to local economies and to the increased well-being of communities in these areas. Such policy change has been initiated in many countries, but needs to be supported to realize the full potential of this sector.

Illegal Bush Meat Utilisation and Trade:

Historically, bush meat use in the east and southern Africa region has been perceived as a purely subsistence activity undertaken by traditional hunter/gatherer societies. The increasing human population, acute poverty and widespread unemployment in the region, however, is leading to a greater reliance on natural resources. For many, bush meat is increasingly viewed as an important resource that contributes extensively to the local standard of living. This study has documented that bush meat use also constitutes one of the most far-reaching impacts on wildlife in east and southern Africa. It involves more people, and has a greater effect on wild animal populations, including those in protected areas, than any other wildlife activity.

Extent and Importance - Bush meat was recognised as a valued resource in all 13 field sites in this study. Bush meat consumption is a daily, weekly or monthly activity for most people surveyed. In rural areas such as Kitui District, Kenya, about 14.1 kg of bush meat per household is consumed by 80% of the households each month, representing the bulk of all meat protein consumed, with domestic meat playing a reduced role in meeting protein requirements. Such reliance on bush meat is also seen in the Kweneng rural survey area of Botswana, with 18.2 kg being consumed per household per month by 46% of households. In this area, bush meat represents the only viable meat protein source, with domestic meat being prohibitively expensive and largely unavailable. With increasing urbanisation, a key trend within all countries of the study is a continuing reliance on affordable sources of bush meat protein. In the urban survey area of Maputo Province, Mozambique, for example, a substantial trade of more than 50 mt per month of bush meat exists, with the supply emanating from numerous, often distant, source areas. Such commercialised urban trade is also extensive in Lusaka, Zambia, and reflects the emerging dynamic that bush meat use is not purely a rural phenomenon.

Although the findings of this study support the view that traditional hunter/gatherer societies continue to rely on hunting, bush meat is now found to affect a wide range of other groups, such as the agro-pastoralist Ngoni and Chewa peoples of Malawi and the pastoralist Samburu of Kenya, who now have a high demand for bush meat. Most pastoralist peoples regard their livestock herds as both cultural

and capital assets. People, regardless of ethnicity, generally refrain from utilising their livestock for domestic use, especially when a viable meat protein alternative exists. In all survey areas of this study, bush meat represents this option and is utilised extensively so that livestock can be preserved as a household capital and cultural asset.

Not only is bush meat now utilised by a variety of different ethnic groups in the study's urban and rural survey areas, but also by rural people living in a broad spectrum of localities with different primary land uses and wildlife resource bases. The use of bush meat adapts to different localities and, regardless of the species composition, continues to constitute an important and needed resource. Reliance on bush meat is no longer restricted to those areas with abundant wildlife and compatible land uses. Survey areas in Malawi represents one end of the spectrum in terms of habitat type and wildlife availability: high human population and cultivation densities have resulted in the extirpation of larger wildlife species in the highly modified landscape. Irrespective, however, the trade and use of small high protein bush meat species such as insects, rodents and birds is of considerable importance to most people, and crop losses to these species is often compensated for by their trade and consumption as bush meat.

Although an integral part of the daily lives of most survey area respondents, bush meat is relied upon to a greater extent during times of economic hardship, droughts and famine. Peak hunting periods coincide with dry season drought months as vegetation is less dense and wildlife searching for watering holes are easier to locate and hunt. Hence, supply during times of hardship peaks, and constitutes an important drought and famine coping strategy for the majority in the rural areas surveyed.

Bush Meat Demand - In all but one rural survey area in the seven target countries, bush meat is in demand because it is cheaper than domestic meat. For example, bush meat is 129% cheaper in Kenya, 75% cheaper in Zimbabwe and 30% cheaper than domestic meat in Botswana. Affordability was the main reason why rural households indicated bush meat as the most important meat protein source. In line with this, the poorer the household, the greater its reliance on bush meat. Should bush meat become unavailable, it is likely that rural people could not afford more expensive domestic meat and consumption of protein would decrease significantly. Many of the rural survey areas are characterised by high levels of malnutrition, as indicated by recorded stunting and infant mortality rates. In all likelihood, negative health impacts are kept from increasing further by the availability and use of affordable bush meat.

In the urban survey areas of Mozambique and Zambia, however, a contrasting demand dynamic is evident. In Maputo Province, Beira town in Sofala Province, and in Zambia's capital, Lusaka, bush meat is in demand due to a preference for taste. Bush meat prices are considerably higher than domestic meat in these urban markets, with for example domestic meat being about 43.4% cheaper in Zambia, and 157% cheaper in Mozambique. In contrast to rural areas, only wealthier urban inhabitants can afford bush meat, and regard it as a luxury item superior to that of domestic meat or fish. Prices for Red Duiker in Maputo City markets, for example, quadrupled in the month prior to Christmas when wealthier customers purchase preferred meat for the season's festivities. Interestingly, however, in these two countries, bush meat prices are still cheaper or equivalent to domestic meat in rural areas due mainly to greater supplies of wildlife and the fact that transport and middleman costs are not a major factor.

Although economic considerations are key to demand in rural areas, and taste preference the principal dynamic in some urban areas, other social and cultural factors also significantly affect demand for bush meat. In the Dande communal district of Zimbabwe and the Luangwa Valley survey areas of Zambia, hunters hold esteemed positions within society through the reciprocal provision of meat to

village leaders and to the less capable, elderly, or female-headed households of the village. Hunters in the survey areas also clearly enjoy the activity as a social pastime, which contributes to the overall extent of bush meat utilisation occurring within the countries of this study.

Bush Meat Trade and Subsistence Use - The utilisation of bush meat in the countries under review is no longer motivated purely for subsistence reasons. Commercial trade of bush meat is an emerging dynamic in the majority of the survey areas and is responsible for the greatest portion of supply in Zambia, Mozambique, Malawi and Tanzania. Bush meat hunting 'for the pot' is, however, still critically important, and accounts for most of the supply in the Kenya, Zimbabwe and Botswana survey areas. Nevertheless, even in these countries, the emergence of trade has occurred in recent years, and is likely to continue to replace subsistence supply as wildlife numbers continue to decline. Households are increasingly finding it difficult to secure their own bush meat supplies themselves, and trade has emerged to meet this shortfall.

In many rural survey areas, hunters whose primary objective is still to provide meat to their families, conduct the majority of trade. In Kitui District and the Loikas area of Kenya, and the Kilimanjaro region of Tanzania, many hunters, who are primarily subsistence farmers, sell only excess bush meat after their families have been satisfied. Profits, however, are high due to supply being free and, in Kitui, the resulting income out competes many other forms of livelihood. Such incomes constitute the bulk of cash income received where little other alternative for wage employment exists.

Full-time commercial traders also exist in most of the survey areas. Such traders sell larger quantities of meat and, in many cases, identify more lucrative markets outside of the local supply area. In Kitui District, Kenya, a range of more commercially orientated trade outlets such as open air markets, illegal brew bars, and butchery kiosks are used to trade bush meat. In the western Serengeti of Tanzania, 34.3% of traders rely on bush meat as their sole source of income, and have identified markets as far as 200 km away on the more densely populated Kenyan border. However, most trade in rural areas still occurs locally. Trading mechanisms vary, with house-to house sales and contracts between hunters and consumers or traders being popular due to their relative secrecy.

Countries such as Zambia, Mozambique and, to some extent, Malawi have established well-developed and complex rural to urban trade supply networks. In such cases, lucrative urban prices motivate greater levels of trade and numbers of people who derive their sole income from the activity. In Mozambique, Maputo City maintains the highest prices for bush meat and consequently attracts most of the bush meat supplied from Maputo Province. Trade routes have emerged to satisfy this demand and involve many categories of stakeholders ranging from commercial hunters operating with vehicles and semi-automatic weapons, to intermediate traders who buy in bulk from supply areas, to urban market traders to food stall owners who serve cooked bush meat.

Bush Meat Species - A wide variety of species — ranging from the smaller mini-fauna such as insects, rodents and birds, to mid-sized animals such as duikers and Grant's Gazelle, to the more renowned larger specimens such as elephant and Cape Buffalo — were utilised regularly throughout the survey areas of this study. The data indicate that 58.3% of all species utilised weighed over five kg. Larger species, such as Bush pig and Impala, are generally preferred due to larger quantities of meat supplied per carcass, but also because respondents in many survey areas showed a preference for their taste. However, a clear emerging supply dynamic is indicated by the fact that 41.7% of all species utilised are under five kg in weight. As preferred larger bush meat species populations decline due to over-

hunting, land degradation and habitat loss, bush meat supply has adapted by targeting smaller species that are better suited to surviving in and around modified or cultivated habitats.

Of all the species utilised in the survey areas of the study, the larger species such as Cape Buffalo, Impala, Eland or Lesser Kudu are utilised by a substantial number of communities such as in the survey areas of Western Serengeti, Tanzania, and Ilkiloriti and Lpartuk, Kenya, and still account for a large proportion of bush meat supplied. However, these large species are generally less adaptable to changing habitats and have low breeding capacities due to late sexual maturity and long gestation periods. Bush meat off-take for such species is increasingly likely to be unsustainable because of their reduced ability to sustain unregulated hunting pressure. In contrast, most smaller species have a far greater breeding potential and are able to withstand greater hunting pressures and still maintain viable populations.

Bush Meat Conservation Implications - The emergence of a greater reliance on smaller species is likely to be indicative of the reported declines in wildlife, especially of the larger, preferred species in all survey areas. Catalysing this decline in some locations, such as in Kitui District, Kenya, are significant increases in prices for larger preferred species in the face of diminished local supplies. Greater prices motivate hunters and traders to maintain a continued supply by travelling greater distances to hunt. For example, in Kitui, two-thirds of the species being supplied come from Tsavo East National Park and Kitui Reserves. Similarly, in the Dande survey area of Zimbabwe, reduced availability of certain larger species is motivating trade from neighbouring Mozambique traders.

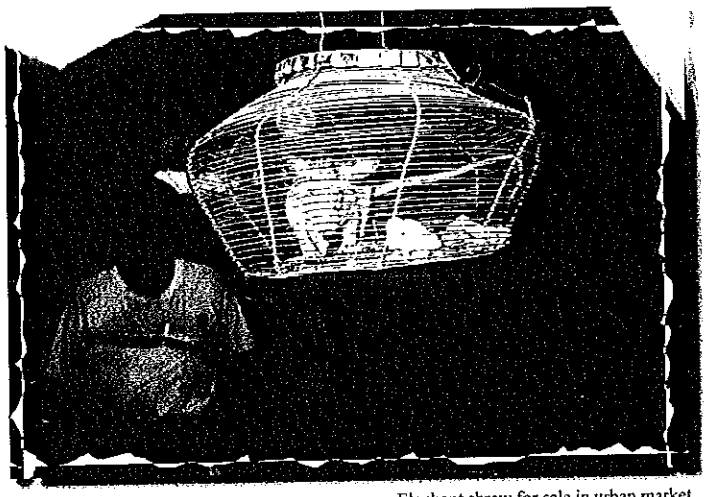
Rising prices for bush meat have led hunters and traders to maintain supply from an ever-increasing variety of species from ever-decreasing populations. With declining wildlife numbers, hunter's catch per effort has declined in most survey areas. Profit motives and the increased value of bush meat have led hunters to continue supply although the hunting effort required is now far greater. To improve catch per effort, more sophisticated and unsustainable hunting methods are used such as wire snaring, night torch hunting, and the use of semi-automatic weapons. The year-round demand for bush meat has also resulted in the gradual erosion of traditional hunting seasons. Increased numbers of hunters and traders that rely on bush meat revenues have resulted in their undertaking hunting and trading for longer periods of the year. In the survey areas of Kenya, Tanzania and Botswana, traditional hunting seasons are gradually disappearing. This means that wildlife no longer benefit from recovery periods during closed hunting seasons.

Other traditional management mechanisms, such as gender selection of hunted species and prohibitions on the hunting of gravid females, are of less concern in survey areas such as Lupane and Chivhu Districts in Zimbabwe. Traditional totem and taboo systems that reduced the use of certain species altogether are also declining in many survey areas. With the decreasing availability of wildlife, communities now utilise most species, with taboo and totem restrictions being largely discarded. This dynamic is perhaps best represented in the Luangwa Valley survey areas of Zambia, where in the past Zebra and Hippo were not hunted, and as a result their populations numbers in the area were healthy. As hunting catch per effort has declined for other more preferred species such as Cape Buffalo, more and more hunters have now turned their attention to these once taboo and totem species.

In countries such as Kenya where cheap price of bush meat is the main demand dynamic, supply will only decrease when prices are equivalent to domestic meat. In countries such as Zambia, where bush meat is regarded as a superior product by many urban dwellers, increased bush meat prices will have less impact on the reduction of supply. Currently, controlling unsustainable off-take through law enforcement fails to deter trade-motivated hunting, as the authorities generally lack implementation capacity in most cases and penalties in the form of judicial fines are often less than the meat value of a carcass.

Conclusion: The use of wildlife for food is one of the main contributing factors to the recorded declines in many animal species. The value most people of the region place on wildlife for meat leads to unsustainable harvest wherever effective ownership and policing of the resource base is lacking. The resulting impact on wildlife, one of Africa's main economic resources, is not only of major concern to the conservation community, but also to those engaged in rural development and food security issues. Without bush meat, the well-being of many families in the countries of this study will decline significantly. When considering the importance of bush meat to the daily livelihoods of a diverse and expanding population, together with the current lack of effective policing of a mainly government-owned resource, common sense dictates that initiatives should be promoted to transfer ownership to the people so that they are stimulated to invest, protect and manage wildlife resources that make such a vital contribution to their well-being.

Transferring wildlife ownership to land-holders and securing land tenure needs to be formalised in legislation, so that large and small land-owners, and people holding rights over communal land, have an interest in investing in the sustainable management of the wildlife resource for meat production. Once benefits accrue to land-holders from a resource they own, wildlife can play an important sustainable role in community development, and by doing so ensure its continued survival. Without it, wildlife will continue to be seen as a free, unowned, and uncared for resource, that benefits only those who use it first. Without a dynamic and proactive response to the bush meat issue in the region, it is likely that the countries of this study will loose not only a valued natural resource, but also a vital community development option. A more equitable distribution of donor funding to this critical conservation and social issue is needed, with greater collaboration between the conservation and community development government departments, ngos and professionals.



Elephant shrew for sale in urban market.
Rob Barnett-TRAFFIC

INTRODUCTION

The illicit trade and utilization of wild meat (hereafter called "bush meat") is perhaps the least documented, but most far-reaching use of wild meat in eastern and southern Africa. It is believed to involve more people and to have a greater effect on wild animal populations, including those in protected areas, than any other wildlife activity. Likewise the trade in legally acquired wild meat (referred to as "game meat"), is a growing economic activity in the region, but its interface with the more informal and largely illegal bush meat utilization and trade industry remains poorly understood.

More high profile African wildlife issues have long overshadowed bush meat utilization. To date, most research on this topic has been carried out in the lowland forest areas in West and Central Africa. Collectively, this body of knowledge has inadvertently created the perception that use of bush meat is a tropical forest-related phenomenon, and that it is not a significant conservation, economic or cultural issue in the non-forested areas of eastern and southern Africa. While some research has been conducted within the region, it does not appear that the resulting information has influenced natural resource management, biodiversity conservation or rural development policies and programmes to any appreciable extent. Indeed, many important policies and activities continue to be promoted and implemented without fully understanding the essential socio-economic and conservation impacts of bush meat utilization.

Expanding human populations, increasing poverty and malnutrition throughout the region have resulted in many communities struggling to eek out a living. In this context, people are increasingly relying on what naturally occurs, with the meat from wildlife thought to be one of the primary resources being exploited. As such, depletion of wildlife valued as a source of meat is likely to have a negative impact on food security, and the livelihoods and nutritional status of many local communities. This represents a serious challenge for community development. Without the bush meat contribution to local economies and family stew pots, it can be expected that the standard of living of a large number of people will decrease even further. At the same time, demand for bush meat may be contributing significantly to recorded declines in wildlife populations, thereby representing a serious conservation challenge for natural resource managers.

Economic and social values associated with the meat of wildlife do, however, provide a persuasive argument for ensuring sustainable use and conservation. While degradation of habitat is perhaps the greatest cause of wildlife depletion in rural communal areas, there are good reasons for conserving such habitats, and promoting sustainable use of wildlife within these areas. The benefits, both nutritional and financial, should serve to generate interest among local communities in conservation and management, so that the bush meat resource will continue to yield rewards.

In some countries, this approach has been formalized in wildlife policy that promotes the legalized utilization of game meat through ranching/farming, cropping/culling, problem animal control and licensed hunting. The increased value associated with wildlife achieved through these formal game meat use mechanisms, together with greater ownership, accountability and responsibility for the resource, could result in its increased regulation and management by landholders. Game ranching and farming has the potential to provide greater incentives for landholders to invest in the future of wildlife, and cropping, culling and licensed hunting can result in increased direct benefits to communities living near wildlife. Where high return uses of wildlife such as non-consumptive tourism and safari hunting are not feasible, game meat values may provide enough of an incentive through sustainable harvesting to maintain the wildlife resource in such areas.

Unfortunately, however, many policy, marketing, and external restrictions exist in relation to formal supply mechanisms, limiting their potential for maintaining wildlife populations through sustainable use of game meat. Furthermore, it is important to note that the demand for bush meat, or the illegal off-take of bush meat, may place increasing strains on all formal game meat supply mechanisms. Inter-relationships exist between the legal and illegal harvest and trade in meat, and these relationships need to be addressed for formal sector industries to reach their full potential. At the same time, it will be essential to ensure that their existence does not adversely catalyze illegal unsustainable bush meat utilization.

There is a critical need to better understand wild meat utilization and trade in the eastern and southern African region. In early 1997, TRAFFIC East/Southern Africa initiated an 18 month review of the informal and formal trade and utilization of wild meat in seven countries. Chosen for their diversity and range of utilization programmes, these countries were Botswana, Mozambique, Zimbabwe, Zambia, Malawi, Tanzania, and Kenya. Specific objectives of the study included documenting the parameters of legal and illegal utilization of wildlife meat, its economic value to rural communities, and the impact on protected areas and species valued as a source of meat. The survey also entailed a review of legislation and regulatory measures, trade volumes, and trade routes as well as a variety of social and economic factors related to trade and utilization.

The results of this survey are presented in this document. Country overviews documenting the main parameters and dynamics of game meat and bush meat utilization within each of the project's target countries are provided together with a regional discussion on wild meat utilization.

METHODS

The project entailed three phases that included: 1) literature review; 2) consultation with experts and field research in each country; and 3) analysis and compilation of results. The three phases of the study are outlined below:

Phase I - Literature review: During the first phase of the project, an international and regional literature search was conducted to identify published and "gray literature" pertaining to wildlife and natural resource utilization (both commercial and subsistence), rural development, food security and cultural anthropology. The international literature search was conducted from London, United Kingdom. Although particular attention was placed on literature referring to the seven target countries, key references were also included from the rest of Africa and, where appropriate, elsewhere in the world.

Within the study countries, relevant literature and on-going projects were identified. The search also entailed visits to conservation experts, wildlife authorities, national libraries, NGOs, and conservation and community development projects, to identify and obtain pertinent documents. References were compiled into an annotated bibliography using *Papyrus* software enabling ready access via key word or author searches.

Phase II - Consultations and field research: This phase entailed an assessment of each country to determine the key parameters of the formal and informal meat trade, and to develop a field research design structure to ensure that important themes were investigated. Baseline surveys were then conducted on selected areas of formal game meat and informal bush meat utilization. There was a strong focus on obtaining baseline data on illegal/informal bush meat utilization due to the information void on this subject in the region.

In-country consultants carried out additional literature searches on the formal game meat industry, and in selected countries undertook baseline data collection. A total of 11 baseline surveys were conducted on formal game meat supply activities in seven countries.

Focal case studies were also undertaken on informal/illegal bush meat utilization and trade in all seven target countries. Thirteen surveys in total were implemented. Surveys were conducted over periods ranging from five to 12 months and focused on community use of a wide variety of bush meat species ranging from the less renowned insects, rodents and birds, to the higher profile plains game, and charismatic species such as elephant and Cape Buffalo. These surveys targeted communities living in rural communal areas, and near buffer zones surrounding protected areas. In addition, urban centers were examined in order to better understand the commercial trade in bush meat.

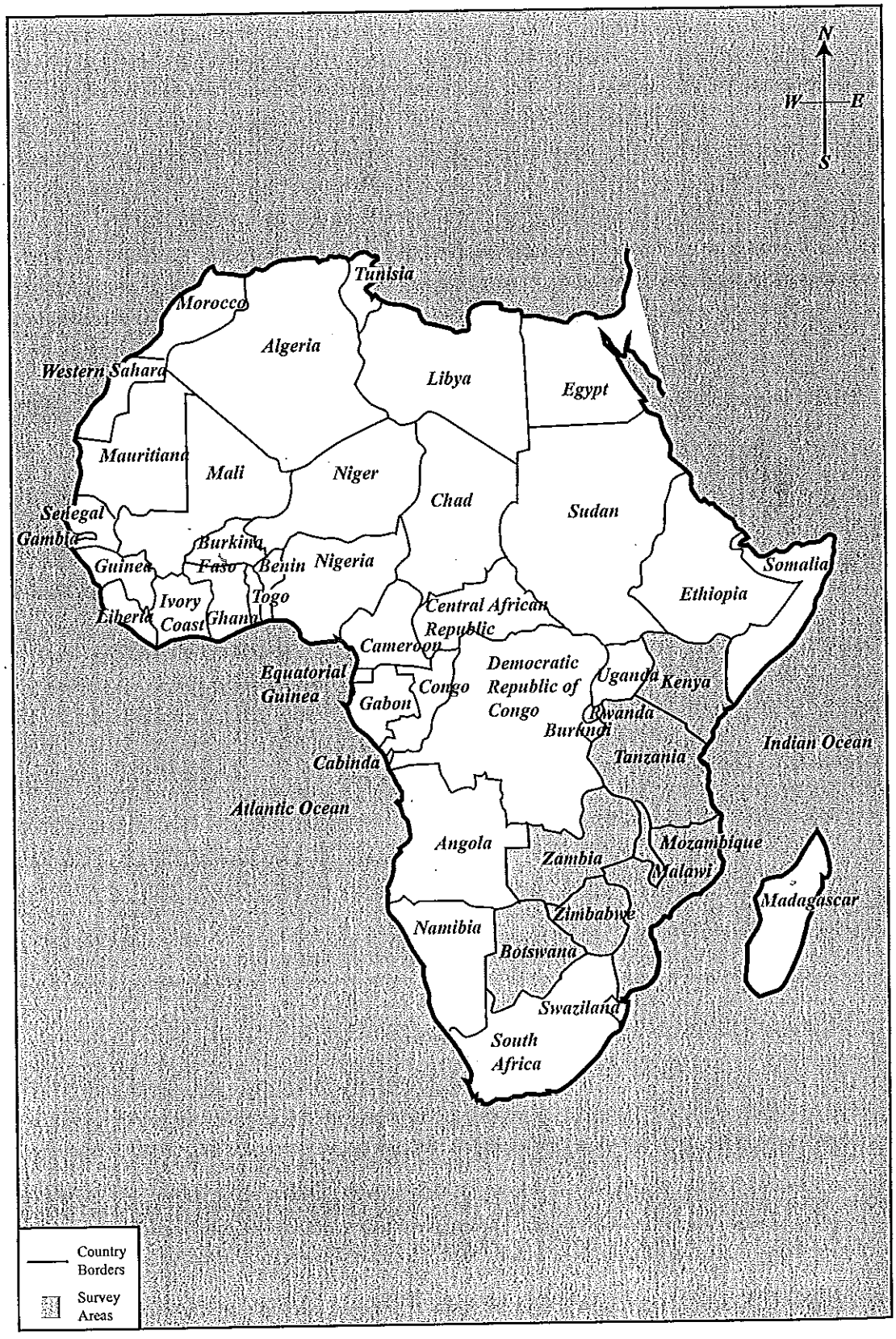
Field research teams consisted of between six to 12 locally-hired enumerators supervised by a research coordinator based in country. Due to the illegal nature of bush meat utilization and the overwhelming reluctance by many communities to reveal information about use for fear of law enforcement reprisal, local enumerators of the same ethnicity and living within the survey area were selected to obtain data. In all cases, local coordinators closely supervised enumerators. Training workshops were held and identification manuals provided to ensure accurate recording of species..

Standardized questionnaires were used for all surveys, and were in some cases modified after pre-testing in the field. Four separate questionnaires were developed to record data from bush meat traders, hunters, subsistence consumers and buyers. In some surveys single research interviews were conducted, but in the majority, repeat survey interviews were conducted over the duration of the study period in order to obtain accurate seasonal data on bush meat utilization and trade.

Phase III - Information analysis: Following submission of reports generated during the baseline surveys and focal case studies, data were analyzed and compiled in a final overview report. Information sourced from the baseline surveys has been referenced with a prefix "T" for TRAFFIC East/Southern Africa followed by the consultant's surname. Annex I to this report provides a reference list for all surveys implemented during this project.

Urban bush meat market.
Rob Barnett-TRAFFIC

AFRICA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Mozambique
Malawi
Madagascar
Zimbabwe
Namibia
Botswana
Swaziland
South Africa
Country Borders
Survey Areas

CHAPTER ONE
REGIONAL OVERVIEW ON WILD MEAT UTILIZATION

I. LEGAL GAME MEAT PRODUCTION IN THE EAST AND SOUTHERN AFRICA REGION

In the eastern and southern Africa region game meat is legally produced from game ranching and farming, large-scale and community-based cropping schemes, ecological culling programmes, resident and safari licensed hunting, and from problem animal control measures. Game ranching is a loose term embracing many different types of utilization of varying intensities (Luxmoore, 1985; Sommerlatte, *et al.*, 1989), conducted on either privately-owned or leased land (Kiss, 1990). Game ranching is the husbandry of presently wild animals for the same purpose as conventional livestock ranching, i.e., the production of food and utilities as a means of occupancy of land by man. Game ranching is defined by Conroy and Gaigher (1982) as the "economic use of game within the farm confines". In contrast, game farming is the concentrated breeding of wildlife species under actively-managed enclosures, involving a greater level of intensive management on a sustained basis (Eltringham, 1994). Large-scale and community-based cropping schemes involve the management of free-ranging wildlife populations located in less controlled or fenced communal land areas of the region, but are similar to that of "game ranching" on private lands in that these schemes are based on sustainable harvesting criteria where a proportion of a wildlife population is cropped at regular intervals (usually once a year) for the sustained production of game meat.

Both game ranching on private lands and cropping schemes on communal lands are used as an ecological management option. Wildlife populations are kept at optimum levels to ensure that wildlife habitat is not degraded due to excessive numbers of animals over and above the sustainable carrying capacity of the land. Wildlife populations within protected areas often require management to control their numbers, especially in national parks where fences or human populations surrounding the area confine wildlife. Ecological culling in protected areas occurs infrequently when the need arises, but in most cases meat derived from culled animals is distributed and utilized by local communities. Such culling is primarily management motivated, whereas game ranching and cropping schemes are in most cases orientated towards game meat production. Hence, game meat from ecological culling in protected areas is seen as a beneficial by-product. Game meat from other legal game meat production systems such as safari hunting and problem animal control can also be regarded as a beneficial by-product. In safari hunting, the primary use of animals is for their trophy value, and in problem animal control the predominant motivation is to reduce human-animal conflict. Although not the primary motivation, game meat produced as a by-product is still valued. In contrast, resident licensed hunting is increasingly motivated for the supply of game meat, with the sport hunting value of lesser concern.

Since the pioneering work of Mossman and Dassman (1962), game meat production systems through wildlife ranching and cropping/culling have been heralded as a more suitable land use option within the semi-arid and unproductive areas of the region. Semi-arid rangelands occupy almost two-thirds of the total land area of Africa (Walker, *et al.*, 1987; WRI, 1994) and are home to a large, and rapidly growing, human population. The ecology of these areas is largely determined by climate, and the overriding feature is low and generally unreliable rainfall leading to limited soil and vegetative productivity. This limits agriculture as a viable form of land use (Macnab, 1991). Much of the area is marginal or sub-marginal from the standpoint of domestic livestock production, and the productivity of the land is not maintained when grazed by livestock (Talbot, 1966; Happold, 1995). A general increase in human populations has forced people to live in semi-arid areas on a permanent basis and, in some countries within the region, rangelands are used to resettle excess populations from arable regions. Domestic livestock numbers have increased as a result of modern husbandry methods such as artificial water points allowing year-

round grazing and campaigns against the tsetse fly (Walker, 1979). Traditional agricultural practices in semi-arid environments also result in land degradation (Child, 1990).

Attempts to boost domestic livestock production under these adverse conditions have largely been confined to finding the domestic species most closely suited to the conditions, and attempting to improve local conditions to meet their requirements (Walker, *et al.*, 1987). These improvements have included controlled burning and associated controlled grazing techniques, but in general increasing productivity in ecologically fragile areas remains problematic. Rather than attempt to adapt the range to conventional livestock, it has been suggested since the 1960s that it would be better to look for livestock better adapted to existing conditions (Macnab, 1991). Over much of the world, and especially east and southern Africa, such livestock was felt to exist in the form of indigenous wild animals (Eltringham, 1994). Ecological studies supporting the view that indigenous wild ungulates use rangeland resources more efficiently than introduced livestock species are numerous.

Comparisons between domestic livestock and wild ungulates indicate a number of differences pertaining to a variety of factors. Wildlife species are more efficient users of local vegetation (Taylor and Walker, 1978; Skinner, 1971; Mentis, 1977; Bigalke, 1982; Catto, 1976). Wildlife exhibits superior physiological adaptation to the environment (Taylor, 1974; Hopcraft, 1981), can maintain superior standing crop and carrying capacity (Mentis and Duke, 1976; Luxmoore, 1985; Rowe, 1984), and has more resistance to disease (Walker, 1979; Luxmoore, 1985). Wildlife also has a superior potential productivity in terms of reproductive rates and growth rates (Skinner, 1971; Walker, 1979; Child, 1990) and overall increased meat production potential (superior carcass dressing out proportions) (Dasmann and Mossman, 1960; Talbot, 1963; Dasmann, 1964; Roth, 1966; Talbot, *et al.*, 1965; Brown, 1963, Walker, 1979; Eltringham, 1984; Child, 1990; Macnab, 1991; Eltringham, 1994; Cooper, 1995). In addition, game meat is nutritionally superior and contains far less fat (Eltringham, 1984), with ungulates yielding greater amounts of edible protein per unit of live weight than domestic animals (Ledger, *et al.*, 1967). Crawford *et al.* (1970) revealed that the fat content of the carcass is 7.7 times greater in domestic than wild animals, and concluded that humans would be healthier eating wild meat over domestic meat. In terms of production and quality of meat product, wildlife is generally accepted to be superior, but the countries of the region still rely heavily on expensive imported foodstuffs that are in most cases less nutritious (IUCN, 1981).

Over the years proponents have expounded on the virtues of wildlife utilization for greater meat production potential and its multi-use aspects as providing the ideal solution to effecting wildlife conservation and combating environmental degradation on a wide scale throughout the semi-arid rangelands of the region. However, the fundamental prerequisite for beginning to achieve the economic and environmental benefits of utilizing wildlife can only be realized by those peoples who have long term ownership of the lands and resources they presently derive a living from. When land tenure is unstable, the first option is to pursue extractive use so that short-term gains are achieved, and in these cases livestock and even agriculture offer the most efficient production systems for achieving these goals.

As such the land tenure issue has been largely responsible for contributing to the development of wildlife ranching on private lands where tenure is secure, and wildlife cropping schemes on communal lands where tenure is less defined. Consequently, wildlife ranching and the commercial utilization of wildlife have only been undertaken in areas of the region in which ownership of the resource is secure thus laying the necessary foundations for persuading landowners to invest in the sustainable productivity of their land for greater benefits to be realized in the future. The advantages of wildlife utilization for increased and more efficient meat production, and the potential options it provides for alternative, more sustainable and profitable land uses, have not reached the rural African population living in loose tenure arrangements in the semi-arid rangelands to the same extent as large private ranchers.

A limited number of community-based cropping and culling schemes have been initiated which are trying to remedy this situation, but are still largely regarded as pilot initiatives, and require in most cases the managerial and technical support of external agencies such as government institutions and NGOs.

The formal game meat industry remains underdeveloped when compared to its potential, but when combined with non-directed game meat production systems, overall supply in the seven countries studied is still substantive and estimated at 8,449 mt per annum of game meat produced at an economic value of USD 7,698,224 (refer Table 1). Together these production mechanisms can contribute effectively to meeting the social objective of poverty alleviation, and in increasing food security and the nutritional status of many of the region's people.

Table 1

Regional overview of estimated annual game meat production

	Game Ranching		Cropping		Safari Hunting		Resident License Hunting		Problem Animal Control	
	Quantity (mt)	Value (USD)	Quantity (mt)	Value (USD)	Quantity (mt)	Value (USD)	Quantity (mt)	Value (USD)	Quantity (mt)	Value (USD)
Botswana	17.9	91,982	251	213,350	321	272,595	1,423	1,209,720	114	5,865
Mozambique	0	0	0	0	102	78,386	198	152,152	0	0
Zimbabwe	2,413	1,771,248	0	0	512	117,760	0	0	0	0
Zambia	39	78,400	516	1,031,400	138	275,200	138	276,200	144	288,000
Malawi	3	9,000	0	0	0	0	12	22,819	139	92,533
Tanzania	0	0	417	423,600	308	255,474	346	287,097	211	175,047
Kenya	556	554,826	0	0	0	0	2.8	4,648	127	10,922
Total	**3,029**	**2,505,456**	**1,184**	**1,668,350**	**1,381**	**999,415**	**2,120**	**1,952,636**	**735**	**572,367**
Total quantity of game meat produced:			**8,449 mt**							
Total value of game meat produced:			**USD 7,698,224**							

Source: TRAFFIC survey data, 1998

In addition, game meat plays a critical role in community-based wildlife management. Throughout the region, wildlife management decision and policy makers have recognized that without the support and participation of rural communities who live with wildlife resources, little progress will be made towards attaining the balance between sustainable use and conservation. To this end, policy has been increasingly directed at the devolution of more wildlife benefits to rural inhabitants with the aim of changing current negative attitudes toward wildlife. Game meat in many cases represents one of the most direct and tangible benefits that many communities receive from wildlife, and as such has contributed extensively to promoting wildlife as a valued resource.

Although the economic value of game meat is low, it provides benefits beyond its cash value. Distributed to low-income families unable to afford domestic meat, or in areas where trypanosomiasis and tsetse fly have reduced alternative domestic meat supply, game meat can be a welcomed source of protein otherwise not available. Formal compensation for wildlife-inflicted damage to property or life in all cases consists of game meat derived from culled problem animals. Further, devolving greater proportions of financial revenues from lucrative use options such as safari hunting to rural inhabitants has been problematic in some community-based programme areas. In such cases, meat supply from directed cropping, or as a by-product from licensed hunting or problem animal control, represents the bulk of wildlife benefits accrued. Hence, legally supplied game meat is an important resource and mechanism for attaining greater community wildlife management that currently is not being fully utilized, with a considerable degree of wastage occurring through ineffectual meat distribution from the various legal supply mechanisms.

Game Ranching and Farming

Game ranching within the region was founded on the meat production potential of wildlife (Child, 1988b; Child, 1993a). In theory such potential was believed to be substantial and based primarily on the principle that wildlife had evolved in the African environment over many millions of years, and hence was better suited to its conditions than domestic livestock introduced in relatively recent times. Physiological superiority, and the efficient use of all components of the habitat by a range of wildlife species adapted to a particular niche, suggested that wildlife had the potential to be a more efficient and sustainable land use option in semi-arid habitats (Pinchin, 1992). The east and southern Africa region was well suited to the promotion of game ranching, with extensive ungulate populations occurring over large areas of suitable semi-arid rangeland where agriculture, it was hoped, could not compete with wildlife production (Parker, 1977b). Demand for the wildlife products, especially meat, was believed to be extensive. Increasing human populations throughout the region, coupled with a traditional demand and decreasing food security status of many resulted in a substantive market for game meat.

Initial enthusiasm within the study countries was extensive, and early attempts at realizing the potential meat production and value of sustainably harvested wildlife was mainly focused in Zimbabwe (Rossyln Ranch, Henderson Ranch) but also in Kenya (Kekopey) during the 1960s (Child, 1988a; Blankenship, *et al.*, 1990; Child, 1993b). Such initiatives were based primarily on meat production. In practice, however, it soon became apparent that harnessing the theoretical advantages of wildlife meat production were not as straightforward as previously thought (Child, 1988b; Dean, 1990; Cumming, 1990b). Policy and legislative restrictions were in part responsible for the early failures (Muir, 1989; Peters, 1993). Excessive veterinary and health regulations imposed on the processing and marketing of game meat and a general lack of support from government, as was being provided to other agricultural and livestock land uses, reduced the viability of wildlife meat production (Walker, 1979; Woodford, 1989; SADCC/ GTZ, 1989; Pitman, 1990; Child, 1990). Also, problems were encountered in efficiently harvesting a resource that by its nature was free-ranging and in contrast to domestic livestock could not be corralled (Swank, *et al.*, 1974; Eltringham, 1984), and there was a lack of adequate market research in identifying suitable markets for meat and its effective distribution and sale (Skinner, 1971; Muir-Leresche, 1987; Pitman, 1990; Bond, 1993; Hill, 1994). Wild meat was also a low priced product resulting in limited revenues; large quantities of meat were needed and had to be marketed frequently in order to obtain sufficient returns (Jansen, *et al.*, 1992; Hill, 1994).

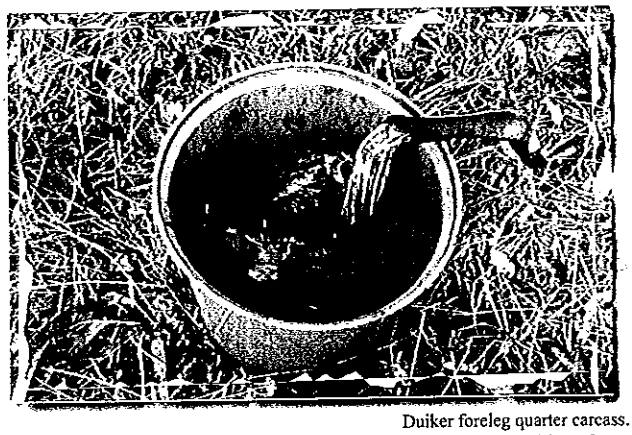
Experiences and lessons learned by the early pioneer ranches in Zimbabwe and Kenya and from large-scale cropping schemes undertaken extensively throughout the region, generally concluded that wildlife ranching for game meat production alone resulted in insufficient returns to justify wildlife management as a land use option (Luxmoore, 1985; Child, 1990). Hence, during the 1970s and into the 1980s the initial enthusiasm for game ranching waned, and expansion of the industry was further restricted by lack of necessary policy and legislative change that would enable ownership of wildlife on private land or a greater devolution of wildlife user rights to land owners. Such restrictions were largely responsible for game ranching not being attempted seriously in many countries such as Tanzania and Mozambique. Experiences from South Africa, and increasingly from game ranches within the countries studied, led to the recognition that wildlife management could only justify itself as a feasible land use option if the variety of its uses were fully utilized rather then relying purely on meat production (Eltringham, 1984; Goodman, 1992; Berry, 1986). The mixed production of wildlife and domestic livestock on a ranch could result in satisfactory financial returns that justified keeping wildlife on the property (Conroy and Gaigher, 1982). In addition, by incorporating all the wildlife utilization options ranging from photographic tourism, safari hunting, resident hunting and game meat production, the total value of wildlife was increased considerably (Walker, 1979). This multi-use approach was facilitated in countries such as Zimbabwe and Botswana, with the introduction of safari hunting on

private lands that provided a lucrative wildlife use option to game ranches (Cumming, 1988; Child and Child, 1986). In Zimbabwe where devolution of wildlife user rights by private land holders had been fully incorporated into legislation, the result was a rapid expansion of the game ranching industry due its increased financial viability when fully incorporating the large variety of consumptive and non-consumptive wildlife use options in ranch management (Bond, 1993; Murphree and Cumming, 1993).

Currently, the wildlife ranching industry in the countries of this study still reflect the wildlife multi-use and mixed farming approach, with no ranches relying solely on game meat production. In Zimbabwe, although many ranches have totally replaced livestock and other land uses with wildlife, this has been achieved by harnessing the broad range of consumptive and non-consumptive wildlife use options. Ranches in Botswana and Zambia also rely on the full range of wildlife use options ranging from resident hunting especially, but also safari hunting, photographic tourism and meat production. Even in Kenya, where policy and legislation have severely restricted the consumptive wildlife use options available to game ranches to that of game meat production alone (and to a negligible extent licensed bird hunting), no ranches rely solely on game meat for financial sustainability. Ranches in Kenya rely on mixed domestic livestock ranching and a few on revenues obtained from non-consumptive photographic tourism.

Meat production, however, does play an increasingly critical role in the overall financial viability of many ranches, and results in the majority of legally supplied game meat within the countries studied. Although other wildlife use options such as safari hunting result in the greatest economic return per animal; such use is restricted to only a small proportion of all available wildlife species on a ranch such as male trophy animals of particular preferred species such as Cape Buffalo. Berry (1986) revealed that in three ranching areas of South Africa, when considering total wildlife populations, game meat production could result in the greatest overall profit because it utilized all species. In addition, game meat production is associated with smaller set up costs in comparison to safari hunting, and does not require the high levels of marketing and business skills associated with this highly competitive market. Hence, game meat production in many cases has the potential to be the primary use option for many ranches that do not have the species composition, capital or management expertise needed for other use options such as licensed hunting and photographic tourism.

Game ranching for meat production within the countries studied is largely restricted to the countries of Zimbabwe, Kenya, Zambia and Botswana. Zimbabwe has by far the largest game ranching sector in the countries of the study. It is well developed and has expanded due to the conducive policy and legislation within the country that has effectively devolved wildlife utilization rights to private landowners. Ranches, whether they are mixed (wildlife and domestic) or purely wildlif-based recognize the important contribution that game meat production and sale provides to the overall viability of their ranch. Regular ecological cropping of species such as Impala, which have a smaller market for more lucrative use options such as safari hunting, occurs for meat production which in many cases results in substantive revenues. Meat derived from resident or safari hunting is also effectively utilized and sold resulting in large total annual game meat quantities produced and marketed. Small and large ranches efficiently utilize all meat, although veterinary and health restrictions on the movement of game meat within Zimbabwe have resulted in most ranches marketing locally and at reduced prices.



Duiker foreleg quarter carcass.
IUCN Mozambique

Ranches in Zimbabwe have, however, adapted well to these marketing restrictions and developed extensive local markets that often involve "value added" processing and increased revenues through the sale of processed game meat. All meat products are utilized, with offal and bones being used as animal feed, and other cuts sold locally to restaurants, hotels, lodges and staff canteens. The industry is extensive, with game meat production and sales contributing significantly to the sector's development. Monitoring of the industry prior to this study, however, and documenting the role it plays in generating national revenues, has not occurred. Although a Wildlife Producers Association plays an active role in providing technical assistance to the game ranching industry which entails advising on cropping, processing and marketing aspects, quantities of game meat cropped and utilized are not monitored, and as such government policy has not been directed by an increased awareness of the significant contribution that the industry is believed to contribute to national revenues.

As seen in Table 2, game ranching in other countries of the study has not developed to the same extent as Zimbabwe. Kenya produces the next largest quantity of game meat from ranching, but the game ranching industry remains under-developed and restricted by a lack of permanent devolution of wildlife

Table 2

Regional overview of estimated annual legal game meat production from game ranching

Country Prioritized	Production (mt)	Value (USD)	Contribution to National Game Meat Production (%)	Main Characteristics
1. Zimbabwe	2,413	1,771,248	55.4%	1) developed industry; 2) conducive wildlife policy and legislation; 3) active Wildlife Producers Association; 4) meat production plays important role in overall viability of ranches; 5) meat sales mainly local; 6) meat revenues restricted by veterinary/health restrictions; 7) limited monitoring.
2. Kenya	556.5	554,826	94%	1) main legal game meat supply; 2) ranching based on pilot programme; 3) restrictive policy and legislation; 4) few consumptive use options; 5) game meat main legal use; 6) non permanent devolution of wildlife user rights; 7) limited investment in sector; 8) prohibitive and misdirected marketing policy; 9) game meat marketing constraints; 10) limited use of allocated quotas; 11) under-achievement of potential; 12) good monitoring sytem of use in comparison to other countries.
3. Zambia	39	78,400	4%	1) limited supply; 2) not actively supported; 3) non-existent monitoring from wildlife authority and Wildlife Producers Association; 4) game meat revenues restricted by excessive veterinary/health restrictions; 5) limited wildlife user rights; 6) non-conducive legislation and policy.
4. Botswana	17.9	91,982	4.5%	1) confused understanding of policy and legislation; 2) need for fenced properties has reduced investment in sector; 3) large distances between ranches and markets; 4) veterinary/health movement restrictions have reduced game meat revenues; 5) sector under-developed; 6) limited monitoring.
5. Malawi	3	9,000	9.9%	1) negligible supply; 2) lack of ungulate stocks and land areas required for industry
6. Mozambique	0	0	0	1) negligible supply; 2) non-conducive land tenure and wildlife ownership policy and legislation; 3) no security for long term investment in sector.
7. Tanzania	0	0	0	1) no supply; 2) non-conducive land tenure and wildlife ownership policy and legislation; 3) no security for long term investment in sector.
Total	**3,029.4**	**2,505,456**		

Source: TRAFFIC survey data, 1998

user rights to private landholders that has limited investment in the sector. The industry relies primarily on meat production due to Kenya's restrictive consumptive use wildlife policy, which does not allow the use of safari hunting as a wildlife use option, as opposed to Zimbabwe, Botswana and Zambia, where it is the mainstay of successful ranches. Restrictions are also imposed on the processing and especially the marketing of game meat, which includes excessive veterinary and heath regulations, the sale of game meat to authorized retail outlets only, and the prohibition of any advertising or promotion of game meat. The marketing strategy of targeting high-value human consumption and low-value animal feed markets which has been partly imposed by policy but also by ranches themselves, has led to under-achievement of potential meat revenues. The poor financial viability of ranching in Kenya based mainly on game meat production has resulted in only half of all available cropping quotas being effectively utilized.

The Zambian game ranching sector is also under-developed with little active support provided by government. Devolution of wildlife user rights involves limited extension of wildlife custodianship to private landholders. Existing wildlife policy and legislation has not actively promoted the industry, with monitoring and regulation being non-existent reflecting the general lack of importance associated with the sector. Excessive veterinary and health regulations on the processing and marketing of game meat have also restricted revenues accrued. Such restrictions have also been largely responsible for reducing game meat revenues on ranches in Botswana, where veterinary cordon fences have restricted the movement of ranch-produced game meat to more lucrative urban markets of the country. Devolution of commercial wildlife user rights is restricted to those ranches that have erected game-proof fencing, and a general confusion surrounding wildlife utilization policy in Botswana has resulted in little investment in the game ranching sector, and hence its under-development. Game ranching and game meat production sectors in Kenya, Zambia and Botswana have been inhibited in reaching their full potential by government policy and legislation and resulting restrictions imposed on the effective processing and marketing of game meat. In Mozambique and Tanzania government support to game ranching is almost totally lacking, with necessary changes to land and wildlife ownership legislation not being formulated to allow for the establishment or development of game ranching. The Malawi ranching sector has been severely constrained by the lack of large resident ungulate populations and uninhabited areas that are required for successful meat production on the scale required.

The potential for game ranching and meat production throughout the target study countries is extensive, but with the exception of Zimbabwe has not been realized due to restrictions imposed on the effective processing and marketing of game meat. In all countries government policy is still firmly focused on alternative land uses such as agriculture and livestock production, which receive substantial aid in the form of government subsidies, price controls and market protection through import tariffs. In contrast, game ranching has received no such assistance. Lucrative duty free European Union markets accessed through the EU/Lome convention have also been largely responsible for the establishment of veterinary and health restrictions on the movement of game meat and wildlife to ensure disease-free domestic meat. In Zimbabwe and Botswana, zoning of the country between wildlife and domestic livestock has severely impacted the movement and marketing of game meat. Health restrictions have also impacted heavily on the ability of game ranches to access the lucrative international game meat markets, with approved abattoirs necessary for processing often lacking. Customs categories for game meat are non-specific and generally included within domestic meat definitions. Hence potential for monitoring game meat exports is not possible.

Agreements such as the EU/Lome convention are not likely to continue indefinitely and the continuing promotion of agriculture and livestock production at ever increasing and unsustainable levels in unproductive and unsuitable semi-arid rangelands is resulting is severe land degradation. Together with a general dynamic within the region of increasing human populations and decreasing standards of living, the role that game ranching and meat production can play to the sustainable development of the

region has increased. For the industry to live up to this challenge, development of conducive policy and legislative frameworks in each country is required. These should include the permanent devolution of wildlife ownership and user rights to private landholders, and a greater level of government support in line with that currently obtained by alternative land uses. Wildlife producer associations should be actively promoted to develop strategies to increase the effectiveness of game meat cropping, processing and particularly marketing, and also to develop monitoring systems that are currently lacking in most countries.

Game farming has been less inhibited by a lack of support from government due mainly to the intensive nature of crocodile and Ostrich farming, which is predominantly conducted in the countries of this study. Meat production in the past has mainly been viewed as a by-product to more lucrative products such as skin. In the crocodile farming sector, meat is mainly fed back to crocodiles as feed, although in the past few years declines in world skin prices have increased the importance of meat revenues. In Zimbabwe, crocodile meat for the human market is increasingly being seen as an important revenue source. Ostrich farming for meat production is also a lucrative industry that has been promoted by accessing high-priced international markets in Europe. Meat now represents a large proportion of revenues earned in contrast to the past where the industry mainly relied on skin and feather sales. In the rest of the countries studied, game farming of crocodiles and Ostriches is limited with in most cases returns found to be elusive. Farming of suitable species such as Cane Rat and hyrax does, however, have considerable potential as a community-based natural resource management programme activity for contributing to community development and food security status of rural peoples in communal lands. In Tanzania and Malawi, the farming of species such as guinea fowl is gaining greater acceptance among communities and is likely to expand.

Cropping and Culling

The cropping and culling of wildlife populations has always been an integral component of wildlife management (Bindernagel, 1975). Since colonial times large-scale culling of wildlife populations for the control of tsetse fly resulted in the supply of huge quantities of meat (Child, 1970). Policy at the time, especially in Mozambique and Zambia, recognized the meat protein value deriving from such disease control culling schemes, and meat was effectively distributed to local communities. With the advent of other control mechanisms, such as fencing and zoning of large areas of the country to keep wildlife and domestic livestock separate, aerial insecticide spraying and insect trapping, large-scale culling to control disease began to be replaced by sustainable cropping for meat production by the 1970s (Eltringham, 1984). For example, game meat production in Zambia in the 1960s and 1970s resulted in many large-scale cropping schemes that were based on sustainable harvesting criteria and aimed at making game cropping for meat production economically viable (Field, 1974; Ecosystems, 1980).

In Mozambique, large scale Cape Buffalo cropping was undertaken in the Marromeu complex during the late 1970s with the primary aim of providing affordable meat protein to inhabitants of an area characterized by tsetse fly and the unavailability of alternative domestic livestock meat (Bindernagel, 1980; Chambal, 1989; Rosinha, 1990). In Kenya, early experimental programmes of cropping and marketing meat were conducted under the Galana Game Management scheme in the early 1960s, and later by the UNDP/FAO-sponsored Kajiado cropping programme (Parker, 1977a; Blankenship, *et al.*, 1990). The large plains game resources of Tanzania and Zambia also attracted considerable interest in undertaking large-scale cropping. In Tanzania, such programmes occurred in the Grumeti/Ikorongo and Loliondo areas of the Serengeti ecosystem, Lake Rukwa, Yaida Valley and around Kilimanjaro (Ecosystems, 1980; Gogan, 1972; Field, 1974). In Zambia, large-scale elephant and hippo culling was conducted in the Luangwa Valley (Eltringham, 1984).

The theory that wildlife can be a source of sustainably produced game meat was well accepted, but in practice the majority of these large-scale cropping schemes failed (Bindernagel, 1975). External constraints such as the imposition of excessive veterinary and health procedures during cropping, processing, and marketing of meat, restricted the overall effectiveness of operations (Reinwald and Hemingway, 1968; Robinette and Archer, 1971). Logistical problems in ensuring adequate quantities of animals, transporting the produce to markets, and, in some cases, resistance from domestic livestock butcheries resulted in many of the schemes not attaining financial self-sufficiency. Such experiences indicate that large-scale cropping exercises requiring high off-takes and sophisticated meat processing distribution schemes were both impractical and uneconomic (Eltringham, 1984; GTZ, 1996).

Ecological culling of wildlife populations is still an important management activity in all countries of the study with the exception of Kenya. Kenya's restrictive consumptive use policies and legislation inhibit such options to the detriment in some cases of habitats. Ecological culling of excess populations in all other countries of the study is sporadic, and the infrastructure required, such as abattoirs and meat distribution centers, are often lacking. In the case of Nyala culling in the 1980s in Lengwe National Park of Malawi, and elephant culling in Chirisa Safari Area during the 1980s in Zimbabwe, poor infrastructure impeded the effective distribution of meat (Mkanda, 1991;Wasawo, 1987; Murindagomo, 1990). However, where ecological culling occurs, benefits derived from meat distribution are still an important mechanism for providing wildlife benefits to local communities surrounding protected areas.

Experience from large-scale cropping schemes undertaken in the region during the 1960s and 1970s and in more recent years from sporadic ecological culling from protected areas has resulted in the general belief that small-scale community based cropping initiatives are the best approach to ensure effective meat distribution (ITC and IUCN, 1989; MTNRE, 1995). The suitability of this approach continues to be confirmed by the remaining large-scale cropping schemes suffering the same problems in processing, marketing and distribution experienced previously. Currently, large-scale cropping schemes are conducted by the Tanzania Wildlife Corporation (TAWICO) and by the Luangwa Integrated Resource Development Project (LIRDP) in Zambia. In Tanzania, TAWICO's returns from game cropping and meat sales have been less than satisfactory due to excessive wastage, transport and marketing problems. In Zambia, LIRDP has also experienced problems with regulating the distribution of large quantities of game meat, and this has resulted in the increased commercialization of cropping. People from outside of the area consume most meat, which is against the stated aims of the scheme in providing benefits directly to resident communities.

As a result of these experiences, policy has shifted towards supporting small-scale community-based cropping initiatives. Tanzania, Zambia, Botswana and Zimbabwe presently conduct community-based cropping on an annual basis, with other countries such as Malawi and Mozambique undertaking infrequent ecological cropping in protected areas. Currently, such schemes are responsible for substantial supplies of legally supplied game meat accruing directly to rural communities (refer Table 1). Many areas in which such cropping schemes are undertaken are characterized by the prevalence of tsetse and limited availability of alternative domestic meat. Hence, game meat supply is extremely welcomed and recognized as a substantive tangible wildlife benefit by communities. Benefits derived to households from safari hunting revenues for example in CAMPFIRE communal districts in Zimbabwe

Bush pig being transported to market.
Simon Milledge-TRAFFIC

are infrequent, and sometimes insubstantial. Therefore the cumulative effect of free or subsidized game meat distribution is an important element in persuading inhabitants that wildlife is a useful resource.

Tanzania has perhaps best incorporated community cropping schemes and meat distribution into current wildlife policy, with three large conservation and development programmes currently including cropping in their activities. Other private initiatives such as the Cullman and Hurt Wildlife Project, sponsored by a private safari hunting company, also rely on small-scale cropping quotas for increasing benefits to rural communities in hunting concession areas. Community-based cropping schemes as conducted in villages surrounding the Selous Game Reserve in Tanzania have been very successful in deriving social and financial benefits from quota allocated wildlife, and these schemes constitute the bulk of all wildlife benefits communities receive. The Selous Conservation Programme is perhaps the exception where communities themselves set prices for meat and revenues are controlled and managed directly by communities for village development projects. Prices set by villages are generally higher and resulting revenues much larger when compared to other community-based cropping schemes where meat distribution generally meets a social objective such as providing meat at cost. In the CAMPFIRE communal districts of Zimbabwe and the community quota allocated districts of Botswana, for example, meat is distributed for free or at very low prices that only just cover cropping and distribution expenses. Community management of these cropping programmes is limited and schemes are generally undertaken with external NGO support. The free distribution of meat results in schemes not being self-financing as is the case with the Selous Conservation Programme in Tanzania.

Although substantive progress has been made in increasing the efficiency of cropping and meat distribution through greater use of mobile abattoirs, creation of extensive meat distribution networks and general improvements to the processing and marketing of game meat as exemplified in the Omay communal district of Zimbabwe, problems with equitable distribution of game meat and the sustainability of such schemes are still apparent. Often meat distribution is less than equitable with certain communities or individuals receiving larger shares and others none. Low prices of game meat have also led to the commercialization of cropping with meat often being purchased by outsiders for resale outside of the local area for cash profits and hence defeat the social objective of providing nutrition to local inhabitants. These are key problems being faced by schemes conducted in communal areas of

Table 3

Regional overview of estimated annual legal game meat production from cropping

Country Prioritized	Production (mt)	Value (USD)	Contribution to National Game Meat Production (%)	Main Characteristics
1. Zambia	515.7	1,031,400	52.6%	1) large supply but increasingly commercialized; 2) most benefits accrue outside of area; 3) limited capacity to regulate; 4) inequitable distribution; 5) meat subsidized although results in substantial revenues due to large quantities.
2. Tanzania	417	423,600	37.1%	1) meat generally sold at subsidized prices; 2) greater revenue obtained in Selous areas; 3) important wildlife management option; 4) facilitated by large wildlife resource base; 5) quotas not fully utilized due to logistical constraints.
3. Botswana	251	213,350	10.5%	1) important use option for communities due to limited domestic meat availability in tsetse areas; 2) subsidized price or free; 3) non self-financing; 4) inequitable distribution.
4. Zimbabwe	0	0	0	1) supply restricted to communal districts with large numbers of suitable species; 2) meat subsidized; 3) important in few districts; 4) increasing efficiency in processing and equitable distribution.
Total	**1,183.7**	**1,668,350**		

Source: TRAFFIC survey data, 1998.

Zimbabwe, in the Luangwa Valley and Bangweulu wetlands of Zambia, and in the quota districts of Botswana where wildlife quotas are allocated.

Legal game meat supplies from such schemes are sometimes used as a cover for the sale of illegally obtained bush meat. Proponents of community-based cropping schemes believe that the increased availability of game meat supplied at prices lower than that of illegal origin will result in a reduction in illegal off-take. However, the limited quantities supplied, extensive demand, and the existence of social factors that motivate illegal hunting, have sometimes yielded limited positive impacts. Game meat derived from community cropping schemes contributes importantly to many communities' household food security, nutritional and economic status, but efforts are required to increase quantities supplied through more effective and equitable distribution, as well as increasing the level of community management of such schemes.

Licensed Hunting

Safari Tourism Licensed Hunting: Safari hunting is an important wildlife use option. It provides a lucrative land use option in areas that are generally less suitable for photographic tourism, because they are unscenic or lack the variety of species that are required to attract non-consumptive visitors (Winter, 1991; Edwards and Allen, 1992; Leader-Williams, *et al.*, 1995). In most countries, safari hunting contributes significantly to national as well as wildlife authority management revenues (Taylor, 1993; Murphree, 1994). Countries such as Tanzania, Zambia, Zimbabwe and Botswana rely heavily on the financial benefits that the industry provides through high-priced hunting fees, and the add-on benefits accrued through employment and external spending within the country.

In such countries, provision has been made to channel more of these revenues directly back to wildlife authorities for management of the resource. This has happened in the Selous Game Reserve in Tanzania under a "Retention Scheme" where a proportion of safari license fee revenues are retained for wildlife management, in Zambia where a considerable proportion is retained within the Zambia Wildlife Authority controlled Wildlife Conservation Revolving Fund, in Zimbabwe where appropriate district authorities under the CAMPFIRE initiative retain the majority of revenues for wildlife management within communal lands, and in Botswana where "district allocated quotas" enable communities to retain the majority of safari hunting revenues from their allocated quota. In such countries, safari hunting is a key source of wildlife management revenue, and policy and legislation fully support the industry.

Governments and safari operators have realized that without the devolution to local communities of greater financial and social benefits from safari hunting, and a greater level of community participation in managing the resource base, illegal hunting for bush meat will continue and could endanger the future viability of the industry (Hurt and Etling, 1991; Edwards and Allen, 1992). Currently, hunting revenues are substantial, but in many cases the equitable distribution of such financial benefits to rural communities either directly as in the case of CAMPFIRE communities in Zimbabwe, or indirectly through increased community development programmes as in the case of LIRDP in Zambia, has been problematic (Jachmann, 1997). Community-based programmes undertaken directly by safari hunting companies in Tanzania (Cullman and Hurt Wildlife Project; Freidkin Conservation Fund) have, in most cases, made the most progress in distributing safari hunting benefits to communities, and in achieving greater levels of community involvement in wildlife management (Jones, 1997; FCF News, 1997; Cullman and Hurt, 1997). However, in all cases the substantial supplies of game meat derived from trophy hunted animals have not effectively been used as a major potential mechanism for providing greater wildlife safari hunting benefits to communities (ITC and IUCN, 1989; Winter, 1991; GTZ, 1996). In many safari hunting areas, tsetse fly is prevalent and the supply of free or cheap game meat from trophy hunted animals is extremely welcomed and represents the most tangible benefit that can be related directly to safari hunting.

The majority of meat is currently not effectively distributed to rural communities, due to the large distances between hunting areas and communities, and because meat is provided to hunting clients and camp staff. However, internal safari operators' requirements from meat are small, and large quantities of meat, especially when larger species are hunted, are left in the bush and wasted. Potential supplies that could accrue directly to communities are substantive. Malawi and Kenya do not have a safari hunting sector due to the former lacking suitable wildlife, and the latter having prohibitive legislation. In the remaining countries, however, safari hunted animals represent a substantial meat resource (refer Table 1). Although progress has been made in trying to ensure a greater distribution of meat from trophy hunted animals, with for example "community allocated quota" districts in Botswana requiring through legal provision in hunting concession agreements that a village community member accompany each hunting trip to effectively process and distribute meat, in most cases no such legal provisions are made and most meat is not effectively distributed.

Table 4

Regional overview of estimated annual legal game meat production from safari hunting

Country Prioritized	Production (mt)	Value (USD)	Contribution to National Game Meat Production (%)	Main Characteristics
1. Tanzania	307.8	255,474	22.4%	1) distribution good in community based programme areas; 2) distribution low in other areas; 3) leases generally do not provide for distribution.
2. Mozambique	101.8	78,386	20.8%	1) distribution low; 2) not provided for in leases; 3) communities receive little benefit from safari hunting.
3. Zambia	137.6	275,200	14%	1) medium distribution; 2) hunting leases provide for distribution clause, but generally not adhered to; 3) only about 5% distributed in Luangwa valley.
4. Botswana	320.7	272,595	13.5%	1) distribution good; 2) hunting leases provide for distribution; 3) greater community involvement in distribution; 4) problems however with equitable distribution and Safari operators' lack of commitment.
5. Zimbabwe	512	117,760	3.7%	1) medium distribution; 2) only a few leases provide for distribution; 3) authorized communal districts do not enforce distribution; 4) some safari area operators sell meat to cover transport costs.
Total	**1,379.9**	**999,415**		

Source: TRAFFIC survey data, 1998.

Game meat derived from trophy hunting is currently under-valued in terms of the potential that it represents for increasing communities' positive attitudes to their wildlife and safari hunting in general. The equitable distribution of game meat is likely to far outweigh its actual economic value in terms of the positive role it can play in distribution of benefits to rural communities. Concerted efforts are required to include legal provision within hunting lease concession agreements for greater distribution of meat. An increased role of communities in processing and distribution of meat that could be self-financing would result in the more efficient use of the resource.

Resident Licensed Hunting: Licensed resident hunting is provided for under relevant wildlife legislation in all countries of this study, although Kenya is the most restrictive, allowing only licensed bird hunting. In many countries of this study, resident licensed hunting is considered to be an important component of wildlife policy that allows the government mandate of owning wildlife on behalf of and for the people to be achieved. Resident licensed hunting is seen as an important mechanism for allowing access to wildlife resources. In addition, governments view wildlife as an important protein source,

thus licensed hunting can contribute significantly to poverty alleviation and improvements to inhabitants' nutritional status (Kappara, 1993; MTNRE, 1995; GTZ, 1996). As most countries face increasing human populations, poverty and unemployment especially in rural areas, resident hunting continues to be regarded as an important social development strategy, where affordable licenses are intended to allow for the provision of game meat to communities.

As seen in Table 5, Botswana has the most substantive legalized resident hunting sector in the study. Government policy recognizes the right of all Batswana to benefit from the country's wildlife resources. A wide range of license categories are available that allow all socio-economic classes of urban and rural citizens to benefit (FGU-Kronberg, 1988a; NRMP, 1994). In Botswana, provision of hunting licenses directed at lower income Remote Area Dwellers (RAD) who are located in the less productive areas of the country forms a substantive component of government community development, drought and poverty alleviation programmes (Hitchcock and Masilo, 1995). Quantities of meat in Botswana that are supplied through such a comprehensive resident license hunting sector are extensive and by far the largest legal supply for many lower income Batswana. To a lesser but still considerable extent, resident hunting also allows for the provision of affordable meat in Zambia, Tanzania, Malawi, and Mozambique. Kenya's industry, which is focused on bird hunting, is not intended to meet any social objectives, and results in an almost negligible amount of meat supplied nationally. Total contribution to national legal production in other countries is, however, substantial and has a significant impact on wildlife populations.

The policy objective of providing affordable meat protein to the people has resulted in license fees being subsidized. Current fees do not reflect the actual meat product value of wildlife, or for that matter the safari sport hunting value. Therefore the trend is towards the commercialization of the sector, and in most cases this has negated the positive role that licensed resident hunting plays in

Table 5

Regional overview of estimated annual legal game meat production from resident licensed hunting

Country Prioritized	Production (mt)	Value (USD)	Contribution to National Game Meat Production (%)	Main Characteristics
1. Botswana	1,423.2	1,209,720	59.9%	1) license fee under meat value; 2) license free to lower income RADs; 3) widespread abuse of system but mainly for trophy hunting; 4) over use of license quotas; 5) quotas generally not within Recommended Allowable Off-take; 6) limited monitoring/regulation.
2. Tanzania	345.9	287,097	25.2%	1) license fee under meat value; 2) commercialization; 3) majority are urban resident hunters (92%); 4) traditional weapons prohibited; 5) limited regulation/monitoring.
3. Mozambique	197.6	152,152	40.4%	1) license fee under meat value; 2) limited regulation / monitoring; 3) large-scale commercialization.
4. Zambia	138.1	276,200	14%	1) license fee under meat value; 2) widespread commercialization; 3) abuse of system through over use of quotas, issuance of excessive nos of licences to individuals; 4) declining overall allocation of licenses and quotas.
5. Malawi	12.5	22,819	17.8%	1) limited supply due to decreasing wildlife numbers; 2) increase in licenses issued in recent years; 3) limited regulation /monitoring.
6. Kenya	2.8	4,648	0.8%	1) negligible supply; 2) objective not social; 3) good monitoring/regulation; 4) license fee under meat value; 5) revenues accruing to landowners and nationally negligible in contrast to potential.
Total	**2,120.1**	**1,952,636**		

Source: TRAFFIC survey data, 1998.

alleviating poverty. Low license fees, high demand and high meat prices mean that licensed hunting is a lucrative activity. Through commercialization, benefits from wildlife accrue to fewer people, and incentives for profit have caused large-scale abuse of the system through overshooting allocated license quotas and the issuance of excessive numbers of licenses and hunting quotas to trade motivated individuals. Rural communities as intended beneficiaries have, in some cases such as in Tanzania, not benefited greatly, with the majority of resident hunters being urban and more commercially orientated (ITC and IUCN, 1989; Leader-Williams, *et al.*, 1995). Wildlife authority capacity to monitor and regulate such abuses of the system is limited in most countries, and commercialization of the sector has continued largely uninhibited.

The recognition that licensed resident hunting is not meeting intended social objectives has resulted in some countries such as Zambia in reducing the number and amounts of animal quotas allocated to the sector in favor of the more lucrative safari tourism hunting industry. In Botswana, quotas are allocated as "District Community Quotas" so that communities themselves can decide on the proportion of animals that should be subject to different use options. In Botswana, and as seen in CAMPFIRE districts of Zimbabwe, communities realize that greater financial returns can be obtained through other uses such as safari hunting. When provision of meat is a primary aim, communities generally opt for formal cropping schemes that reduce the chances for commercialization as exemplified in resident licensed hunting, and ensure a greater equity of the meat supply. Although the objectives for the establishment of resident hunting are socially justifiable, other mechanisms such as community-based natural resource management programmes result in the more effective and equitable distribution of wildlife revenues and meat. Hence resident hunting is naturally being replaced in favor of other community-based programmes in countries such as Botswana and Tanzania. This development should be fully promoted throughout the countries of this study.

Problem Animal Control

Increasing human populations and associated demand for land to undertake agricultural and livestock production has stimulated land clearing, habitat destruction and encroachment (Ottichilo, 1995; Mwale, 1995). Conflicts between legitimate land uses and wildlife have increased (KWS, 1990; GTZ, 1996). Antagonism caused by such conflict has played a large part in determining the status and viability of wildlife populations in such areas. In some countries studied where conflict is extensive, such as high-density agricultural areas surrounding protected areas, antagonism often manifests itself in increased illegal hunting of the problem animal resource (Mwalyosi, 1991). Effective strategies to reduce wildlife/human conflict are often lacking, and such mechanisms as fencing can be prohibitively expensive. Effective programmes have made negligible impact in countries of the study when compared to the scale of the problem (Boyd, 1996). As preventative solutions have been largely unpractical, culling of problem animals has remained the primary management option throughout the countries of the study.

Game meat derived from problem animal controlled (PAC) culling in many cases represents the only form of direct and tangible compensation that communities receive for wildlife damage caused to property, crops and human lives (Mkanda, 1988; SADCC/GTZ, 1989; ITC and IUCN, 1989; Deodatus and Sefu, 1992). In some parts of Malawi, benefits obtained from the consumption and trade of crop raiding species can more than adequately compensate for crop damage incurred (Wilson and Zegeren, 1996). Other modes of compensation from government or other sources to communities for enduring such damage do not exist within most countries of the study (MTNRE, 1996). In Kenya, a financial compensation scheme that involved the payment of limited amounts from government for wildlife-inflicted loss of life was found to be ineffectual (KWS, 1990; TCK International, 1995). Hence, game meat supply to affected communities from PAC culled animals is seen as the most effective form of compensation (Ndurungu, 1994; Seige, 1996).

As shown in Table 6, quantities of game meat legally supplied through this form of production are substantial in most countries studied. However, volumes are considerably under-reported, and thus represent a small proportion of the total national supply of legal game meat. Malawi has the highest human population density in the region, and demand for land is great. As a result, the country has experienced erosion of buffer zones surrounding protected areas, leading to increased human-animal conflict. Control measures lead to a supply of PAC culled game meat. High demand for wild meat in Malawi has resulted in the possibility of more of the larger renowned crop raiding species such as hippo being reported for PAC culling than required, due to the benefits derived by communities from meat supply. In Kenya also, human wildlife conflict is regarded as one of the largest conservation issues facing the country, and this will continue in light of ongoing increases in human populations and sub-division of land. Other countries such as Tanzania, Zambia and Mozambique have lower human densities, but in certain regions of higher agricultural productivity, such as the Kilimanjaro region in Tanzania, the Copperbelt in Zambia, and the northern provinces of Mozambique, human-animal conflict is an increasing issue resulting in significant PAC culling and supplies of meat. Conflict and PAC supplied meat in Zimbabwe are mainly confined to communal lands, and increased community wildlife management has resulted in more of the larger species omitted from PAC culling due to their greater perceived value by communities for safari hunting. Botswana perhaps has the lowest level of conflict due to the vastness of the country, very low human densities and the least conflicting major land use of livestock production.

Characteristic of all countries, however, is a loosely defined legislative framework and policy that allows for communities to undertake wildlife PAC culling in defense of property and life. Species scheduled under such provisions are generally numerous. Even though most community-conducted

Table 6

Regional overview of estimated annual legal game meat production from problem animal control

Country Prioritized	Production (mt)	Value (USD)	Contribution to National Game Meat Production (%)	Main Characteristics
1. Malawi	138.8	92,533	72.3%	1) meat sold; 2) revenues important but less than potential; 3) abuse of system; 4) high level of community culling; 5) loose legislation; 6) monitoring focused on protected species; 7) high demand/value from PAC species compensates for harvest loss.
2. Tanzania	211	175,047	15.3%	1) meat free; 2) more animals than necessary culled by communities; 3) loose legislation; 4) limited capacity in Wildlife Division; 5) conflict of concern in key areas only.
3. Zambia	144	288,000	14.7%	1) meat free; 2) policy importance to meat supply; 3) loose legislation; 4) limited monitoring/regulation; 5) limited capacity; 6) conflict of concern in key areas only.
4. Kenya	127	10,922	1.8%	1) meat free; 2) distribution of meat not legislated; 3) increasing conflict, loose legislation; 4) high community PAC levels; 5) limited monitoring/regulation; 6) limited capacity.
5. Mozambique	-	-	-	1) meat free; 2) conflict limited; 3) supply limited but greater importance in northern provinces; 4) capacity limited; 5) monitoring/regulation non-existent.
6. Botswana	113.8	5,865	0.3%	1) conflict limited; 2) meat sold but revenues small; 3) high degree of wastage; 4) good monitoring/regulation.
7. Zimbabwe	-	-	-	1) meat free; 2) conflict high in communal areas; 3) supply of game meat important wildlife benefit; 4) increased community wildlife management resulted in decrease in PAC culling.
Total	**734.6**	**572,367**		

Source: TRAFFIC survey data, 1998.

PAC culling has to be reported to wildlife authorities, this in practice rarely occurs. In many countries of the study such unregulated PAC culling is believed to result in the largest supply of game meat, although in many cases primary motivation is not to protect property or lives, but to obtain meat and trophy benefits. Wildlife authority capacity to monitor and regulate such abuses of the system is generally limited. Government priorities generally target the larger protected species such as elephant, which require greater PAC management but yield a tangible trophy value.

Game meat distribution from such authorized culling of problem animals is in many cases less than effective. Distribution is often not equitable with only a few people receiving a share of meat. Wastage through rotting is common. Five out of seven countries distribute meat freely, but Kenya legally does not allow its use. The revenue generating potential of game meat is not realized, and although the supply of meat as a form of compensation should be continued, the sale of meat at subsidized prices could still result in critically needed revenues to cover costs of government problem animal control units and for increasing levels of regulation and monitoring.

II. ILLEGAL BUSH MEAT UTILIZATION IN THE EAST AND SOUTHERN AFRICA REGION

The illegal utilization and trade of bush meat within the east and southern Africa region has in the past been perceived as a subsistence activity conducted mainly by hunter/gatherer societies with a tradition of hunting and use of wildlife resources. In the past, hunting wildlife for meat was not regarded as a major conservation issue within the region, due to the extensive wildlife resource base and low human population densities. With increasing human populations and demand for land, acute poverty, unemployment and food insecurity, reliance on natural resources has become an acute coping mechanism. Bush meat is increasingly being viewed as an important resource that can contribute extensively to the local standard of living.

The importance of bush meat to community development in the west and central African region is well documented, and the role bush meat plays through trade in generating cash incomes to many traders is now regarded as an important consideration in Gross Domestic Product and national revenues (Asibey, 1974; Ajayi, 1977; de Vos, 1978; Hart and Hart, 1986; Anadu, *et al.*, 1988; Anstey, 1991; Infield, 1988; Steel, 1994; King, 1994; Fa, *et al.*, 1995; Amman, 1996; Yaa Ntiamoa-Baidu, 1998). In the east and southern Africa region the importance of bush meat to community development and national revenues is not well documented. A continued perception of bush meat use being purely subsistence motivated and occurring on a limited scale by a few traditional societies persists. Past research focuses predominantly on these traditional hunter/gatherer societies, and community household food security surveys conducted in the countries of this study do not generally include an assessment of bush meat use or its contribution to household incomes. Such lack of documentation has been catalyzed by the illegal nature surrounding the utilization and trade of bush meat. Communities are well aware of the penalties for bush meat use, and consequently are adverse to revealing information on the activity to outsiders. This has contributed to the general lack of bush meat related research conducted in the countries of this study. The result has been a continued perception by many that bush meat utilization and trade is of limited concern.

This perception is misguided, with limited research indicating that in some countries hunting and bush meat use constitutes a major informal industry. In Tanzania, the utilization of bush meat was found to represent the largest economic value of wildlife, far in excess of legalized hunting, tourism or trophy values (ITC and IUCN, 1998). Increasing demand for bush meat has resulted in supplies being sourced from protected areas in all seven of the countries studied (Melamari, 1989; Sheldrick, 1976; Hofer, *et al.*, 1996). In Mozambique, severe declines in wildlife populations in protected areas have been directly

attributed to hunting for bush meat (Anderson, *et al.*, 1990; Dutton, 1995). In Botswana, wild meat has been documented extensively to be the major meat protein source for many rural inhabitants living in the semi-arid and arid rangelands of the country (von Richter, 1969a; Murray, 1980; ODA, 1996). In Malawi, bush meat derived from mini-fauna species is utilized extensively throughout the country (Wijnhoven, 1992; Heldens, 1992). In Kenya, traditional hunter/gatherer forest dwelling people rely heavily on bush meat protein supply and the potential it provides for generating cash incomes (Stiles, 1981; Magoka, 1992; Heath, 1995a; Fitzgibbon, *et al.*, 1995). In Zambia, bush meat off-take for commercial trade is now recognized as replacing trophy poaching as the main impact on wildlife populations in many areas (Jachmann, 1997). Past research suggests that bush meat utilization and trade is becoming an increasingly important activity in many areas, and that for all countries of the study results in positive benefits to community development. At the same time, it is a serious conservation concern.

Current research reflects the increasing utilization and trade of bush meat throughout the countries of the study. Such use no longer represents a limited subsistence orientated activity conducted by a few rural traditional societies, but is increasingly becoming an integral trade and subsistence activity to many societies throughout the urban and rural areas of the countries of this study.

Importance of Bush Meat Utilization

As summarized in Table 7, current research substantiates largely anecdotal evidence that the utilization and trade of bush meat is an integral component of many communities' daily lives. A reliance on hunting and consumption of bush meat is no longer the sole domain of traditional hunter/gatherer societies living in areas of abundant wildlife. As human populations have increased, and general standards of living have continued to decline, a wide range of communities consisting of different ethnic groups occurring in a wide range of localities have begun to rely on the bush meat resource as a coping strategy to maintain or increase household food security, nutritional and economic status. Bush meat is a valued resource and is recognized as such in all 13 survey areas of this study.

Extent of Bush Meat Use: The vast majority of survey area inhabitants in the study countries utilize bush meat through subsistence or trade supplied consumption on a frequent basis. Bush meat consumption is a daily, weekly or monthly activity for most people, and in areas such as Kitui District, Kenya represents the bulk of all meat protein consumed by inhabitants, with domestic meat playing a reduced role in meeting protein requirements. Such reliance on bush meat is taken a step further in the Kgalagadi and Kweneng survey areas of Botswana, where bush meat represents the only viable meat protein source, with domestic meat being prohibitively expensive and largely unavailable.

Overall, quantities consumed in the survey areas are substantial, especially so for the Luangwa Valley rural survey areas in Zambia, and the Maputo Province urban survey areas of Mozambique. With increasing urbanization, a key trend within all countries is a continuing reliance on affordable sources of wild meat protein. Urban survey areas such as those in Lusaka in Zambia and in Maputo Province, Mozambique, reflect the dynamic that bush meat use is not purely a rural area phenomenon. It is also increasingly a regular activity within many urbanized areas, and in both urban and rural areas constitutes a growing informal industry.

In most survey areas, bush meat is regarded as being the most important meat source to households. The main factor is the affordability of bush meat and the consequent household savings that its consumption represents. Quantities of bush meat consumed in most survey areas are more than the FAO recommended annual meat protein intake requirement of 22 kg per capita. Should bush meat become unavailable, it is highly likely that the need to purchase more costly domestic meat supplies

would be prohibitively expensive for most of the survey area inhabitants and would accordingly result in the consumption of smaller quantities of meat protein. Currently, many of the survey areas (e.g Kitui District, Kenya; Kweneng/Kgalagadi, Botswana) are characterized by high levels of malnutrition, as indicated by recorded stunting and infant mortality rates. In all likelihood, negative health impacts are kept from increasing even further by the availability and use of affordable bush meat. The extent of use and importance of bush meat to many households in the survey areas is substantial and economic values of quantities consumed equate to a considerable proportion of household average monthly incomes. In Kenya's Kitui District, for example, amounts of bush meat consumed equate to 34% of household monthly income and in Kweneng and Kgalagadi in Botswana ranges from 15.7% to 39.2% respectively.

Although bush meat is critically important to most surveyed households due to economic considerations, other more social factors also play an important role in many survey areas. In Zimbabwe, a strong social and traditional affiliation with hunting and the role it plays in the cultural framework of society is an important consideration in its continued importance. In the Dande communal district of Zimbabwe, hunters hold esteemed positions within society which is largely achieved through reciprocal provision of meat to village leaders and through their role as providers of food to the less capable elderly, or female-headed households of the village. In Kweneng and Kgalagadi survey areas the reciprocal exchange network is also a very important component of life with female-headed households receiving the majority of their meat protein in this way. Hunters are also respected and enjoy the esteem of communities in Kitui District of Kenya and in the Luangwa Valley of Zambia. Although the increased value associated with bush meat is beginning to reduce the amount of reciprocally provided free meat in communities such as the Bisa peoples of the Luangwa Valley, Zambia, the Basarwa peoples of Kweneng and Kgalagadi, Botswana, and the Kamba of Kitui District, Kenya, it still represents a considerable supply and an important dynamic of bush meat utilization within the study countries. In addition, hunters in the survey areas clearly enjoy the activity as a social pasttime, which contributes to the overall extent of bush meat utilization.

Hence, the extent and importance of bush meat utilization within the survey areas is primarily based on economic factors, but also social and cultural considerations. The resulting quantities of bush meat utilized by the majority of inhabitants are substantial and represent one of the most important natural resources available to households that contributes significantly to community development in most cases.

Ethnicity of Bush Meat Use: Bush meat now affects a wide range of people. Limited past research on the utilization of bush meat has primarily focused on traditional hunter/gatherer societies, that has created the misperception that bush meat is only actively utilized by certain peoples that have a historical relationship with the resource. Although current research supports the view that these traditional societies continue to rely on bush meat hunting and use as an integral part of their culture and survival strategies, many other less historically associated peoples such as agro-pastoralist Ngoni and Chewa peoples of Malawi and the pastoralist Samburu of Kenya are now found to have a high demand for the resource.

Most agro-pastoralist and pastoralist peoples maintain a cultural affiliation with domestic meat, and regard their livestock herds as both a cultural and capital asset. People, regardless of ethnicity, generally refrain from utilizing their livestock for domestic use, especially when a viable meat protein alternative exists. In all survey areas, bush meat represents this viable option, and it is utilized extensively so that livestock can be preserved as household capital and cultural assets, and used only in dire circumstances such as during drought and famine. Pastoralist peoples such as the Samburu of Kenya, who in the past relied to a limited extent on the bush meat resource, have in recent years begun to utilize the resource more as human populations increase and standards of living based on livestock production decline. Pastoralists such as the Masai in Ngorongoro Conservation Area in Tanzania are not only cultivating to a much greater extent (McNabe, 1994), they are also utilizing bush meat (SNP, 1997).

Table 7

Regional overview of questionnaire responses on the importance of bush meat utilization

Country and Survey Areas	Proportion of Users (%)	Average Quantites Used (kg/mt) per month	Most Important Meat Source (%)	Rely More During Famine (%)	Description of Survey Community and Area
Tanzania:					
Western Serengeti:	75%	106.3 mt over 8 months	95%	87%	1) rural; 2) agro-pastoralists; 3) agriculture main land use; 4) low human densities; 5) large wildlife resource base.
Meatu District:	94%	Hunter 150.3 kg	55%	77%	1) rural; 2) agro-pastoralists; 3) agriculture main land use; 4) low human densities; 5) large wildlife resource base.
Kilimanjaro Region:	67.5%	Hhld. 1.6 kg	-	84%	1) rural; 2) agriculturalists; 3) agriculture main land use; 4) high human densities; 5) low wildlife resource base.
Kenya:					
Samburu District:			-	-	1) rural; 2) pastoralists; 3) livestock main land use; 4) low human densities; 5) high large wildlife resource base
Ilkiloriti	98.2%	Hhld. 1.13 kg	-	-	
Lpartuk	93%	Hhld. 1.4 kg	-	32.9%	1) rural; 2) agro-pastoralist/trade; 3) high human densities; 4) low wildlife resource base.
Loikas	85%	Hhld. 5.4 kg	-	51.9%	
Kitui District	79.7%	Hhld. 14.1 kg	67%	73%	1) rural; 2) agro-pastoralists; 3) semi-arid; 4) drought prone; 5) high human density; 6) low wildlife resource base.
Zambia:					
Lusaka	-	-	-	-	1) urban; 2) variety of ethnicity; 3) trade/business
Luangwa Valley:					
Plateau zone	Majority	Hhld. 4.6 kg	Yes	-	1) urbanized, traders/agro-pastoralists; 2) high human densities; 3) low wildlife resource base;
Intermediate zone	Majority	Hhld. 36.8 kg	Yes	-	1) rural; 2) agriculturalists; 3) low human densities; 4) tsetse fly; 5) large wildlife resource base.
Alluvial zone	Majority	Hhld. 13.6 kg	Yes	-	
Zimbabwe:					
Lupane/Chivhu	100%	Hhld. 1.1 kg	29.8%	Yes	1) rural, agro-pastoralist; 2) high human densities; 3) low wildlife resource base.
Dande	100%	Hhld. 13.8 kg	85.7%	Yes	1) rural, agriculturalist; 2) limited livestock; 3) high large wildlife resource base.
Botswana:					
Kweneng District:	46%	Hhld. 18.2 kg	Yes	Yes	1) rural; 2) traditional hunter/gatherers; 3) arid; 4) limited land use/low productivity; 5) high destitute levels; 6) very low human density; 7) large wildlife resource base.
Kgalagadi District:	49%	Hhld. 12.4 kg	Yes	Yes	
Malawi:					
Central Region	100%	-	19.7%	Yes	1) rural; 2) agriculturalists; 3) very high human and cultivation densities; 4) large wildlife resource base
Dzalanyama P.A	100%	Hhld. 0.4-25 kg	-	Yes	1) rural; 2) agriculturalist; 3) borders protected area; 4) high human and cultivation density; 5) large wildlife only available in protected area.
Mozambique:					
Maputo Province	-	50.3 mt per month	62.9%	-	1) urban; 2) traders; 3) high human and cultivation densities; 4) reduced wildlife resource base.

Note: Hhld.= Household.
Source: TRAFFIC survey data, 1998.

Locality and Bush Meat Use: Not only is bush meat utilized by a variety of different ethnic groups in urban and rural areas, but also by rural peoples living in a broad spectrum of localities with different primary land uses and wildlife resource bases. Active bush meat use and reliance on the resource is no longer restricted to those areas with abundant wildlife populations or compatible land uses. Although certain areas such as those in western Serengeti and Meatu District of Tanzania with access to relatively abundant wildlife resources utilize larger quantities of bush meat as would be expected, other localities which have

higher human and cultivation densities have adapted to reduced availability of the larger, preferred and more charismatic species by utilizing a greater variety of smaller species that have been able to adapt and survive in human modified environments. Although smaller, such species still provide substantial quantities of bush meat, and in many cases, rodents, insects or birds are nutritionally superior and contribute significantly to households' standard of living. Bush meat in such areas, regardless of species availability and composition, continues to be an important resource to communities. This is evident in particular in the survey areas of the Central region of Malawi, and the Kilimanjaro region of Tanzania. It is also critically important to communities living in areas of medium agricultural productivity where domestic livestock is not a viable land use option due to the prevalence of tsetse fly and trypanosomiasis. This is the case in the Alluvial zone survey area of the Luangwa Valley in Zambia. In semi-arid infertile areas of Kweneng and Kgalagadi Districts of Botswana, where both agriculture and livestock production is limited, bush meat also represents an important resource. In semi-arid areas characterized by poor agricultural potential and a reliance on livestock production such as the Samburu District of Kenya, bush meat also is a valued resource relied upon by the majority of inhabitants.

Survey areas in the Central region of Malawi represent one end of the spectrum in terms of habitat type and wildlife availability. Malawi's high human populations and cultivation densities mean that larger wildlife species have not been able to survive in such highly modified habitats. The result is an increased reliance on smaller species such as insects, rodents and birds, especially those renowned for crop raiding. Agriculture is the main land use, incomes are primarily subsistence, and reliance on bush meat is considerable by the majority of people. At the other end of the spectrum are communities living in western Serengeti survey area villages, where agricultural productivity is low and livestock production limited, but wildlife availability high. Such communities also rely extensively on the bush meat resource. Hence, bush meat is important to a whole range of communities in different localities and under different primary land uses. Utilization of the resource adapts to the different environment and conditions, and regardless of the composition of bush meat species continues to constitute an important and relied upon resource.

Increased Importance of Bush Meat Use: Although important throughout the year, bush meat is relied upon to a greater extent during times of economic hardship such as prolonged drought. At such times frequency of consumption increases, and bush meat represents a larger proportion of total meat protein intake. Again households only utilize domestic livestock for subsistence consumption if bush meat supply becomes limited. In general such times of hardship and drought occur over dry season months, which is generally the peak hunting season due to greater hunting catch per effort because it is easier to locate animals that are searching for water, and vegetation is less dense. Hence, supply during times of hardship is at its highest during the year, and constitutes an important drought and famine coping strategy for the majority of rural survey area inhabitants. On the other hand, pastoralists such as the Samburu of Kenya, rely less on bush meat during such times due to increased availability of domestic meat from greater natural mortality within herds during times of drought.

Bush Meat Species Utilized

In the countries studied a wide variety of species are used as bush meat ranging from the smaller mini-fauna species such as insects, rodents and birds to larger animals such as duikers and Grant's Gazelle to the more charismatic species such as elephant and Cape Buffalo. Species selection and composition for bush meat use in rural areas depends, as would be expected, on location, habitat type and species availability. In urban areas, however, preference for certain species results in higher-priced species being sourced from more extensive supply areas. Hence, species composition in urban areas where trade is the main supply mechanism is generally determined to a greater extent by preference and

demand, and the ability of the market to source and supply most species from large areas of the country. In contrast, species composition in rural areas is based more on local availability of wildlife, with the most abundant species being utilized in the greatest quantities.

In general throughout the study countries larger species are preferred because of their larger dressed carcass weights and quantities of meat supplied per carcass, although in many of the survey areas a preference for the quality of meat is also shown. When still largely available in rural survey areas, they constitute the bulk of bush meat utilized. For all 13 of the rural survey areas, such larger species (referred herein as macro-fauna) that have a dressed carcass weight of over five kg represent 58% of all species consumed, suggesting that availability of such species is still considerable. However, a clear emerging dynamic that is reported to have occurred over the past decade is the increasing use of a large variety of smaller less charismatic species (herein referred to as mini-fauna) weighing under five kg dressed carcass weight such as small mammals and reptiles, insects, rodents and birds. The use of such mini-fauna bush meat species represents a significant proportion of species utilized in all of the survey areas (42%). As preferred larger bush meat species populations decline due to over-hunting, land degradation and habitat loss, bush meat supply has adapted by targeting more of these smaller species that have been better suited to surviving and living in generally human modified and cultivated habitats.

Bush Meat Mini-Fauna Species: Although the amount of meat provided per species is small, greater numbers and availability in large parts of the countries of the study have resulted in these mini-fauna species supplying a large part of bush meat protein supply, and as such constitute an important resource that contributes substantially to many household's standard of living when macro-fauna are unavailable. The small size of such species as insects does not reflect their nutritional benefits with protein content per gram being extremely high (Myers, 1983; Styles, 1994). Other mini-fauna such as rodents and birds also contain high protein contents in contrast to larger species (Eltringham, 1984). In general, mini-fauna have a highly seasonal supply, with guinea fowls for example largely being available only during planting and harvesting times when they are trapped in larger numbers for crop protection in Kitui District of Kenya. In the Central region of Malawi, insects are mainly utilized only during the beginning of the wet seasons when they emerge in mass and are easily trapped in sufficient quantities. In Botswana, the mopane worm is harvested for only a few short weeks twice a year. Rodents also are seasonally supplied, mainly after harvest when fallow fields are burned and rodents trapped in large quantities. Although seasonal, communities in many countries obtain considerable benefits through direct consumption and trade of these mini-fauna.

Demand for mini-fauna in countries such as Malawi, Zambia, and Botswana is high, and during supply seasons has resulted in an extensive trade that is open and conducted formally due to the perception that use of such species is legal. In the countries of Zambia, Zimbabwe and Botswana the trade in mopane worm represents a substantial and lucrative industry that results in considerable economic revenues to individual traders (Cheater, 1979; Wilson, 1987; Hobane 1994; Hobane, 1995; Ditlhogo, 1996; Moruakgomo, 1995; Letsie, 1996). The trade and utilization of a variety of mini-fauna throughout the countries of the study is commonplace with rodents and birds being the most utilized species in Chinamura communal area of Zimbabwe (Graham, 1995), and insects being an important source of protein in

Roadside sales of bird *mpani*.
Rob Barnett-TRAFFIC

Shurugwi communal area (McGregor, 1991). In Zambia a traditional reliance on the use of mini-fauna ranging from grasshoppers, crickets, beetles and termites by a wide range of ethnic groups continues to this day (Marks, 1984; Scudder, 1971; NFNP, 1972; Davies, *et al.*, 1997).

Although a reliance on mini-fauna is apparent throughout the countries of the study, Malawi is characterized by the greatest use, as most larger bush meat species are unavailable in communal areas. Smaller mini-species have, however, been able to adapt and survive in Malawi's highly modified landscapes, and due to high cultivation densities and mono-crop agriculture, some crop raiding mini-fauna populations are believed to have increased due to abundant food supplies. In Malawi, mini-fauna are utilized extensively for crop protection but also for the nutritional and trade benefits they represent to subsistence farmer communities. Indeed, Wilson and Zegeren (1995) maintain that benefits derived from the trade in mini-fauna crop raiding bird species in the Lake Chilwa area of Malawi more than adequately compensates for crop losses. Trade of mini-fauna is extensive during seasonal supply periods, and represents important additional incomes to many inhabitants of the Central region, where little alternative for more formal employment exists. In Malawi and as reflected in most countries of the study, mini-fauna such as insects and rodents are consumed as a snack, or as a relish with main carbohydrate staples. In many cases such mini-fauna represent a substantial proportion of protein consumed during seasonal supply periods and contribute extensively to food security and nutritional status.

In contrast to Malawi, other countries of the study such as Tanzania and Kenya, still have good availability of larger species. In areas such as Meatu District, western Serengeti in Tanzania, and the Ilkiloriti and Lpartuk areas of Samburu District in Kenya, inhabitants are still in the enviable position where bush meat demand can be satisfied by large bush meat animals supplied from the local area. However, even in these countries with a larger wildlife resource base, certain survey areas such as the Kilimanjaro region of Tanzania and Loikas area of Samburu District, Kenya, that are characterized by higher human population densities, have had to begin to utilize a far greater variety of mini-fauna species.

The variety of mini-fauna harvested throughout the study's survey areas is extensive (Annex II) and represents an important resource that in most cases is sustainably harvested, due to the high seasonal nature of supply and that species generally have a high fecundity and population growth potential. Therefore, such species in highly populated areas have the potential to contribute significantly to community development through sustainable use.

Bush Meat Macro-Fauna Species: In contrast to mini-fauna, macro-fauna species are more susceptible to bush meat motivated hunting off-take and habitat loss. This is due in many cases to their reduced ability to sustain off-take levels and survive successfully in human modified habitats. Some macro-fauna have a greater ability to sustain hunting off-take rates, and have been able to adapt and survive in changing environments better than others. The extent of macro-fauna use and quantities of bush meat utilized throughout the study's survey areas is generally characterized by a reliance on these more adaptable and consequently more available species when other larger and more preferred species are less abundant.

Although species composition of bush meat utilized has been shown to be related directly to habitat type and corresponding wildlife availability which is location-specific, the implementation of 13 surveys throughout the countries of the study conducted in a wide range of habitats, represents a good sample for determining those species most targeted for bush meat use, and the conservation and development implications of such use on a species basis. Of all the species utilized in the 13 survey areas (Table 8), the larger species such as Cape Buffalo, Impala, Eland or Lesser Kudu are utilized by a significant number of survey area communities and still account for a large proportion of bush meat supplied. This suggests that supply of these species in the study's survey areas is still relatively abundant. However, in survey areas such as Lupane and Chivhu in Zimbabwe, and Central region of Malawi that

Table 8 Regional overview of questionnaire responses on the utilization of bush meat macro-fauna species

Species	Country and Survey Area Use Ranking (Based on Quantity of Bush Meat Supplied in Dressed Carcass Weight [kg])													Regional Ranking	Conservation Status	Ability to Sustain Hunting Offtake					
	Kenya		Tanzania		Malawi	Zambia	Zimbabwe	Mozambique				Botswana		No. of Survey Areas	IUCN Red List 1996	Sexually mature (months)	Gestation period (months)	Av. No. of young	Adapt to modified habitats	Dressed carcass weight (kg)	Ability to sustain hunting
	Kitui	Samburu	Meatu	West Serengeti	Central Region	Luangwa Valley	Lupande Chivhu	Dande	Maputo	Beira	Zambezi Delta	Kweneng	Kgalagadi								
Warthog	14	10	5	13		2	5	5	16	6	5			10		24	5	3	No	39.8	Medium
Bushbuck	2	9		17		8	1	9	19	1	3			9	NE	12	6	1	Yes	21	High
Common Duiker	5				2	10	6	7	1	4	10	3		9	NE	6	6	2	Yes	6.7	High
Cape Buffalo	6	1	2	6	9	3		2		9	14			9	LR cd.	24	11	1	No	314	Low
Scrub Hare	11	7		14	1		2	8	11				8	8	NE	8	1.5	2	Yes	2.7	High
Common Eland		6	10	7	11			14			12		6	7	LR cd.	18	9.5	1	No	257.7	Low
Impala		8	1	3		1	3	4	6					7	LR cd.	18	6.7	1	No	31.7	Medium
Bushpig	4				3			1	5	2	7			6	NE	18	4	8	No	29	Medium
Lesser kudu	7					11		3	7			5	2	6	LR cd.	18	7.4	1	No	57.1	Low
Common reedbuck	15				6		4		17	5	4			6	LR cd.	12	7.2	1	Yes	36	Medium
Hartebeest		14	9	9							16	6	3	6	LR cd.	12	8	1	No	70.3	Low
North Afr. Porcupine	13							11	9		17	8		5	LR nt.	3	6	4		4	High
Zebra		2	6	5		5			18					5	NE	30	12	1	No	145.7	Low
Wildebeest			7	2		6						4		4	LR cd.	15	8	1	No	108	Low
Cane rat					4			10	10		1			4	NE	6	1	3	Yes	3.6	High
Sable antelope					5			12		10	15			4	LR cd.	30	9	1	No	127	Low
Suni									8	7	2			3	LR cd.	18	6	1	Yes	8	High
Red duiker									2	3	9			3	LR cd.					8.4	High
Steenbok	9								15			7		3	NE	7	5.6	1	Yes	6.2	High
Thompson's gazelle	10	4		1										3	LR cd.	18	6	1	No	11.2	Low
African elephant		3				9		13						3	EN Alb	120	22	1	No	1,683	Low
Giraffe		11	8	12										3	LR cd.	24	15	1	No	475.4	Low
Hippopotamus				15		7					19			3	NE	48	7.8	1	No	584	Low
Bat eared fox												9	7	2	NE	9	2	3	Yes	3	High
Grant's gazelle	12			8										2	LR cd.		6	1	No	29.3	Low
Boho reedbuck			3	11										2	LR cd.	12	7	1	Yes	30	Medium
Dik dik (general)			4	10										2							High
Waterbuck		15									13			2	LR cd.					56.9	Medium
Geunther's dik dik	3	5												2	NE	10	6	2	Yes	2.7	High
Ostrich		12					7							2		42	1.5	6	No	62.2	Low
Greater kudu		13			8									2	LR cd.	17	7	1	No	124.3	Low
Nyala									3		8			2	LR cd.	11	8.5	1	No	75	Medium
Topi				4	10									2	LR cd.	18	8	1	No	63.5	Low
Klipspringer				16			8							2	LR cd.	12	7	1	Yes	5.9	Medium
Yellow baboon					7						6			2						8	High
Grysbok								6	4					2						5	High
Oribi										8	11			2	LR cd.					100	Low
Gemsbok												1	1	2	LR cd.	24	9.2	1	No	107	Medium
Springbok												2	4	2	LR cd.	6.5	5.6	1	No	18.3	Medium
Harvey's red duiker	8													1	LR cd.					9.6	Medium
Spring hare													9	1	NE	8	1.5	2	Yes	2.7	High
Oryx		16												1	LR cd.	18	9	1	No	98	Low
Puku						4								1	LR cd.	13	8.8	1	No	45.8	Medium
Honey badger									12					1	NE	12	6.5	2	Yes	7	Medium
Samango monkey									13					1	NE					8	High
Civet											18			1						3.9	Medium
Black backed jackal													5	1	NE	12	2	2	Yes	3	High
Kirk's Dik dik	1													1	NE	10	6	2	Yes	2.7	High

Note: Conservation status according to 1996 IUCN Red List of Threatened Animals: NE: Not Evaluated; LR: Lower Risk; cd: Conservation dependent; nr: Near threatened; EN: Endangered; A: Declining population

Source: TRAFFIC, 1998; Halternorth and Diller, 1996; Burton and Pearson, 1987; Dorst and Dandelot, 1993

are characterized as having higher human population densities and less availability of larger species, it can be seen that a reliance on the smaller macro-fauna species such as duikers, bushbuck and hares are apparent. These smaller macro-fauna species are more adaptable to changing human modified habitats and as with mini-fauna bush meat species have been able to survive to a greater extent within such habitats. Greater fecundity and breeding capacity in terms of shorter time to sexual maturity and shorter gestation periods have facilitated their ability to withstand greater hunting pressures. In contrast, larger species that are still targeted due predominantly to their larger dressed carcass weights and a preference shown for the meat in many survey areas, are shown to be less adaptable to changing habitats, with population breeding capacities being generally low due to long periods of time required for reaching sexual maturity and prolonged gestation periods. Bush meat off-take rates for such larger species are increasingly likely to be unsustainable due to the reduced ability of populations to sustain hunting pressure.

Hence, certain species such as the Common Duiker, dik diks, bushbuck, North African Crested Porcupine and Bush Pig have physiological advantages that allow them to survive in increasingly human modified habitats and to withstand hunting pressures and maintain viable populations. Conservation implications of bush meat hunting on large species are severe. Many of these larger species are categorized as "Lower Risk-conservation dependent" according to the "1996 IUCN Red List of Threatened Animals" and as such continued or increased bush meat trade impacts are of serious concern. Although most of these species are not defined as being threatened, their continued viability is still dependent on ongoing conservation initiatives and programmes. Only one species, the elephant, is categorized as being threatened, and it is utilized for bush meat in Kenya, Zambia and Zimbabwe. The limited nature of threatened species being utilized reflects the regional dynamic that supply is generally based on availability, with scarce species generally not targeted.

Although, on the national and global scale the composition of species utilized throughout the study countries does not represent a concern for biodiversity conservation, at the local level reductions in wildlife populations are of concern and may be a prelude to a national dynamic. Wildlife declines also have critical implications for community development, due to the loss of a valued resource. With increasing demand for the resource and an ever increasing use of unsustainable harvesting techniques, even the more hardy species are likely to be facing excessive hunting off-take levels that together with other environmental issues such as habitat loss to agriculture and livestock production, is resulting in severe conservation and community development implications. In addition, certain species are facing greater bush meat motivated hunting impacts due to a larger market demand for these preferred species which is based on a perceived superior taste and demand for larger carcass animals. Price provides an indicator of such increased demand. A high price indicates a reduced supply, but a maintaining demand for a preferred species. The higher the price the greater the motivation by trade motivated hunters to ensure continuing supplies from dwindling resources. The same holds true for macro-fauna species that are in low demand due to a distaste of meat or that the species is widely regarded as being taboo, but maintains a large supply due for example to the species being a renowned crop raiding animal.

Kitui District in Kenya provides a good example of such dynamics and is likely to be representative of many other survey areas of the study. In the district survey areas species such as Grant's Gazelle, Thompson's Gazelle and Lesser Kudu are reported to be largely unavailable within the district's communal hunting areas. A preference for the meat of these species and their relatively large dressed carcass weights when compared with the more common and available species such as Kirk's Dik Dik and Common Duiker, has resulted in their increased price. Lucrative returns from these species has enticed trade motivated hunters to ensure supplies from protected areas of the district. In contrast, species such as the North African Crested Porcupine are still largely available within the district and as crop raiders enter the bush meat market in large quantities. However, demand for this species is low

due to a widespread taboo custom associated with this species, and prices are very low. Protection of crops is the main impact on this species, whereas for the larger species such as Lesser Kudu, bush meat demand is a major factor relating to their population status.

Bush Meat Demand

The overriding demand dynamic for bush meat in the study countries is based on economic considerations. In all rural survey areas, bush meat is less expensive than alternative domestic meat and consumption results in considerable savings to household expenditure. In many cases, bush meat represents a "free" good when it is subsistence hunted or gathered hence increasing the role it plays in cost savings. Whether obtained for free or purchased at low cost, bush meat allows people to reduce expenditure on consumable products. Food purchase represents one of the largest monthly expenditures for many African households. In Kitui District, Kenya, food expenditure for poor and non-poor households represents 70.4% of monthly income, so savings made through obtaining bush meat for free or at cheaper prices constitutes an important contribution to the standards of living. Access to bush meat is especially important among poorer households. In Kitui District, poor households can only afford to purchase small amounts of expensive domestic meat, in contrast to non-poor or wealthier households that purchase 74% more domestic meat. Hence, less wealthy households rely more extensively on affordable bush meat for maintaining their food security and nutritional status (MPND, 1998).

Table 9

Regional overview of questionnaire responses on bush meat demand

Country and Survey Area	Cheap	Prefer Taste	Out of Habit	Available	Price of Bush Meat verses Domestic Meat	Main Users
Zambia:						
Urban Areas	8.3%	70%	11.7%	10%	DM 43.4% cheaper in urban areas	High income in urban areas
Rural Areas	Yes			Yes	BM equivalent to DM in rural areas	Low income in rural areas.
Mozambique:						
Urban Areas		Yes			DM 157% cheaper in urban areas	High income in urban areas
Rural Areas	Yes			Yes	BM 6.5% cheaper in rural areas	Low income in rural areas
Malawi:						
Rural Areas	16%	33.3%	28.6%	0%	BM 77% cheaper in rural areas	Low income subsistence farmers
Botswana:						
Rural Areas	Yes			Yes	BM 30% cheaper in rural areas	Low income traditional hunter/gatherers
Zimbabwe:						
Rural Areas	32.9%	33.8%	6.3%	13.4%	BM 75% cheaper in rural areas	Low income in rural areas
Kenya:						
Rural Areas	42.6%	15.8%	9.6%	27.8%	BM 129% cheaper in rural areas	Low income (72.6%) High income (27.4%)
Tanzania:						
Rural Areas	47%	38.8%	0%	0%	BM 17.6% cheaper in rural areas	Low income in rural areas

Note: DM-Domestic Meat; BM-Bush Meat
Source: TRAFFIC survey data, 1998.

In most rural survey areas, bush meat is considerably cheaper than domestic meat, and indicates that supply in such areas is still considerable. In Kenya and Tanzania, rural survey areas revealed that bush meat is in demand because it is affordable. In such countries demand is likely to continue until supply of bush meat is reduced to such an extent that prices increase to the same level as domestic meat. In such circumstances it is likely that inhabitants would opt for preferred domestic meat. In Mozambique, Zambia

and Malawi, surveys suggest that although affordability of bush meat is still important in rural supply areas, there also exists a large demand for bush meat that is based on a preference for bush meat over domestic meat, that is especially prevalent in urbanized areas. In the Luangwa Valley of Zambia for example, survey areas such as the Plateau zone, which is characterized by urbanization and reduced wildlife availability, are characterized by maintaining a high demand for bush meat that is more expensive than domestic meat. Such demand is based on the perception that bush meat is a superior product in comparison to domestic meat, and wealthier inhabitants of the urbanized Plateau zone survey area are willing to purchase more expensive bush meat. In contrast in the Luangwa Valley, inhabitants of the rural, sparsely populated and increased wildlife availability survey areas of the Alluvial zone rely on bush meat due to its affordability, especially when obtained through subsistence hunting. Greater supply in the area and generally poorer inhabitants demand bush meat mainly because of its affordability and the cost savings they can achieve through its consumption.

Mozambique also reflects these same demand dynamics. Rural survey areas such as in the Zambezi delta where supply is greater and inhabitants poorer also rely on the affordability of bush meat. Urbanized markets such as found in Maputo Province and Biera town in Sofala Province are based in contrast on bush meat being regarded as a superior and more expensive product than domestic meat. Inhabitants are generally wealthier and pay considerably higher prices for bush meat. Bush meat in urban markets of Mozambique is a luxury product. In Maputo, for example, prices paid for bush meat rise dramatically during religious festivals to many times that of domestic meat. In contrast to countries such as Kenya and Tanzania where survey inhabitants only utilize bush meat extensively because of its affordability, Mozambique and Zambia have established urban markets that are based on a preference for bush meat regardless of economic considerations. The conservation implications in such countries are severe, as dwindling supplies and increasing prices do not affect such lucrative markets.

Survey areas in the Central region and the Dzalanyama areas of Malawi also show to some extent an increasing demand for bush meat based on preference. Economic considerations are however still important, but decreasing supply of larger species and a traditional association with bush meat use has resulted in increased demand for bush meat as a superior product. Prices for larger species have increased considerably and resulted in supplies being increasingly sourced from protected areas, and from neighboring countries such as Mozambique. Demand for ungulate bush meat as a preferred product regardless of price has stimulated trade even in light of dwindling resources and increasing prices.

In Botswana, the supply of wild meat to the country's inhabitants has been legislated for extensively through a comprehensive licensed resident hunting sector, and access to wild meat is seen as a traditional right and not a privilege. Traditional demand for bush meat in Kweneng and Kgalagadi is a key consideration for the predominantly Basarwa hunter/gatherers, and plays an important but lesser role in all countries of the study. In Mozambique, for example, national food security surveys revealed that bush meat was utilized in greater quantities and played a more important role in household food security in areas of the country where traditional hunter/gatherer peoples existed. As such, traditional habit is an important demand dynamic that affects the use of bush meat in all survey areas of the study but to differing degrees. The increased availability of wildlife is also critically important in establishing demand dynamics in some survey areas of the study. Large parts of the region are characterized by the prevalence of tsetse and trypanosomiasis resulting in the limited availability of domestic meat. In the Luangwa Valley of Zambia the increased availability of bush meat is a critical factor contributing to its demand.

The affordability of bush meat is the primary element of demand in most countries, although preference for bush meat is an important consideration in Zambia, Mozambique and, to a lesser extent, Malawi. Where preference is the principal motivation, bush meat is often more expensive than domestic meat. For example, wealthier inhabitants in urbanized areas such as Beira and Maputo Province continue to

purchase bush meat because of preference, even though it is more expensive. In rural survey areas, such as in Chivhu, Lupane and Dande in Zimbabwe and rural districts of Kilimanjaro region in Tanzania, lower income groups are the main identifiable bush meat users due to bush meat being cheaper.

Bush Meat Trade and Subsistence Use

The utilization of bush meat within the countries of the study is no longer motivated purely by subsistence use. Commercialization of the resource is an emerging dynamic in the majority of the survey areas. Although bush meat hunting "for the pot" is still critically important, increasing cash values associated with the resource has led to bush meat no longer being regarded as a free resource available to all. Increasingly, bush meat is a valued product that contributes substantially to maintaining household food security, nutritional and economic status by generating cash income through trade. In contrast, a continuing perception by law enforcement officers in most countries of the study is that bush meat off-take is within sustainable rates due to its subsistence nature, and is largely responsible for the limited law enforcement effort put into the regulation of bush meat use and trade.

Throughout the countries of the study, subsistence supply is still the primary source of all bush meat in rural areas. However, marketed supplies of bush meat are increasing, and are related to declining wildlife populations, increasing demand for bush meat, and rising human populations. Factors such as increased land clearing, habitat encroachment and wildlife habitat loss have resulted in a decrease in bush meat supply through unsustainable harvests. The result has been a decrease in the ability of all households to adequately subsistence hunt or gather their own bush meat supplies, and trade has emerged to meet this shortfall. The emergence of trade as a supply mechanism is growing and has reached different levels within each of the survey areas of the study. The Kweneng and Kgalagadi survey areas of Botswana and the Ilkiloriti and Lpartuk survey areas of Kenya represent communities where availability of large ungulate wildlife species is still abundant and trade is therefore of lesser importance. Communities in such areas still have good access to bush meat through subsistence hunting. However, even in Kweneng and Kgalagadi Districts, trade has emerged in the last few years where none occurred in the past. The increasing cash economy of these areas, a general decline in wildlife populations, and a greater value being afforded to the resource has resulted in less bush meat being given away for free to extended families through the reciprocal exchange network and a greater degree of cash exchange trade occurring.

Other rural survey areas such as Kitui District of Kenya, Dande area of Zimbabwe and the Luangwa Valley of Zambia represent communities that benefit from a substantial bush meat trade. In many rural survey areas, hunters whose primary objective is still to provide meat to their families, conduct the majority of trade. In Kitui District, and Loikas area of Samburu District in Kenya, and in the Kilimanjaro region of Tanzania, many hunters, who are primarily subsistence farmers, sell only excess bush meat after their families have been satisfied. Bush meat is sold regularly but in small quantities within the local hunting supply area. Profits realized are high due to supply being provided for free and constitute an important additional income to subsistence farmers where little alternative through formal or informal employment exists. In Kitui, incomes from part-time subsistence hunter/trader activities more than adequately compete with other more formal professions, and for these traders bush meat sales are responsible for the bulk of all cash income received.

Many of the rural survey areas have a well-developed trade that includes many individuals where bush meat represents their sole source of income. Such commercialized trade is found to exist within all the rural survey areas of the study. Full-time commercial traders sell larger quantities, and in many cases identify markets outside of the local supply area. In Kitui, a range of more commercially orientated trade outlets such as open air markets that occur next to formal markets, illegal brew bars, and butchery kiosks are used to trade bush meat. In the western Serengeti of Tanzania, full-time traders have identified

Table 10

Regional overview of questionnaire responses on bush meat trade and subsistence use

Country and Survey Areas	Proportion Traded Supply	Proportion Subsistence Supply	Summary of Traded and Subsistence Bush Meat Supply
Tanzania:			
Western Serengeti: Meatu District:	61.5% 57.2%	38.5% 42.8%	1) rural; 2) large wildlife resource base; 3) huge demand; 4) external markets targeted; 5) profit margins high at 36.6% in western Serengeti; 6) limited formal employment; 7) majority traders rely on bush meat profits as main source of income; 8) well developed trade market.
Kilimanjaro Region:	67%	33%	1) rural and urban; 2) huge demand; 3) reduced wildlife resource base; 4) proportion of trade legal.
Kenya:			
Samburu District: Ilkiloriti: Lpartuk: Loikas:	0% 0% 2.1%	100% 100% 97.9%	1) rural; 2) no trade; 3) due to large wildlife resource base still available 1) rural; 2) no trade; 3) due to large wildlife resource base still available 1) rural; 2) emergence of trade; 3) due to decreased wildlife resource base.
Kitui District:	25.1%	74.9%	1) rural; 2) trade localized; 3) trader middlemen profits of 24.8% but far higher for traders who hunt their own supplies; 4) all traders obtain profits in excess of most other formal livelihoods; 5) variety of trade mechanisms; 6) secret; 7) hawking most popular; 8) trade increasing due to reduced wildlife numbers.
Zambia:			
Lusaka:	80%	20%	1) urban; 2) extensive demand; 3) trade secretive mainly by hawking/house to house sales.
Luangwa Valley:	70%	30%	1) rural; 2) trade extensive as rural hunters can obtain greater returns from sale rather than subsitence consumption due to high bush meat prices achieved; 3) mainly localized trade but external urban markets also targeted.
Zimbabwe:			
Lupane/Chivhu:	33%	77%	1) rural; 2) trade increasing due to reduced wildilfe resource base; 3) greater protection of wildlife supply in private and communal lands.
Dande:	45%	55%	1) rural; 2) trade increasing due to increasing demand; 3) supplied in part by Mozambican immigrants; 4) ward 2 area characterized by limited large wildlife availability hence greater trade dynamic; 5) ward 4 characterized by increased large wildlife availability hence less trade.
Botswana:			
Kweneng/Kgalagadi:	9.5%	90.5%	1) rural; 2) mainly subsistence supply due to large wildlife resource base; 3) trade emerged in recent years due to greater cash economy in areas; 4) increased value of bush meat; 5) no longer viewed as inexhaustible free product; 6) hunters provide less for free through reciprocal exchange network.
Malawi:			
Central Region: Dzalanyama P.A:	70.6% 77%	29.4% 23%	1) rural and urban; 2) trade extensive due to negligible wildlife reource base in communal areas; 3) limited potential for subsistence supply; 4) trade very important as supply source; 5) mainly smaller more available crop raiding species traded in Central region communal areas; 6) some larger species supplied from protected areas in Malawi and from neighboring Mozambique.
Mozambique:			
Maputo Province:	100%	0%	1) urban; 2) well developed trade industry servicing lucrative highly priced urban markets; 3) revenues substantial; 4) many full time traders; 5) trade mechanisms range from cooked food stalls to open markets; 6) trade open due to limited law enforcement.

Source: TRAFFIC survey data, 1998.

markets as far away as the more densely populated Kenyan border, and in Lupane and Chivhu rural districts of Zimbabwe more lucrative urban markets of Harare and Bulawayo are targeted to some extent. In the survey areas of the Luangwa Valley in Zambia, bush meat is supplied to the Lusaka urban market located many hundreds of kilometers away via the Chipata-Lusaka highway. Although some commercial traders targeted more lucrative markets in urban areas, trade within most of the rural survey areas occurs in local markets. Trading mechanisms employed are in all cases directed by the secrecy required in dealing with an illegal product. In many countries, such as Kenya and Malawi, illegal brew bars are a popular mechanism for sale due to the need for secrecy in trading both brew and bush meat. Trading methods vary, with the safest mechanism of house-to-house sales within the local village area being the most popular due to increased secrecy involved with this type of trade. Contracts between hunters and end consumers or trader middlemen are also popular methods for the secrecy they represent.

Countries such as Zambia, Mozambique and to some extent Malawi have established well-developed and complex rural to urban trade supply networks. In such cases, lucrative urban prices motivate greater levels of trade and numbers of people who derive their sole income from the activity. In Maputo Province, Maputo city maintains the highest prices for bush meat and consequently attracts most of the bush meat supplied from the province. Trade routes have emerged to satisfy the city's demand, and involve many categories of stakeholders ranging from commercial hunters operating with vehicles and semi-automatic weapons, to intermediate traders who buy in bulk from supply areas of the province, to urban market traders to bush meat cooked food stall owners. Similar complex trade supply routes and categories of traders are also observed in Beira town of Sofala Province of Mozambique.

Of all countries, Mozambique is characterized as having a trade that is relatively open. In urban areas, bush meat is displayed openly in market stalls, and roadside traders freely show their products to passers by. Such freedom of sale is generally attributed to the lack of any adequate law enforcement capacity within the country. In all other countries, bush meat trade mechanisms are discrete, and in Lusaka, Zambia urbanized trade primarily occurs within traders' households and involves only trusted customers. Trade in the smaller species such as insects, rodents and birds is generally not regarded as illegal. Due to the perceived legal nature of mini-fauna trade, sales occur openly in all countries with insects freely sold in open formal markets of Lusaka, and insects, rodents and birds sold throughout the markets and roadsides of the Central region of Malawi.

Hence, in both urbanized and rural areas, bush meat trade supply represents an important informal industry. The increasing emergence of trade as a major source of bush meat has resulted in positive implications to community development in many survey areas. Most rural areas are characterized with limited potential for alternative wage or business employment, and bush meat sales represent a valued mechanism to generate cash incomes. Economic values realized by traders throughout the countries of the study are substantive and more than adequately compete with alternative formal livelihoods or professions.

Conservation Implications of Bush Meat Utilization and Trade

Wildlife availability differs according to the habitats and locality of the survey areas. Regardless, all survey areas reported a decline in wildlife populations. Causes for such declines are varied, but generally result from pressures exerted from alternative land uses such as livestock production and agriculture. In the survey areas of Botswana, range degradation, habitat loss and erection of veterinary cordon fences motivated by livestock production have resulted in negative impacts on wildlife numbers. In Kitui District of Kenya, habitat loss through increasing sub-division of land for agriculture, and soil degradation caused by the continued promotion of unsuitable land use in a semi-arid and infertile district, are believed to be major reasons for wildlife loss in recent years. In survey areas of Malawi,

increasing human populations and demand for land has reduced wildlife habitats considerably, with the result that most larger wildlife species are now confined to pockets of remaining habitats and protected areas. The role that bush meat motivated hunting has played in decreasing wildlife populations is uncertain due to the preponderance of many negative environmental issues that affect all of the survey areas in one way or another.

However, bush meat motivated hunting in certain survey areas and countries is likely to be the major impact on wildlife populations. In Tanzania, for example, bush meat off-take by communities in western Serengeti and Meatu Districts is believed to have a larger impact on wildlife status than other concerns of land degradation and habitat loss due mainly to low human populations in such areas. In Mozambique, reductions in wildlife populations especially in protected areas have been directly attributed to bush meat hunting. In Malawi, larger species are mainly confined to protected areas, yet bush meat motivated hunting has similarly caused declines in populations occurring in these areas. Zambia has one of the largest urbanized populations in Africa, resulting in low rural human population densities over large parts of the country. In the Luangwa Valley survey areas that are characterized by low soil productivity and limited livestock production because of tsetse, bush meat demand represents the largest impact on wildlife populations. This is in part confirmed by the fact that zebra and hippo populations are healthy within the valley because of the widespread belief in the past that these species were considered taboo or totem and were not hunted.

Hence, bush meat motivated hunting is believed to constitute a major impact on wildlife populations in many survey areas, but its importance in relation to other environmental issues is hard to differentiate. Regardless, bush meat demand plays an important role in determining wildlife population status in all survey areas. Such impacts are likely to increase as human populations rise and demand for bush meat increases. The value of bush meat to communities has increased considerably regardless of whether it is obtained for subsistence or through trade. Decreasing standards of living are a norm throughout most survey areas of the study, and thus bush meat values are increasing and are resulting in additional subsistence and trade motivated hunting pressure. The emergence of trade and a recognized cash value of bush meat are likely to catalyse the negative effects of demand. Decreasing wildlife populations and increasing demand for bush meat has in all survey areas resulted in overall increases in bush meat prices.

Rising prices for bush meat have motivated hunters and traders to maintain supply from an ever increasing variety of species from ever decreasing populations. A good example is in Dande communal district of Zimbabwe where wildlife availability in Ward 2 has reduced significantly. Owing to increasing demand, prices for bush meat are almost double of those obtained in Ward 4 where wildlife availability is far greater. Increased lucrative returns have resulted in Mozambican traders meeting demand from the neighboring country, and in undertaking hunting within the local area on a more commercialized and, in many cases, unsustainable basis. Such profit motives have increased negative impacts on particular species in other survey areas. Larger ungulates that are preferred for their taste but largely unavailable within the communal lands of Kitui District, for example, are now actively hunted from protected and gazetted areas by trade-motivated hunters due to the increased revenues obtained from these higher-priced species. Equally, in Malawi, where protected areas represent the last vestiges of habitat for most of the larger species in the country, the lure of profits means they are increasingly targeted for bush meat trade.

The increasing value and demand associated with bush meat has given rise to unsustainable hunting and supply mechanisms. All of the survey areas reveal a dynamic of the increased use of more sophisticated and, in most cases, unsustainable hunting weapons and techniques. With declining wildlife numbers, hunter's catch per effort has declined in most survey areas. Profit motives and the increased value of bush meat have led hunters to continue supply although the effort required is now far greater. To improve catch per effort, more sophisticated and unsustainable methods are used such as wire snaring

and night torch hunting. In Tanzania, long line wire snares result in greater numbers of animals being caught than can be effectively removed from the area. Wire snaring requires less time, reduces risk of apprehension and results in greater catches. In Tanzania, and especially in the Serengeti ecosystem, the negative impact on wildlife populations from wire snaring has been substantive, and is beginning to be reflected in countries such as Zambia.

The yearlong demand for bush meat has also resulted in the gradual erosion of traditional hunting seasons. Increased numbers of hunters and traders that rely on bush meat revenues as their most important cash income has resulted in their undertaking hunting and trading for longer periods of the year. In Kitui District of Kenya, and also in the Tanzania and Botswana survey areas, traditional hunting seasons are gradually disappearing. This means wildlife no longer benefit from recovery periods during closed hunting seasons. Other traditional management mechanisms, such as gender selection of hunted species and prohibitions on the hunting of gravid females, are of less concern in areas such as Kitui District, and Lupane and Chivhu Districts in Zimbabwe, and traditional totem and taboo systems that reduced the use of certain species altogether are also declining in many areas. With the decreasing availability of wildlife, communities now utilize most species, with taboo and totem restrictions being discarded. This dynamic is perhaps best represented in the Luangwa Valley of Zambia, where in the past hippo and zebra were not hunted or utilized, and as a result their population numbers in the area were healthy. As hunting catch per effort has declined for other more preferred species such as Cape Buffalo, more and more hunters have turned their attention to these once taboo and totem species.

Table 11

Regional overview of questionnaire response on conservation implications of bush meat utilization

Country	Status of Demand	Status of Supply	Status of Prices	Main Conservation Implication Issues
Mozambique:	Increasing	Decreasing	Increasing	1) bush meat viewed as a traditional and free resource; 2) negligible law enforcement; 3) extensive, lucrative and open trade; 4) use of ex-military weapons; 5) high off-take from protected areas; 6) limited CBNRMP initiatives; 7) reliance on larger, higher priced species; 8) demand based on taste and less responsive to price change.
Kenya:	Increasing	Decreasing	Increasing	1) reduced catch per effort; 2) increasing trade supply; 3) increased use of sophisticated weapons; 4) higher prices for certain less available species; 5) off-take from protected areas; 6) negligible law enforcement; 7) erosion of traditional hunting seasons.
Malawi:	Increasing	Decreasing	Increasing	1) larger species targeted from PAs; 2) greater use of firearms in PAs; 3) supply trade motivated; 4) limited conservation implications on mini-fauna mainly utilized in communal areas due to seasonality and high fecundity of species; 5) demand in part based on taste and less responsive to price change.
Zimbabwe:	Increasing	Decreasing	Increasing	1) greater use of more efficient hunting techniques; 2) traditional hunting season still largely intact but limited traditional management through taboos and totems.
Zambia:	Increasing	Decreasing	Increasing	1) trade motivated with lucrative profits; 2) high urban/rural trade industry; 3) use of more efficient hunting techniques; 4) reduction in traditional hunting seasons; 5) reduction in taboo and totem restrictions; 6) demand based on taste and less responsive to price change.
Tanzania:	Increasing	Decreasing	Increasing	1) trade greatest supply; 2) increased use of wire snaring; 3) no identifiable traditional hunting seasons; 4) bush meat motivated hunting believed to be greatest impact in wildlife populations.
Botswana:	Increasing	Decreasing	Increasing	1) emergence of trade; 2) decline in meat sharing; 3) decline in catch per effort; 4) increased use of more sophisticated and illegal hunting methods; 5) reduced effectiveness of traditional wildlife management systems such as taboos/totems.

Source: TRAFFIC survey data, 1998

The decreasing role being played by traditional management mechanisms, and the lack of effective external law enforcement, especially outside of protected areas, gives rise to serious conservation implications throughout the countries of the study. Bush meat utilization, and increasing subsistence and trade-accrued values, are leading to unsustainable harvesting techniques, which have an increasingly negative impact on wildlife populations. The conservation and community development implications are dire, and unless immediate action is taken, will likely result in the loss of many valued resources.

III. CONCLUSION

The utilization and trade of wild meat in the countries of this study represents an extensive legal and illegal industry that affects a considerable proportion of people. The wild meat industry contributes substantially to individuals' standards of living and the economic welfare of the countries studied. The legal industry through such mechanisms as game ranching/farming, cropping/culling, problem animal control and licensed hunting, currently supplies significant quantities of game meat. Revenues obtained from game meat sales are, however, limited and are restricted by external and local policy and legislative constraints. Such restrictions have resulted in the theoretical advantages of wildlife meat production being largely unrealized. In a region characterized by the existence of extensive areas of semi-arid and arid rangelands, such under-achievement of the legal game meat production sector has resulted in wildlife still being viewed as an inferior land use option in many areas.

Game meat production is of critical importance in promoting wildlife as a land use option, especially in areas of the country where other wildlife uses such as photographic tourism and safari hunting are less viable. On private lands, game ranching and the effective use of wildlife for meat production has the ability to achieve substantial conservation success, as exemplified in Zimbabwe. In less secure land tenure areas of the region, legal meat production through directed cropping and culling initiatives, or through non-directed problem animal control and safari hunting currently plays a critical role in the devolution of wildlife benefits to communities that is a prerequisite for achieving greater community based wildlife management. Game meat in many cases is the most direct and tangible benefit accruing to communities, and is often measured far in excess of any economic values. However, awareness of the importance of the resource, especially when game meat is regarded as a by-product from problem animal control or safari hunting is often lacking, resulting in its ineffectual utilization. The legal game meat industry is characterized by limited support that is related to a general lack of importance associated with the industry. Policy and legislative change together with greater efforts to effectively promote the industry and create a conducive environment for its development are required as a matter of priority, so that it's full potential in meeting social, conservation and economic objectives can be achieved.

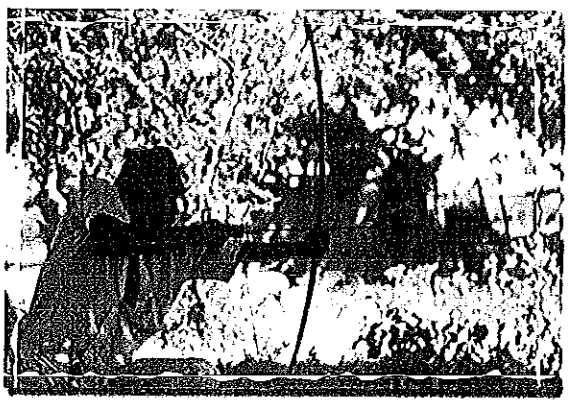
In contrast to the legal industry, illegal bush meat utilization and trade is believed to be developing and increasing at a considerable rate. The use of bush meat is an important social and economic activity that occurs in many habitat and ethnically diverse areas. Its role in maintaining communities' livelihoods, food security and nutritional status through subsistence consumption is critical to many, and the emerging importance of trade markets has resulted in bush meat being viewed as a considerable economic resource that contributes substantially to household and national economies. Bush meat is increasingly being regarded as a valued resource due to the direct benefits it currently provides to communities. Decreasing standards of living and increasing human populations are resulting in an overall increased demand for the resource.

A continuing decline in many wildlife populations throughout the countries studied is apparent. Such declines are caused by a range of environmental factors such as habitat loss, conversion to agriculture

and livestock production, and excess hunting pressure. Regardless of the primary cause of decline, additional bush meat off-take pressure in most cases is believed to be unsustainable and contributes negatively to the conservation of the wildlife resource base. Increasing demand and values associated with the bush meat resource are currently believed to be placing unsustainable pressure on wildlife populations. Such increased values of bush meat, however, provide the potential for wildlife to begin to be viewed as a beneficial resource. If legally provided for, bush meat benefits may result in wildlife in suitable semi-arid and arid rangelands beginning to compete with other land uses such as agriculture and livestock production which are less suitable to these generally dry and infertile areas.

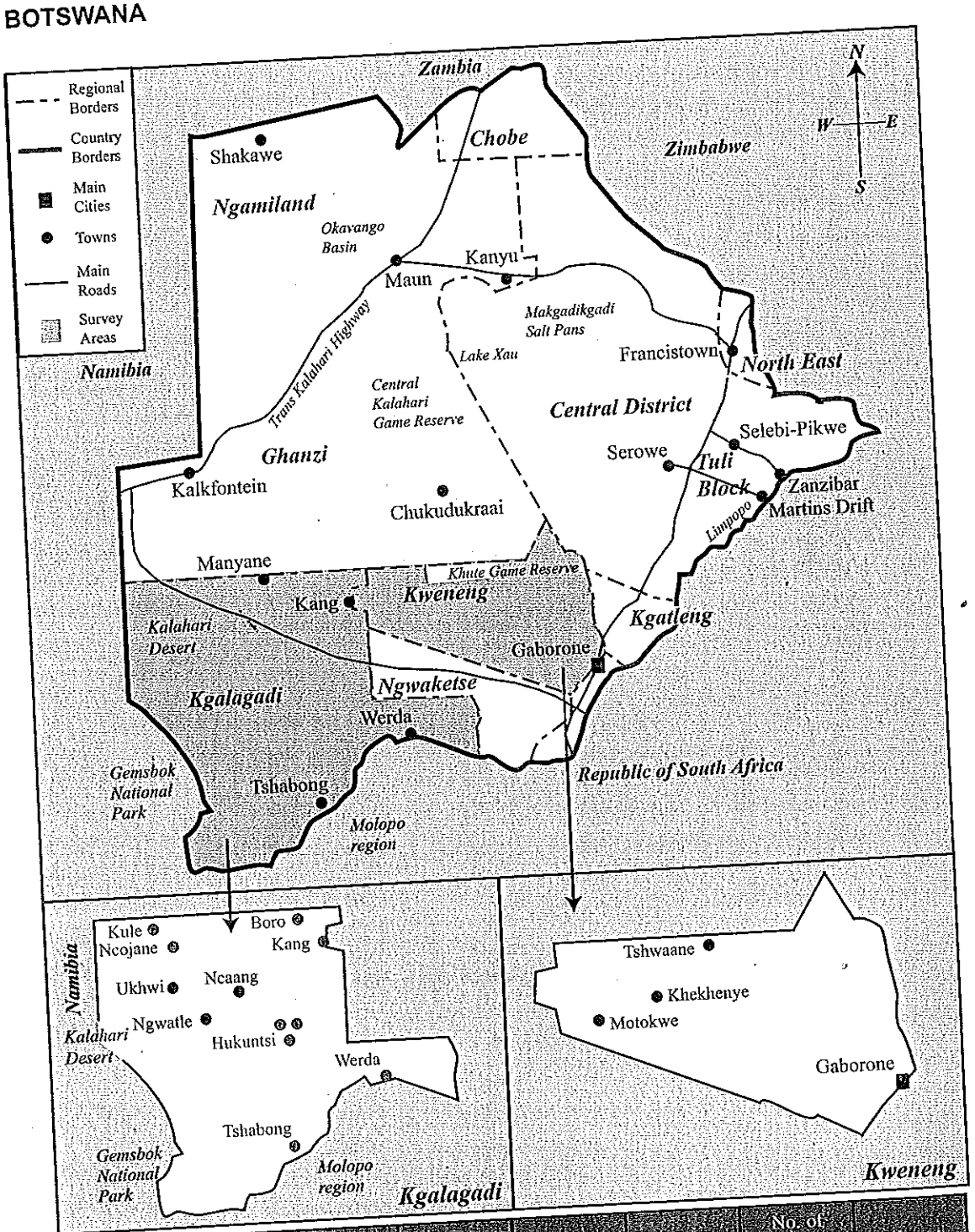
The realization of such potential for promoting the sustainable use of the wildlife resource through legalizing the utilization and trade of its meat values is presently being achieved through the implementation of many community-based natural resource management programmes. Such initiatives need to be fully supported and expanded through necessary policy and legislative change in many countries that will allow for the greater devolution of wild meat benefits to communities directly. The initiation of such programmes in wildlife areas of the study countries where wild meat production would be the only viable wildlife use needs to be implemented on a pilot basis as a matter of priority. This would provide the basis for determining if the meat value of wildlife would result in necessary returns for promoting wildlife as a preferable land use.

Wild meat represents a valued resource to the countries of the study, however it is not currently being fully harnessed. The resource provides the potential on private lands to contribute significantly to national economies through game ranching and farming. In communal areas, regulated wild meat production and supply through greater community-based management has the potential to make wildlife a valued asset that would be protected and used sustainably. Effective use of the wild meat resource has the ability to achieve conservation and community development throughout large areas of the target study countries. For such potential to be achieved, considerable effort is required to increase levels of monitoring and regulation of the current industry, and to initiate comprehensive programmes to fully support wild meat production in private and communal lands.



Traditional bow and arrow bush meat hunter.
Rob Barnett-TRAFFIC

BOTSWANA



Settlement	Population	No. of Households Surveyed	Sample size
Ukhwi	430-450	66	47%
Ncaang	150-170	21	57%
Ngwatle	135-190	12	67%
Total			

Settlement	Population	No. of Households Surveyed	Sample size
Motokwe	1464	232	34%
Khekhenye	314	44	48%
Tshwaane	343	58	53%
Total			

CHAPTER TWO
BOTSWANA

I. BACKGROUND

Area: 582,000 km². ***Population:*** Estimated at 1.6 million with an annual growth rate of 3.5%. ***Density:*** 1.6 per km².

Botswana is a landlocked country that shares borders with the Republic of South Africa, Namibia, Zambia and Zimbabwe (SADCC/GTZ, 1989). Botswana can be divided into four wildlife habitat regions. The Kgalagadi region, comprising more than two-thirds of the country's land area, is characterized by sandy infertile soils and is representative of the southwest arid biome. The Okavango/Chobe region contains a rich fauna with Central African elements, and the Limpopo region contains southeast lowland faunal elements. The Makgdikgadi region represents a transitional zone between that of the Kgalagadi and Okavango/Chobe regions (Barnes, 1990). The country is semi-arid with mean rainfall ranging from 650 mm in the northeast to less than 250 mm in the southwest. Rainfall is highly variable and drought is endemic (T. Traill-Thomson, 1998).

The topography of the country has determined human settlement patterns (Campbell, 1980). At present the higher rainfall areas in the east and southeast support about 78% of the human population (Silitshena, 1993). However, a significant redistribution of the population has occurred. In 1964 the population was predominantly rural with an estimated 4% living in urban areas, but during 1981 to 1991 the urban population grew from 17.7% to 33%. This change was due primarily to severe drought between 1981 and 1987 that caused significant declines in agricultural production and livestock populations (BIDPA, 1997b). The drought forced the sedentarization of many Remote Area Dwellers, and higher wage earnings in large settlements or urban centers contributed to urban migration. Approximately 45% of urban households earn less than USD 89 per month, but for rural households the figure is 75% (Silitshena, 1993).

At independence in 1966, Botswana was one of the least developed countries in Africa, with its population depending largely on subsistence agriculture which contributed over 40% to the GDP (MOA, 1990). The post-independence period brought significant economic and social changes, facilitated by the emergence of a minerals industry. By 1989 the mining sector in Botswana represented 51% of total GDP compared to 3% from the agriculture and livestock industry (BIDPA, 1997a). The expansion of the minerals sector in the 1970s was mainly responsible for an estimated 13% GDP growth rate during the 1966-1989 period. Although contributing less to overall GDP, the agriculture (mainly livestock) sector is still one of the most important industries in the country. The sector grew steadily from 1966 to 1981, with declines after this period attributed to the 1981-87 drought and more recently to cattle lung disease in Ngamiland District (T Letsie, 1998). Cattle have an immense socio-cultural significance in Botswana and in 1989 cattle numbered over 2.5 million and goats two million (Central Statistics Office, 1997).

Despite Botswana's economic transformation, the poverty level remains high among urban and rural populations, and in recent years, unemployment levels have risen (T Letsie, 1998). Recurrent drought has increased the rural-urban income disparity, and has led to a high proportion of destitute rural communities representing 14% of total population (BIDPA, 1997a). In recognition of the physical limitations for increasing food production in many rural areas, the Government introduced the *Food Security Policy Strategy, 1991.* This policy is aimed at increasing income levels in order to purchase food, and also includes provision for drought relief food rations and other services for rural destitute communities (Sigwele, 1993).

Botswana is characterized by significant cattle ownership, and the socio-cultural importance of the livestock industry is evident in Government policies favoring cattle related interests over and above wildlife, in the majority of Botswana's land use policies (T. Traill-Thomson, 1998). The commercial wildlife sector does not contribute significantly to national or rural development (Arntzen and Fidzani, 1997). The informal wildlife sector in relation to utilization of meat is, however, important in maintaining livelihoods of many rural communities and especially for those classed

as destitute, where low monthly incomes and few shops or butcheries in rural areas have led to limited alternative protein sources (T. Traill-Thomson, 1998).

In the past wildlife was abundant in Botswana, but this resource experienced rapid declines between the 1950s and 1980s, although some stabilization of wildlife numbers occurred in the 1990s. The greatest causes of wildlife depletion are rising human populations and livestock development resulting in loss of wildlife habitat and severe habitat degradation. Illegal hunting and pressure to convert Wildlife Management Areas to cattle ranching have inhibited population recoveries (Thouless, 1997). Under the EU/Lome Convention, countries may import Botswana's domestic meat on a duty free basis, if it originates from tsetse and foot and mouth disease (FMD) free zones (Woodford, 1989). This has therefore resulted in the erection of veterinary control fences which have effectively divided the country between southwest and northeast, restricted animal movements and impacted considerably on wildlife population levels (Taolo, 1997). For example, over the past 15 years, populations of Blue Wildebeest and Red Hartebeest have suffered declines of over 90%, and Cape Buffalo and zebra populations in the north have declined by 60% and 70% respectively (Perkins and Ringrose, 1996).

Reduction in wildlife numbers represents a considerable community development loss, especially in rural areas, and has adverse effects on rural livelihoods in terms of provision of meat and future development opportunities through wildlife utilization (Arntzen and Veenendal, 1986). During the period 1981 to 1997, the wild meat available per person per year in Botswana declined from about 4.5 kg/person in 1980 to less than 0.5 kg/person in 1996 (Arntzen and Fidzani, 1997).

Over 30% of the country falls under some form of wildlife management with national parks totalling 7.6%, game reserves 10.3%, gazetted wildlife management areas (WMA) 11.35% and proposed WMAs a further 10.6%. Proposed and gazetted WMAs act as buffer zones between parks and reserves and hold considerable wildlife resources (Broekhuis, 1997). Approximatel 6% of Botswana is privately owned and this land is grouped into three main blocks: Tuli Block and the Limpopo Valley, the Molopo region in the south and the Ghanzi Block in the west. In Tuli, game viewing and photographic safaris predominate. In Ghanzi Block, hunting occurs on several game ranches and in the Molopo region wildlife is not commercially exploited (Grossman, 1992). Most land in communal areas has been divided into Controlled Hunting Areas (CHA) within WMAs. In some CHAs, commercial safari hunting occurs on a leased concession basis, while in others the community receives a hunting quota from the Government, which they manage themselves. This recent development reflects a move to provide proprietary rights to ensure more sustainable use of the wildlife resource (NRMP, 1994; T. Traill-Thomson, 1998)

II. POLICY AND LEGISLATION

Wildlife policy in Botswana is administered by the Department of Wildlife and National Parks (DWNP), which falls within the Ministry of Commerce and Industry. The *Wildlife Conservation Policy of 1986* reflects the Government objective of sustainable utilization of wildlife resources to the extent that "sustainable utilization meets the needs of the present without compromising the ability of future generations to meet their own needs" (KCS and CWT, 1995). The policy refers to the entire spectrum of wildlife utilization activities that result in a supply of game meat. Activities include non-safari hunting (subsistence hunting practised by "less well to do citizens" for game meat), safari hunting (practised by "non-residents, residents and some affluent citizens"), culling and cropping operations, and game ranching and farming. The wildlife policy recognizes the ownership of wildlife to be vested in the state on behalf of the people, although right of ownership of animals is provided for any private landholder who has erected a game proof fence around their property (FGU-Kronberg, 1991; Mathumo, 1992).

Botswana's principal law pertaining to wildlife utilization is the *Wildlife Conservation and National Parks Act, 1992*, which is supported by the *Unified Hunting Regulations, 1979* and various other subsidiary acts such as the *Fauna Conservation Amendment Act of 1979*. The *Wildlife Conservation and National Parks Act, 1992* regulates

the harvest, possession, sale and trade of wildlife. The *Tribal Lands Act, 1968* makes provision by the Tribal Lands Board for granting rights to use lands within WMAs and CHAs, although the power to grant rights to utilize wildlife within these areas lies with the DWNP. The *Diseases of Animals Act, 1977* also affects wildlife utilization through restrictions on the movement of wild meat which produces particular impacts in a country that is characterized by large distances between wildlife areas and urban markets (T. Traill-Thomson, 1998).

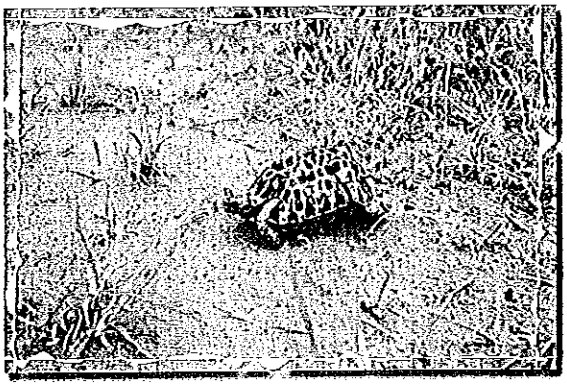
III. CONSUMPTIVE WILDLIFE UTILIZATION CONTEXT

Botswana is relatively unique within the region in that wildlife policy recognizes the right of all Batswana to utilize and benefit from the wildlife resource. Hence hunting regulations allow for many urban and rural peoples to gain access to the game meat resource within the country, and this has resulted in legal game meat supplies being substantial on a national basis (Murray, 1980; T. Traill-Thomson, 1998). Other sources of legal game meat are less significant, and although wildlife policy firmly supports the notion of developing the game ranching and farming sector, in practice little financial, technical or legislative support is provided with the industry being characterized by misunderstanding of policies and legislation, and an inability to live up to its potential for expansion (White, 1985; Conybeare and Rozemeijer, 1991; Barnes and Kalikawe, 1992). In contrast to many other countries of the study, Botswana provides the greatest mechanism for legal game meat supplies through current hunting licenses. Although these are available at subsidized fees to all categories of residents ranging from low-income remote area dweller rural communities to higher income urban dwellers, illegal off-take conducted mainly through the over use of license quotas represents a substantial proportion of the wild meat supply within the country (FGU-Kronberg, 1988a; NRMP, 1994; DWNP, 1997; T. Traill-Thomson, 1998).

i.) Legal Game Meat Utilization

Potential legal game meat production in Botswana is substantial with estimated annual supplies amounting to 2,397 mt representing an economic value of USD 2,023,267 if all allocated quotas were effectively utilized. As seen in Table 12, the largest supply derives from the licensed hunting sector (73.4%), which in order of game meat priority includes, Special Game Licenses (40.2%), Single Game Licenses (15.9%), Safari Tourism Hunting (13.5%), and Small Game Licenses (3.8%). Licensed bird hunting is believed to represent a very important source of game meat nationally, that could be the largest legal supply if all quotas were utilized, but during this study bird hunting could not be accurately quantified. Wildlife community quotas are increasingly becoming an important source of game meat within the country (10.5%) and in the future will largely replace that currently supplied through the issuance of Special Game Licenses.

Legal game meat production from all utilization sectors within Botswana is intended to remain within the overall wildlife quota, the Recommended Allowable Off-take (RAO), set each year by the DWNP. The RAO had a potential off-take of 2,165.8 mt in 1996, but dropped to 1,228.5 mt in 1997 (representing a maximum of 30,272 animals). Thus a 43% decrease in potential harvest resulted, with quotas for the majority of species reduced due to overall declines in wildlife populations. Increased quota allocations occurred for only five out of 35 species, and were all for smaller



Leopard tortoise.
Nina Marshall-TRAFFIC

species such as hares, jackals, foxes and wild cats. Single Game Licenses, community hunting quotas and safari hunting quotas are allocated according to the RAO. However, Special Game Licenses, Small Game Licenses, Bird Licenses, Problem Animal Control, and landholders privilege quotas are not taken from the RAO quota, with an additional set quota allowed per hunter for a given period in any CHA. This has resulted in a total potential off-take from all 1997 licensed hunting of 2,397 mt, which is far higher than the RAO quota for the year of 1,228.5 mt. For example, the RAO for Gemsbok during 1997 was 1,037 animals, but the total potential off-take was 2,803 animals if set quotas from Special Game Licenses (1,766) are included. Although the potential off-take is almost certainly much higher than actual off-take because quotas may not be filled, high potential off-take figures do highlight the need for all licensed hunting to come under the RAO to ensure sustainable harvesting (T. Traill-Thomson, 1998).

The legal game meat industry predominantly involves localized domestic use, due to restrictions imposed by veterinary and health regulations which curtail the movement of meat products through veterinary control fences throughout the country. Although international and regional legal trade is believed to be limited for these reasons, Botswana Department of Customs and Excise also do not maintain records for game meat export, and indeed any game meat

Table 12

Estimated annual legal game meat production in Botswana during 1996-1997

Description	No.	Estimated Game Meat Potential Off-Take per Annum (mt)	Average Price per kg (USD)	Estimated Total Value per Annum (USD)	Contribution to National Estimate (%)
Total RAO Wildlife Quota, 1997:	*30,272 max. animals (excluding birds)*	*1,228.5*	*USD 0.85*	*USD 1,044,225*	-
Within RAO Wildlife Quota:					
Safari Hunting, 1997:	2,688 animals	320.7	0.85	272,595	13.5%
Community Area Quotas, 1997: (Eight Areas in Ngamiland)	5,850 animals	251	0.85	213,350	10.5%
Single Game Licenses, 1996: (Citizen and Non-citizen)	7,726 animals and licenses issued	377.6	0.85	320,960	15.9%
Outside RAO Wildlife Quota:					
Special Game Licenses, 1997:	883 licenses issued Potential off-take of 176,600 animals	956.1	0.85	812,685	40.2
Bird Licenses, 1996:	3,946 licenses issued Potential off-take of 15.9 million birds	n/a	1.96	n/a	n/a
Small Game Licenses, 1997:	577 licenses issued Potential off-take 43,852 animals	89.5	0.85	76,075	3.8%
Land Holders for Consumption (Subsistence) Privilege Permit, 1997:	63 permits issued Potential Off-take 6,198 animals	270.9	0.848	229,755	11.3%
Game Ranching and Farming, Land Holders for Profit (Commercial) Privilege Permit, 1997:	20 game ranches/farms	17.9	5.138	91,982	4.5%
Problem Animal Control, 1996:	89 animals	113.8	0.051	5,865	0.3%
Total Potential Licensed Wildlife Off-Take, 1996/97	***243,003 animals (excluding birds)***	***2,397.5 mt***	-	***USD 2,023,267***	-

Note: RAO-Recommended Allowable Off-take
Source: T Traill-Thompson, 1998.

that may be exported is classified under the aggregate title of either "Other, including edible flours and meals of meat or meat offal" or "Other meat and edible meat offal, fresh, chilled or frozen". During the period 1989 - 1996, 4,643.2 mt of "other meat" and "edible flours" meat were exported from Botswana with 156.8 mt of that quantity exported in 1996. Possible proportions of actual game meat exported cannot be ascertained, although the export of rabbits and hares could be identified which represented 11.9 mt exported from Botswana over the same period with 0.45 mt exported in 1996. The only other wild meat identified as exported was frog legs in which 4.8 mt were exported to South Africa between 1989 and 1996 (T. Traill-Thomson, 1998). It is likely that export is limited and game meat production from the different legal sectors within the country is mainly utilized locally within the country.

Licensed Hunting:

Botswana is probably the only country in Africa where hunting by citizens is a right and not a privilege (NRMP, 1994). The replacement of tribal hunting regulations, which previously varied by district, with a "unified hunting system" under the centralized administration of DWNP, was undertaken to provide some means of controlling hunting quotas and was intended to promote the "use of the country's wildlife resources on a rational and fair basis for the benefit of all Botswana while ensuring that the rural people dependent upon wildlife were not deprived of subsistence and income from the resource" (Hitchcock and Masilo, 1995). Under the unified hunting regulations, the DWNP allows for the commercial sale of game meat from all classes of hunting, whether from citizens or non-citizens, except for Special and Small Game Licenses where trade is prohibited (FGU-Kronberg, 1988b).

Currently, licensed hunting involves the granting of licenses to members of the public under a quota system. Licenses are sold or issued to citizens, residents and non-residents under differentiated fee structures and quotas provided by the DWNP (NRMP, 1994). There are four types of licenses: Single Game License, Small Game License (citizens only), Bird License, and the Special Game License (eligible citizens only). Hunting quotas are also provided to safari hunting operators, to land owners under the landholder's privilege permit, and wildlife hunting quotas allocated to communities. The purpose of each type of quota and license varies, as do the species and numbers allocated (T. Traill-Thomson, 1998).

Safari Hunting: Safari hunting primarily occurs within the Ngamiland and Chobe CHAs, which are either private concessions or community managed areas. Quotas during 1997 consisted of 12,486 animals of which 2,688 animals or 21.5% of the quota was utilized. Species most hunted include lechwe (666), Impala (533), and kudu (288). The quotas of high-value trophy species such as Cape Buffalo and elephant are always fully utilized, and result in substantial quantities of meat. However for the antelope species in which a larger quota is given many species are not hunted and off-take is often less than one-third of the quota. This is determined by the demand from safari company clients. Requests by safari companies to cull the rest of the quota for meat production have been denied by the DWNP, and in most cases outside of community managed areas, meat resulting from trophy hunted animals is provided to camp staff and little is distributed to rural communities (T. Traill-Thomson, 1998).

Research conducted during 1997 on all safari hunting companies (11) and community hunting management areas (7) located in Ngamiland and Chobe reflects the dynamic of limited quantities of trophy hunted game meat reaching rural communities. The carcass from a trophy shoot is the property of the client. The meat can be divided in four ways: feeding the camp; as bait; given to the camp staff who make biltong; and the balance, usually 50% as agreed in the concession lease if relevant, is handed over to the associated community. The community can either consume or trade the meat. Originally it was intended that the meat be given to only the destitute and most poverty stricken members of the community. In practice, though, this did not work and a system was devised whereby community members paid a small amount for the meat. Problems, however, also arose over what happened to trust funds generated from meat sales and now the meat is generally distributed freely to all community members on a first-come first-served basis (T. Traill-Thomson, 1998).

The total quantity of meat received by communities during the hunting season in Ngamiland and Chobe (19.8 mt) is marginally lower (47.1% of meat distributed) than the quantity received by camp staff (50.9%), with hunting clients using a minimal proportion of meat (2%) as bait. Communities receive a larger proportion of meat at 80% and 47.5% respectively when larger species are hunted such as elephant and Cape Buffalo. Transport of game meat to often remote rural communities in the area results in the carcasses of smaller animals such as Impala being provided to camp staff. Only when sufficient quantities of meat are available from larger species is effort made to transport and distribute meat to communities. Overall, the distribution of meat from safari hunting is well characterized by one operator's comment "Apart from elephant meat, communities are still not getting much meat.... the old system of the hunter staff taking it all seems hard to get rid of" (Safari company owner, pers. comm., to J. Traill-Thomson, 1998).

Special Game Licenses: Remote Area Dweller (RAD) hunters dependent on wildlife for subsistence and livelihood income are issued free Special Game Licenses under the unified hunting system. Special Game Licenses were issued to legitimize subsistence hunting using traditional weapons only, to protect RADs from harassment and prosecution, and to allow them to further benefit economically from the sale of wildlife products (although commercial meat trade has never been legalized). Field officers of the Remote Area Development Programme (RADP) assist and advise DWNP licensing officers concerning the eligibility of RADs requiring licenses. Quotas have been exceeded and licenses misused, and as a result, there has been a shift from individual licensing to community management of an allocated wildlife quota. For an area to be allocated a community management wildlife quota it must have established a Trust that is authorized to represent the community. The time required for this process has meant that many communities are still using Special Game Licenses (T. Traill-Thomson, 1998).

During 1997, a total of 883 Special Game Licenses were issued across Botswana with the majority in Kgalagadi, Kweneng and Ghanzi Districts. Each license makes provision for the hunting of 30 duiker, two Gemsbok, 30 Steinbok, three warthog, one kudu, four springhare, 50 Bat Eared Fox, 50 African Wild Cat, ten Cape Fox, ten Caracal, four monitor lizard, and unlimited numbers of Black Backed Jackal. As such the potential off-take from 883 Special Game Licenses issued during 1997 is over 176,600 animals hunted and 956.1 mt of meat supplied. If a Special Game License holder successfully hunted his entitlement his family could consume approximately 16 kgs of game meat per month (based on average household size of 6 people). The potential off-take for example of 26,490 duikers and Steinbok, and 44,150 Bat Eared Fox and African Wild Cats is likely to be unsustainable. However, most hunters do not fully utilize their entitlement because they are constrained by traditional hunting methods and a decline in wildlife numbers. Even so, off-take of animals from Special Game Licenses is outside of the RAO and raises concerns as to the sustainability of this licensed hunting sector (T. Traill-Thomson, 1998).

Single Game Licenses: Single Game Licenses are awarded to citizens and residents of Botswana in an annual raffle held by the DWNP in each of the districts. There was a considerable increase in the quotas of 21 out of 33 species allocated for 1997, with entitlements for larger species such as Cape Buffalo, elephant and Eland increasing significantly. Out of the 7,726 Single Game Licenses issued, Steinbok (2,120), duikers (1,946) and kudu (856) were responsible for the majority. In the past, it is likely that most of the game meat available for purchase was associated with this type of license. Extensive overuse of Single Game Licenses was reported to have generated enough surplus meat to enable people to recoup the costs of their hunting trips. Over-hunting on Single Game Licenses has been reported to be up to four times the limit and DWNP have implemented tighter controls following overuse of these licenses during the 1980s, particularly of Cape Buffalo and zebra. It is locally believed that this over-hunting has had a negative effect on the populations of Cape Buffalo and zebra in Chobe and the Okavango Delta (T. Traill-Thomson, 1998).

The Single Game License is issued on a single animal basis and allocated to a specific area. If this area is a concession area the hunter must make additional financial arrangements with the concessionaire. The best hunting areas are generally within the concessions, a fact that causes much dissatisfaction among citizen hunters due to the extra costs of the hunt. Also, animals such as lechwe, reedbuck and Tsessebe concentrate in areas of water, which

again tend to be within the concession areas. Therefore, following the lottery and the allocation of Single Game Licenses each year, trading in these licenses is reported to be extensive.

Species on License	*DWNP Price*	*Market Price of License*
Cape Buffalo	*USD 3.56*	*USD 711.7*
Kudu	*USD 1.78*	*USD 177.9*
Warthog	*USD 0.09*	*USD 17.8*
Impala	*USD 0.36*	*USD 35.6*

Source: DWNP Licensing Department, 1998; T. Traill-Thomson, 1998.

As indicated above, DWNP prices of licenses are also very low in comparison to their black market safari hunting market price in Botswana. Current DWNP prices do not reflect the meat production or safari hunting value of these animals. Success in obtaining licenses through lottery allocations often results in licenses being resold for cash profit to safari hunting companies or to more affluent urban residents (T. Traill-Thomson, 1998).

Small Game Licenses: Small Game Licenses are issued to citizens only and are valid during the hunting season at a cost of BWP 5.00 (USD 1.78). Species available on the license vary slightly by region depending on availability. In Maun, for example, each license enables the holder to hunt five Cape Fox, Caracal, and monitor lizard; 20 Bat Eared Fox, Genet, Cape Hare, Springhare and African Wild Cat; and three South African Crested Porcupine. During 1997, a total of 577 Small Game Licenses were issued with most in the southwestern districts of Kgalagadi (204) and Kweneng (144). Potential off-take is high at 43,852 animals and 89.5 mt of meat. The selling of game meat from these licenses is prohibited and additionally it is unlikely that any illegal trade occurs given that most are small carnivore species. Although hunters will eat all carnivores, the value is placed on the skin rather than the meat (T. Traill-Thomson, 1998).

Bird Licenses: Bird licenses can be purchased by citizens and non-citizens and can be used anywhere except in National Parks. The sales of hunted birds are restricted although some formal trade in Helmeted Guinea Fowl, doves, francolin and ducks does occur. The vast majority of bird licenses are sold to citizens in Central and Ngamiland Districts. For citizens the bird license costs BWP 5.00 (USD 1.78) and is valid for one year. Prices rise for residents (USD 26.70) and for non-residents (USD 71) and the length of validity is limited to a maximum of three months for non-residents (*Statutory No. 54 of 1988, Government of Botswana, 1988*). Part III of the 7th schedule of the *Wildlife Conservation and National Parks Act* outlines 16 bird species that can be hunted under license and potential off-take is very high with more than ten birds a day allowed for 11 species. During 1996, 3,830 citizen bird licenses, and 116 non-citizen licenses were issued. For citizens alone this could represent an annual off-take of 13.9 million birds. Research conducted during 1997 recorded market prices for 12 species specified on bird licenses with average values being about BWP 5.50 (USD 1.95), and consequently potential revenues generated from bird hunting could be substantial. However, quota entitlements are not likely to be filled (T. Traill-Thomson, 1998).

Culling and Cropping Schemes:

Culling was undertaken in the past for tsetse fly (*Glossina morsitans)* eradication and FMD prevention, and in 1964 such culling yielded 713.6 mt of game meat, comprised mostly of Cape Buffalo, kudu and warthog (Child, 1970). Currently, the Department of Animal Health and Production carries out tsetse control with insect traps and targets. Tsetse fly persists in very low densities and no cases of sleeping sickness have been recorded since 1985 (Furstenburg, 1996). Large-scale ecological cropping/culling operations for meat production are not undertaken at present because

of the low densities of game animals and the difficulty of transport (T. Traill-Thomson, 1998).

However, local community quota cropping for meat supply was introduced in 1997 in Community Managed Areas (CMA). Communities that have established an accountable and representative trust can decide collectively what to do with the community quota. The community area wildlife quotas are intended to replace the system of Special Game Licenses (NRMP, 1994). Aggregating the community's potential wildlife off-take enables them to pool their resources, and with a larger communal resource base their wildlife utilization options are broader. Depending on the area and the animals available a community can choose to use the quota itself and consume or sell the meat, or undertake a joint venture with a photographic tourism or safari hunting company. If a joint venture or lease is offered to a safari hunting company, conditions are attached with respect to the use and distribution of game meat derived from trophy hunted animals. For example, 50% of the meat is usually distributed to the community (T. Traill-Thomson, 1998).

In some cases wildlife is culled for meat supply, which during 1997 in eight CMAs of Ngamiland District had the potential to supply 251.03 mt of game meat (or 7.5 kg of meat to each of the 2,786 inhabitants) (Ecosurv, 1997a; T. Traill-Thomson, 1998). The largest quotas are for smaller species such as Steinbok (1,885), duiker (1,340) and Impala (514) with overall quotas being characterized as having limited numbers of larger species such as elephant (31) and Cape Buffalo (50) in comparison to safari hunting quotas. This results in a reduced potential for effective meat distribution to rural communities, although during 1997, in the community managed wildlife quota area of Chobe Enclave in the north of Botswana, game meat distribution from safari hunters constituted an important additional source of protein to communities and is preferred over beef and seen as a speciality or privilege.

In the Chobe Enclave, the full community quota has been sold to a safari hunting company who distributes over 50% of meat from trophy hunted animals. During 1997, this amounted to approximately 13.5 to 14 mt of meat. Meat is effectively distributed, although with about 6,500 people living in the Enclave (Ecosurv, 1996), not everyone receives a portion. Originally meat given to the community in the Enclave was valued at BWP 4 (USD 1.40) per kg, but even when the cost was reduced to BWP 2 (USD 0.71) per kg in 1995, villagers struggled to pay the amount and currently meat is provided for free. As such the economic contribution to the village trust has been negligible representing 1.17%, 1.21% and 9% of total income for the years 1993, 1994 and 1995 respectively. However, social benefits to the community are significant with the Trust ensuring the effective collection and distribution of meat. Two community escorts accompany all trophy hunting clients to ensure that all meat is processed (usually made into biltong) in the field and distributed among the villages of the Enclave (T. Traill-Thomson, 1998).

Problem Animal Control:

There is a small and infrequent trade in game meat by the Government to the people of Botswana as a result of Problem Animal Control (PAC). Because agricultural activities are limited, and grazing areas for domestic livestock are vast, human-wildlife conflict in Botswana is minimal (T. Traill-Thomson, 1998). Nevertheless, the *Wildlife Conservation and National Parks Act, 1992* does make provision for culling of problem animals by DWNP officers (*Part XIV-General, 80.*). Game meat from problem animals is auctioned by DWNP, along with other animals acquired through various means such as road kills, limited conflict with crop agriculture and as meat seized by DWNP officers from unlicensed hunting. During 1996, only 92 animals were auctioned generating BWP 16,481 in revenue. BWP 19,634 was generated by the sale of 89 animals during the first eight months of 1997. In both years the average price was BWP 2.38 per kg. Although average prices are high, a considerable degree of wastage occurs that results in negligible revenue accruing to the DWNP. Total potential meat supply from animals culled during 1996 was 113.8 mt, but only BWP 16,481 (USD 5,865) was realized. If all meat was effectively sold a value of BWP 270,844 (USD 96,385) could have been generated. Principal species auctioned are Cape Buffalo, Gemsbok, kudu and Springbok (T. Traill-Thomson, 1998). In general, PAC auctions result in a negligible supply of game

meat to communities and limited revenue to the Government.

Game Ranching and Farming:

The *Wildlife Conservation and National Parks Act, 1992* makes specific provision through the *Land Holders Privilege Act (Section 20 of WCNPA, 1992)* for game farming and ranching under a long-term permit (Land Holders {Commercial/For Profit} Privilege Permit) issued by the Director of DWNP. This permit allows landowners to own wildlife once a game proof fence has been erected (Mathumo, 1992). Despite the official promotion of wildlife ranching and farming through the Wildlife Conservation Policy, 1986, the industry has not developed to the extent it has in neighboring countries (Conybeare and Rozemeijer, 1991; FGU-Kronberg, 1991; Attwell, 1992). In 1997, there were 20 game ranches and farms in the country of which only a few were producing on a commercial level. While all persons selling game meat are required to have a permit, no information was available from DWNP on ranch/farm game meat production or trade, indicating a limited level of monitoring (T. Traill-Thomson, 1998). An estimated five mt of crocodile meat, 20 mt of Ostrich meat, 30 mt of medium to high quality biltong and 30 mt of high quality fresh or frozen meat was produced in 1991 (FGU-Kronberg, 1991). It was expected at that time that production would increase, however, the projected growth does not appear to have been realized. A survey conducted in 1997 on all game ranches and farms resulted in a minimum estimate of USD 40,464 in game meat sales, and research conducted on the major game meat trade outlets revealed that 17.9 mt of game meat valued at USD 91,982 were marketed. This is likely to be a more accurate value for the game ranching and farming industry in Botswana and indicates that the industry is negligible (T. Traill-Thomson, 1998).

Land Holders (Subsistence Consumption/Not for Profit) Privilege Permit:

The Land Holders Privilege Permit allows landholders to consume game meat derived from their property. This privilege is entitled to any landowner in Botswana, and to persons leasing a piece of land for a period of at least three months. In addition, any bona fide employees of the landowner or the lease, spouse and children are entitled through the *Land Holders Privilege Act* to consume game meat. The quota for the Land Holders Privilege is a fixed one no matter what size the holding is. The permit is valid for one year and no sales of game meat are allowed. The limit set for the maximum number of animals which may be killed during the year are ten animals of kudu, Gemsbok, Blue Wildebeest, Red Hartebeest, Ostrich, and 25 animals of all other species (per the *8th Schedule, Section 20, Wildlife Conservation and National Parks Act, 1992)*(T. Traill-Thomson, 1998).

DWNP should receive returns from each landholder using these privileges but monitoring is presently limited. Supplementary game use was estimated to take place on 250 primarily livestock properties that vary in size from 3,000 to 100,000 hectares (Barnes and Kalikawe, 1992). Most production is reported to be on a small-scale and partially for subsistence or recreation. During 1997, only six DWNP stations reported issuing 63 non-commercial Land Holders Privilege Permits. An 18% survey sample of these properties resulted in an average of about 4.3 mt of game meat being consumed during the year, representing a total national estimate of 270.9 mt, with Impala followed by Blue Wildebeest being the most utilized species. There exists a good demand for fresh Impala meat and a small amount is made into biltong. With respect to other species, the best cuts are generally taken and the remainder of the meat is made into biltong. Local residents in Maun have reported that in Ghanzi

Bush meat hunting weapons seized by wildlife authority.
Rob Barnett-TRAFFIC

District at least, landholders sell hunts on their properties rather than just killing the animals themselves. The feeling was that when they do hunt they definitely sell meat rather than consuming it themselves, so there is likely to be an informal trade in game meat from these cattle posts and ranches (T. Traill-Thomson, 1998).

Rural Communities' Legal Utilization of Game Meat:

Rural communities, and especially Remote Area Dwellers, obtain considerable benefits from legally supplied game meat through hunting licenses and community quota allocations (USAID, 1979; ODA, 1996). Contribution to livelihoods is substantial with some rural communities relying to a greater extent on game than on domestic meat (RIDS, 1974). The majority of protein in the diet of many Batswana comes from wild animals of every kind (von Richter, 1969b; T. Traill-Thomson, 1998).

Three decades ago game meat was thought to represent 60% of the protein consumed within rural Botswana (von Richter, 1969a). Child (1970) estimated that 90.7 kg of game meat was consumed per person per year in many rural areas, contributing to 40% of their diet. The Springhare harvest alone was estimated to supply over 3.4 million kg of meat to 85,000 Batswana per year (Butynski, 1973). A wealth of research reflects the importance of game meat throughout the country with northwest rural communities obtaining between 6.8 kg to 15 kg per month (Silberbauer, 1981; Lee, 1979a; Tanaka; 1980), to communities in the north and southwest of the country consuming between 2.7 kg and 18.2 kg per month (Flemming, 1975; Wilmsen, 1974/75; Murray, 1980). In general, hunting was mainly subsistence motivated; sale of game meat was not a significant source of income in most communities. At the same time, a limited trade in game meat was identified in certain communities such as those in Ngamiland. It was estimated during the mid 1970s that about one half of hunters were cash motivated with hunting in a transitional stage from being purely subsistence to trade motivated (Flemming, 1975).

Reliance on game meat continues to the present day, with the issuance of Special Game Licenses actually increasing, rather than declining. It was thought that reliance would diminish as rural communities became more developed, however, the socio-economic status of many of these communities has declined rather than improved, perpetuating the need for game meat (Hitchcock and Masilo, 1995). For example, subsistence use of game meat was still found to be prevalent in 1993 and 1995 in rural communities just outside of the Central Kalahari Game Reserve (Kent, 1993, Hitchcock and Masilo, 1995).

This continuing reliance on game meat for maintaining the nutritional, food security and economic status of rural communities within Botswana is reflected in current research conducted during 1997 in the Kweneng and Kgalagadi Districts of western Botswana. A summary of the key parameters and dynamics of the utilization of game meat in these survey areas is provided in Table 13.

Importance of Game Meat Utilization:

Research in the Kweneng and Kgalagadi Districts of western Botswana demonstrates that nearly half (47%) of all households hunt and obtain an average of 15.3 kg of game meat per month through Special Game License hunting (2.19 kg per person). The benefits of game meat supply are still important to the majority of inhabitants in these districts, most of which are characterized by RAD settlements that contain little in the way of infrastructure, potential for business or formal wage employment. Limited improvement achieved through RAD development and poverty alleviation programmes, and the greater emergence of a cash economy, has not negated the valuable role that game meat supply plays in these areas.

In six settlements surveyed in the two districts the monthly household income was approximately USD 40.60. Consumption of 15.3 kg of game meat equates to 27.4% of this average monthly income. A greater reliance on game meat is observed in relation to ethnicity and wealth, with poorer and mainly RAD Basarwa community settlements hunting and utilizing game meat to a larger extent. The Ngwatle settlement in Kgalagadi District, for example,

which has one of the lowest average monthly incomes at USD 17.80 and is almost entirely inhabited by traditional hunter/gatherer Basarwa utilized 18.3 kg of meat per hunting household per month equating to over 72% of their average monthly income. In settlements such as Ngwatle, cultural affiliations to game meat use, lower socio-economic status and larger family sizes (11.2 per Hhld. compared to the district average of 8.4) results in game meat playing an increased role in maintaining standards of living (T Traill-Thomson, 1998).

Table 13

Dynamics of game meat utilization in selected survey areas of Botswana during 1997

Survey Areas	Kweneng District (n 51 Hhld's/51%)	Kgalagadi District (n 132 Hhld's/39%)
Species Utilized:	16 species, 44% large, 56% small	34 species, 76% large, 24% small
Prop. of Hhld. that Hunt:	46%	49%
Quantities Consumed:	18.2 kg per Hhld. per month 2.1 kg per person per month	12.45 kg per Hhld. per month 2.28 kg per person per month
Demand Dynamics:	Availability and Cheap Cost	Availability and Cheap cost
% Subsistence Contribution to Monthly Income:	15.7%	39.2%
Price of Game Meat Versus Domestic Meat per Kg	Bush Meat US$ 0.85 Domestic Meat US$ 1.11 Bush Meat 30% Cheaper	
Supply: % Traded % Subsistence	 4% 96%	 15% 85%
Main Subsistence Consumers:	Low income traditional hunter/gatherer Basarwa RADs (Average Hhld. Monthly Income USD 85.3)	Low income traditional hunter/gatherer Basarwa RADs (Average Hhld. Monthly Income USD 44.7)
Main Trade Buyers:	High income and livestock owners	High income and livestock owners
Conservation Implications:	1) declining wildlife populations; 2) increased use of wider variety of smaller species; 3) emergence of trade; 4) decline in meat sharing; 5) increased use of more sophisticated and illegal hunting methods; 6) reduced effectiveness of traditional wildlife management systems such as taboos/totems; 7) limited community participation in wildlife management under SGL system; 8) reliance on coercive and heavy handed law enforcement.	

Note: Small game meat species characterized as those having dressed carcass weight of under 5 kg;
Hhld.=Household; n = sample size
Source: T Traill-Thompson, 1998.

Domestic meat production in the districts is negligible, and what livestock does exist is not utilized but rather kept as a cultural or capital asset. Hence domestic livestock meat is expensive when available, and a lack of aquatic habitats and fish supply in these arid districts means that game meat provides the only viable source of meat protein. Households in Kgalagadi, for example, consume goat meat on only 1.7 days, and beef on 0.4 days per year as opposed to game meat, which is eaten on 114 days per year. Communities indicating a motivation to hunt to satisfy their "hunger" at 76.6% and a "meat craving" at 17% reflect this reliance on game meat as the only realistic source of meat protein. In addition, game meat is regarded as having a better taste and contains more protein than domestic meat, and is felt to be more healthy because wild animals do not consume household garbage but only natural vegetation, and are not spoiled by vaccines and injections as is the case with most livestock in the settlements (T. Traill-Thomson, 1998).

In these districts, game meat plays an integral and critical role in securing not only household food security and livelihood status, but also in maintaining standards of health. In areas such as the Ukhwi settlement in Kgalagadi District, 43% of children and 23% of women suffer from malnutrition (Government of Botswana, 1997). Game meat represents one of the few local resources that contributes significantly to increasing the nutritional status and

health of communities. In Kgalagadi District, the presently low nutritional status of communities would in all likelihood decline even further if the game meat resource became unavailable. Indeed, respondents in the two districts indicated that in the past, children where much healthier when the game meat resource was more plentiful and present declines in the health of communities may in part be attributed to declines in supply (T. Traill-Thomson, 1998). Quantities of game meat consumed per person per year have declined from around eight kg in the 1970s (Lee, 1979a; Wilmsen, 1974/75; Tanaka, 1980; Silberbauer, 1981) to around three kg in the 1980s (Murray, 1980) to 2.19 kg per person in the Kgalagadi and Kweneng Districts in 1997 (T. Traill-Thomson, 1998). The decline in consumption is attributed to reduced wildlife populations (Perkins and Ringrose, 1996), and results in profound conservation and development implications for many rural Batswana.

During the 1997 hunting season, the Kgalagadi settlements were in the process of transition from Special Game Licenses issued at the household level to the community quota system that incorporates all quotas from licensed hunting (safari and residents). In August 1997, KD1 became the first and only Community CHA in Kgalagadi District to be given permission to manage its wildlife quota. This meant that all Special Game Licenses were returned to DWNP. The 1997 quota consisted of 120 Gemsbok, 20 kudu, 1125 Springbok, 200 Steinbok, 70 duiker, 116 Ostrich and two Leopard, all to be shared by the 800 inhabitants of Kgalagadi but only during the hunting season. In a normal year, when the quota is issued at the beginning of the hunting season, about 4.54 kg of bush meat per person per month will be available for all of the 800 inhabitants, and is substantially more then the 2.28 kg found to be presently available to only 49% of households. Assuming an equitable sharing of meat this should represent an increase in the availability of meat to community members due to improved hunting success as hunters are allowed to use rifles under the quota system.

However, the degree to which improved legal supplies will affect illegal bush meat use is uncertain and will to a large extent depend on the effectiveness of meat sharing. For 1997, the late issue of the quota meant a partial quota was issued in the last six weeks of the hunting season. Of 52 respondents, five did not get any share of the meat, another five were not present, and the average number of days for eating game meat for the six week period was only 3.3 days and much less than for the preceding Special Game License period. Implementing effective meat sharing will require concerted effort, but if achieved should result in the increased food security status of residents in the district, and possibly reduce informal off-take (T. Traill-Thomson, 1998).

Game Meat Species Utilized:

Hunting households in the settlements of the two districts utilize a considerable variety of species, with those in Kgalagadi hunting 34 species and those in Kweneng 14 species. A relatively high proportion of smaller species (24% and 56% respectively) and the frequent consumption of carnivores indicate communities' willingness to utilize most available species, although traditional management systems based on taboos and totems do restrict use to some extent. A greater variety of species across many genera are utilized in both districts with numbers of smaller species utilized increasing in recent years. In the past, consumption of these smaller species was limited to the dry season and in times of drought, but now with hunting restrictions and a general decline in larger species the smaller less charismatic species are increasingly used.

However, the larger and preferred game meat species still supply the greatest quantities of meat. Gemsbok (35.3%), kudu (27.3%) and Red Hartebeest (15.4%) are responsible for most supply in Kgalagadi District, and Gemsbok (53.2%), Springbok (12.8%) and Common Duiker (8.3%) in Kweneng District. Antelope species are still preferred, such as Gemsbok because it is easier to hunt and has good tasting meat, Springbok because it has the most preferred meat, and Eland because of its size and the quantities of meat supplied per carcass. However, overall these species are becoming less available and households have reacted by searching for meat supplies from a greater variety of smaller species. Hence in Kweneng District there were fewer households hunting the larger species such as Blue

Wildebeest, Red Hartebeest and kudu, with frequency of hunting being low at only once every two months. In contrast, there were more households frequently hunting the smaller more available species such Steinbok, Common Duiker and Black Korhaan (T. Traill-Thomson, 1998).

Game Meat Trade and Subsistence Use:

Legal trade through the issuance of game meat sales permits does occur as a result of some licensed hunting. Such legal trade, however, is negligible with all DWNP outposted stations issuing very few permits during 1996/1997. Maun District office, for example, issued permits for only 32 animals during 1997 (DWNP, 1997). The movement of game meat from hunting areas to more populated market areas is severely hampered by veterinary movement restrictions. Only dried game meat (biltong) can be transported through control fences and a Movement Permit is required. A review of 1997 Movement Permits indicates that in general hunters only transported small quantities (between 2-10 kg). Hunters were found to predominantly (82%) transport game meat biltong as gifts for friends and relatives when travelling home for holidays (T. Traill-Thomson, 1998). Large distances between wildlife supply areas and potential markets, together with movement restrictions, have resulted in any legal trade from licensed hunting being localized and generally limited (ODA, 1996).

The trade of game meat derived from Special Game Licenses is prohibited. Consequently, the trade of this meat could be classified as illegal in the strict sense of the law (FGU-Kronberg, 1988b). In more recent years, the wider emergence of trading game meat derived from Special Game Licenses within the localized rural area is apparent. For example, hunters in Zutchwa settlement of Kgalagadi trade 88% of their catch, and up to 14% of hunters in six RAD settlements in south western Botswana trade game meat (Molamu, *et al.*, 1995). In Kweneng and Kgalagadi Districts, game meat was never traded prior to the 1980s and the meat sharing reciprocal network was an important component of rural life. With a reduction in wildlife availability, the amount of meat sharing has decreased and the occurrence of trade amounting to 9.5% of all meat utilized during 1997 has emerged (T Traill-Thomson, 1998). Hitchcock and Masilo (1995) attribute the decline in meat sharing and increase in trade to a greater value being given to game meat. This continuing trend is likely to result in increased pressure on the resource.

Although trade is gaining popularity within Kgalagadi and Kweneng, subsistence hunting is still by far the greatest source of wild meat. Craft production in the districts plays an important role in peoples livelihoods and it is the non-meat products of wildlife that are traded to a greater extent. Wild meat is mainly sold to generate cash to buy consumer goods such as tea, sugar, tobacco and foodstuffs. Because the majority of wild meat consumers obtain their supplies through Special Game License hunting or reciprocal exchange, the trade market is limited and generally those few buyers are able to determine price, with trading households having a limited bargaining power. Due to a general decrease in wildlife numbers, and increased hunting effort required, the incidence of hunters having excess game meat to sell is infrequent. The general absence of domestic meat and its prohibitive cost has resulted in households still relying predominantly on the subsistence value of wild meat and the savings in household expenditure it represents.

Wild meat is generally sold on an *ad hoc* and opportunistic basis to trusted individuals within the settlements, with sales to government employees being recorded as obtaining the highest prices. There are no substantial amounts of wild meat being sold or exchanged with "outsiders". Wild meat buyers are typically the more well-off residents of the settlements who have formal employment and are livestock owners. Within the Kgalagadi settlements, wild meat is sold at BWP 2.00 (USD 0.71) per kg and species most frequently traded were Gemsbok and Springbok. Dried meat or biltong is sold for considerably more at BWP 10 (USD 2.81) per kg due to the greater amount of fresh meat necessary in making biltong. In Kweneng settlements, wild meat is slightly more expensive at BWP 2.80 per kg (USD 0.99) due to a comparatively smaller resource base and higher average incomes in comparison to Kgalagadi. Although the trade of wild meat is undertaken by relatively few households within both districts, it represents a considerable additional and, in some cases, sole source of cash income. In Kweneng, the 4% of households trading earned on average USD

13.13 per month equating to 15.4% of the district's average monthly income (USD 85.3). Generally, traders are unemployed and rely mainly on part time livelihood activities such as wild resource (veld) product collection, craft production, beer sales and street vending. As such, low and unreliable incomes are associated with a greater reliance on wild meat sales (T. Traill-Thomson, 1998).

Although traders of wild meat are few in number in both districts, there are proportionately more sellers in the less wealthy Kgalagadi than in Kweneng (15% as opposed to 4%). Although the number of traders is few, wild meat sales provide an important source of supply with 10% of all utilized meat in Kweneng being purchased. The value of game meat has clearly increased from being seen as a virtually free good to being more of a valued item. This is in part reflected in a decrease observed during 1997 in the amount of game meat being given away for free through reciprocal exchange. In Kgalagadi, hunters reported sharing about 37% of their catch in the past, but this declined to approximately 30% during 1997. Greater economic values of game meat have reduced hunters' willingness to give meat away for free to extended family and friends. Meat sharing, however, is still an important source of game meat and helps maintain the social support network. Meat sharing is especially important to female-headed households, as Special Game Licenses are only issued to males resulting in female-headed households in Kgalagadi relying exclusively on meat sharing and supply from extended family members that occurred on a average 3.7 days per month during 1997. A reduced level of meat sharing has been partly replaced by the emergence of trade and bartering for consumable produce, which represents an important source of wild meat at 5.8% of all supplies in Kweneng. The barter and exchange of meat is similar to its cash trade, in that it is localized and not undertaken with outsiders (T. Traill-Thomson, 1998).

As settlements continue to enter into cash economies, and the demand for wild meat rises alongside population growth, it is likely that trade will emerge to become the overriding source of meat within the districts. The current dynamic, however, is that the resource is still largely perceived to be a free good, and this has been an important factor in preventing the emergence of a more notable trade market. However, for the few traders, income from sales of meat makes a major contribution to monthly household income, although overall they make a negligible contribution to the local economy. Subsistence use is still the predominant benefit from the wild meat resource.

Conservation Implications of Game Meat Use:

Ungulates found in Kgalagadi District include Springbok, Gemsbok, Red Hartebeest, kudu, Ostrich, Steinbok, Common Duiker, warthog, Blue Wildebeest and Eland. Blue Wildebeest numbers have been greatly reduced and Eland are now rarely seen. Densities of most species other than Springbok and Gemsbok have steadily declined since 1978. This is partly due to drought and displacement by settlement and livestock from important wet season feeding areas, and through past hunting pressure. A further important cause of decline is the restriction of movement due to veterinary cordon and ranch fences and from water development for livestock (Ecosurv, 1997b).

The most common ungulates in Kweneng District are Springbok, Gemsbok, Steinbok, Common Duiker, and kudu. Red Hartebeest and Blue Wildebeest do move into the area from the Central Kalahari Game Reserve and Khutse Game Reserve. Population declines of most species in Kweneng have been documented and are generally believed to be a result of the combined effects of drought, cordon fences, increased hunting pressure and displacement by settlement and livestock. Threats to wildlife in Kweneng also include the development of ground water for livestock and a localized pressure to prevent the gazettement of the WMA due to a shortage of livestock grazing. In the past, Kweneng had large herds of Red Hartebeest and Blue Wildebeest (Ecosurv, 1997a), and these were hunted at high levels. During 1997, hunting frequency declined due to a reduction in populations of both species (T. Traill-Thomson, 1998).

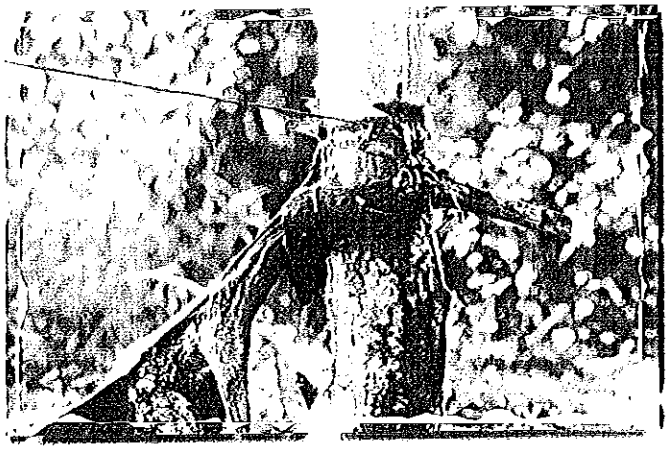
According to hunters in Kgalagadi, numbers of all antelope species have declined since the 1970s. The decline was particularly pronounced during the drought of the 1980s. Hunters claim that they were still able to hunt in and around their settlement during the 1970s but now have to travel far (40-60 km) to find wildlife. All species declined, but Ostrich, wildebeest, Red Hartebeest, and kudu suffered the most. Currently, even the smaller animals in Kgalagadi

are reported to be harder to find near settlements not only because of the 1980s drought but also the annual fires. Declines in animal numbers in both districts are also reflected in reduced success of hunting using the same or improved hunting techniques and weapons. Hunters in Kgalagadi reported that in the past hunting would occur twice a month, whereas during 1997 the frequency of hunts per month was much higher and the catch much lower. During 1997 in Kweneng, hunters reported that considerable distances and effort were required to obtain wild meat especially from the larger ungulate species (T. Traill-Thomson, 1998).

Distances covered by hunters in order to be successful generally increased as species size increased in 1997. For species such as Gemsbok, Blue Wildebeest, kudu, Red Hartebeest, Springbok, Common Duiker and Steinbok, distances were greater at an average of 16.8 km. The average distance reported by respondents required to successfully hunt a Helmeted Guinea Fowl or Black Korhaan was 8.6 km, and the smaller species such as South African Crested Porcupine, Bat Eared Fox, Yellow-billed Hornbill or Kalahari Tent Tortoise was up to 5 km. Longer trips were made for larger animals such as Gemsbok, Blue Wildebeest and kudu with the average length of a hunting trip taking 3.2 days. For the smaller species such as Springbok and Common Duiker hunting trips averaged around 1.2 days. More trips per month are made for duiker, Steinbok and guinea fowl, than Gemsbok, Blue Wildebeest and kudu due to shorter hunting trip duration. As such, considerable effort and input of time and resources are required to obtain satisfactory catch rates in Kweneng.

Kgalagadi hunters claim that prior to the drought of the 1980s a hunting trip normally took about two to three days. Most hunting took place in the vicinity of settlements or temporary camps. One out of every two hunting trips was successful. After the drought of the 1980s, when the decline in wildlife became severe, the success rate dropped to 33%. Furthermore, almost all hunting took place in the area 20 km north of Gemsbok National Park and 60 km south of Ukhwi. A trip now takes at least one week; three days to pick up a track of an animal, the fourth day to kill it, and another three days back. In order to obtain the same quantity of meat as before, hunters now need to make more frequent trips. Of interest, and in contrast to the past, is that currently, hunting groups consist of only close relatives so that meat does not have to be shared to such an extent (T. Traill-Thomson, 1998).

Kgalagadi hunters felt that the decline in wildlife numbers was due to the introduction of firearms, an increase in hunters (from "outside" Kgalagadi), expansion of the hunting area due to increased use of vehicles, unethical hunting behaviour of citizen and non-resident hunters (i.e. wounded animals not followed up), and poor hunting techniques leading to over-hunting of the easiest species to hunt such as the Gemsbok. Other non-hunting related reasons for the decline were attributed to boreholes in Gemsbok National Park attracting animals away from the district, increased cattle, and drought. The relative role that hunting for wild meat contributed to this reported decline is difficult to assess, but the occurrence of a hunting ban implemented by DWNP during 1990-1993 only slowed down the decline of most species (Verlinden, 1994), and suggests that game meat motivated hunting may not be as important as other factors such as loss of habitat and drought. Based on observations on the ground, it seems that after the last two wet seasons a number of species are showing signs of improvement, particularly Red Hartebeest, wildebeest, and Ostrich, although populations are nowhere near pre-drought levels (T. Traill-Thomson, 1998).



Antelope carcass deserted by bush meat hunters in long-line snare.
Freidkin Conservation Fund

Ecosurv (1997b) has compared average estimates from wildlife census surveys between 1979 and 1991 with those after 1994 for Kgalagadi. It is likely that following a catastrophic drop in some species during the drought of the early

1980s, many species have made some recovery. This development will have been encouraged by reductions in the hunting quota and hunting bans in some areas. However, populations are not expected to recover to pre-drought levels as domestic livestock biomass has increased significantly and key forage areas have been lost (Ecosurv, 1997b). It is likely that the effects of drought and restrictions on migratory movements by veterinary cordon fences have had a larger negative impact on population levels than licensed or unlicensed hunting. However, moves toward more unsustainable hunting practices have undoubtedly increased its negative impact on wildlife populations.

In the past, the hunting of large antelopes (especially Gemsbok and kudu) in Kgalagadi district took place during the dry season, while medium sized wildlife species (Steinbok, Common Duiker, Aardvark, hares, etc.) and only male antelopes were hunted during the wet season (breeding season). This allowed the larger antelope species to breed undisturbed during the wet season. Seasonality of hunting was an integral part of a traditional conservation strategy and was dictated by natural constraints and opportunities for hunting. Before the introduction of community quotas in the district, when Special Game Licenses were valid all year round, hunters killed animals whenever they came across them throughout the year. No motivation existed among hunters to pursue the traditional conservation practices since there were fewer animals, and hunters felt that many people from outside their area were hunting with rifles and vehicles in an uncontrolled and careless manner (T. Traill-Thomson, 1998).

The impact of other traditional management systems such as taboos and other totem restrictions on the use of game meat species is also likely to have decreased in effectiveness as wildlife densities and availability of preferred species decline. Residents in the two districts all reported a greater use of a larger variety of species especially of the smaller more available ones. Although a greater variety of species are now consumed as residents find it harder to obtain sufficient game meat from preferred species, taboos and totems prohibiting the use of some species are still apparent. During 1997, taboos were still reported to be important, but in comparison to the past may have declined. In Ukhwi and Ngwatle, for both Basarwa and Bakgalagadi residents the meat from the hyena, Wild Dog, snake, monkey, and owl are not consumed due to traditional taboo belief systems. In Ncaang, taboo species include snake, Aardvark, porcupine, Honey Badger, and Striped Polecat. The reasons given for not eating these species are that the snake and monkey are totems for Basarwa groups, and for all totem species that the meat does not taste nice. Additionally, women and children who eat the meat will become sick or die. The overriding reason, however, for not consuming certain species was that "*we have never eaten them, it is not our custom*" (Ngwatle resident, pers. comm., to J. Traill-Thomson, 1997).

Changes in hunting methods have also resulted in a likely increase in the potential for unsustainable off-take. In the past, and before the arrival of the Bakgalagadi into the district, the Basarwa hunter/gatherers relied on traditional hunting weapons and techniques. These included bow and poisoned arrows, snares made of rope, and pits covered with grass along wildlife trails. These traditional weapons can be characterized as needing a considerable amount of input in terms of time and skill and generally result in low output. With the arrival of the Bakgalagadi in the district, new hunting methods were introduced and some of the old methods, for example bow and arrow, were abandoned. Currently new hunting methods include the use of dogs, which result in greater catches, especially of smaller carnivores such as jackals and foxes. The use of donkeys also increased hunting success with further distances being covered by hunters. The introduction of firearms and metal traps, however, resulted in the largest increase in hunting efficiency. Although the Special Game License regulations only allowed hunting with traditional weapons and prohibited the use of metal traps/firearms and the use of donkeys when hunting with spears, these methods are still used illegally. Declining wildlife numbers have catalysed the need for increased hunting efficiency using these methods (T. Traill-Thomson, 1998).

Lack of rifles and vehicles within the districts has limited hunters' ability to hunt more extensively. Further, DWNP presence and enforcement, and the low incomes of rural inhabitants (so they cannot buy rifles and vehicles) makes it unlikely that hunting pressure from these techniques will increase. Potential pressure on wildlife may come from 'outsiders' who have the necessary resources to hunt, particularly as southern Botswana increasingly opens up

following the tarring of the Trans-Kalahari Highway. Improvements to road networks increase ease of access to the Wildlife Management Areas. Other important pressures on wildlife which are pervasive across Botswana are increasing competition with livestock for grazing and water resources, and constraints on wildlife migratory movements following the erection of veterinary cordon fences (Perkins and Ringrose, 1996; Ecosurv, 1997b).

Trade and Utilization of Mopane Worm:

Rural communities in the North Tuli Block of Botswana undertake an extensive trade in mopane worm. This harvest and trade is unregulated, but because mopane worm is regarded as a veld product, its trade and export is legal and included in Customs statistics. The mopane worm (*Imbrasia belina*) has traditionally been a high protein food supplement for surrounding rural populations, although in the last ten years it has become an important source of cash income not only for poor rural community harvesters, but also for many middlemen traders, a number of whom are drawn from the salaried middle class (Ditlhogo, 1996).

The majority of harvested mopane in Botswana is currently sold for cash income, with very little being kept for domestic dietary needs (Moruakgomo, 1995). About 10,000 rural people undertake the mopane harvest in Botswana. Harvesters see the resource as a quick source of income and sell from harvest sites to large-scale South African traders who buy up to 5,000 bags (30 kg each bag) per season for resale to South Africa, and small-scale traders who sell small quantities (5 kg) directly to consumers in Botswana and South Africa (T Letsie, 1998). Large-scale South African middlemen purchase the majority of harvested mopane (Moruakgomo, 1995), with most being sold in bulk to the high demand South African towns situated in the Northern and Mpumalanga Provinces. In South Africa, middlemen earn quick profits during the short harvest seasons that occur twice a year for periods of about six weeks (Letsie, 1996). In recent years, Botswana has experienced increased demand for mopane, both locally and regionally, as some South African operators have begun to import huge quantities of worms for use as high protein cattle feed (Ditlhogo, 1996).

Research during 1997 estimated that 3,600 mt of mopane worms, worth BWP 14,400,000 (USD 5,124,555), were harvested (T Letsie, 1998). The mopane trade represents a substantial economic contribution to the national economy (Moruakgomo, 1995) that results in important cash incomes to many traders and rural harvesters. Middlemen earn on average a 245% profit, after expenditures of BWP 57,300 (USD 20,391) for the sale of 200 (30 kg each bag) sacks of mopane worm, which is an average quantity usually sold each season. Retailers generate higher profits for the same quantity at about BWP 69,000 (USD 24,555) due to less expenditures and higher sales prices to end market consumers (T Letsie, 1998). Rural community harvesters usually harvest about 180 kg of worms during a season worth about BWP 600 (USD 213). This represents an important income to the mainly subsistence farmer harvesters (Moruakgomo, 1995, T Letsie, 1998). Community harvesters, however, obtain low prices for mopane due to a lack of bargaining power, and the need to sell their harvest as quickly as possible before the worms become spoiled (Letsie, 1996).

Potential for increasing revenues for rural communities is possible through greater market cohesion of harvesters, use of mopane storage facilities, and the establishment of co-operatives (T Letsie, 1998). However, sustainable harvest off-take levels need to be determined. Profit motivated demand has resulted in recent years in a substantial increase in quantities harvested (Macala, 1996), with 756.6 mt exported through Zanzibar and Martins Drift border gates in 1991, increasing to 810.4 mt in 1996 and 938.6 mt in 1997. Total estimated quantities of the industry have likewise increased by over 200% from 979.5 mt in 1994 (Moruakgomo, 1995) to 3,600 mt in 1997 (T Letsie, 1998). Such increases in the harvest and sale of mopane worm over the short term have brought the sustainability of the industry into question (Moruakgomo, 1995). For mopane to continue contributing positively to the national economy and for its community development potential to be fully realized, a sustainable harvest strategy needs to be developed as a matter of priority.

ii.) Illegal Utilization of Bush Meat

The illegal utilization of bush meat in Botswana represents an important supply to citizens. Due to the unified hunting regulations and the provision of Special Game Licenses for free to Remote Area Dwellers and other licenses such as Small Game Licenses and Bird Licenses at limited cost, illegal off-take of bush meat in Botswana often constitutes the overuse of quotas specified on hunting licenses. As such, the legal and illegal supply of wild meat in Botswana is closely inter-linked (NRMP, 1994). DWNP (1997) report over selling of licenses, selling of licenses not on the quota, and overuse of quotas especially for the Single Game License. FGU-Kronberg (1988a) estimates that the extent of illegal hunting for bush meat in Botswana represents 165% of game meat derived from Single Game Licenses, however, estimates of the scale of illegal hunting vary widely. For example, in 1978 it was thought that illegal hunting represented 25% of tribal license allocations (Murray, 1980), while in 1988 the estimate was 400% of all license allocations (FGU-Kronberg, 1988b).

As with the legal trade of game meat, any illegal trade of bush meat is generally localized due to the vast distances between wildlife supply areas and centres of human population. Movement of bush meat is also severely hampered by veterinary control fences that prohibit all but the driest biltong from being transported. Illegal urban commercial trade was found to be negligible in Ngamiland District during 1997/98, and is believed to be indicative of the country as a whole. Illegal commercial trade is generally limited with remaining trade considered to be undertaken by groups of "biltong hunters" from neighbouring countries, and those more affluent citizens who have access to transport and overshoot Single Game Licenses, and then sell bush meat to cover costs of the hunting trip (T. Traill-Thomson, 1998).

Although illegal utilization of bush meat and specifically overshooting on hunting licenses has been documented to be excessive within Botswana, factors such as limited law enforcement capacity, a tendency to focus on trophy related offences, and a reluctance by many wildlife authority personnel to implement bush meat related legislation to the full extent of the law, have resulted in very few people in Botswana being convicted for bush meat offences (T. Traill-Thomson, 1998).

Botswana arguably has one of the strongest law enforcement capabilities within the study countries. The Botswana Defence Force (BDF) and DWNP carry out enforcement. Official records reveal that 528 animals were seized from trophy and bush meat related offences during the period between 1994 and 1997, resulting in an average of only 132 animals seized per year for the whole country. These offences were committed as cross border encroachments mostly into protected areas and were reported by BDF. Unlicensed hunting for trophies and bush meat from protected areas was also reported by DWNP. Although Botswana has at least 48 specific wildlife-related offences under the *Fauna Conservation Act*, the Botswana Police national records show that for themselves, DWNP and BDF, the total amount of game cases going to court was 231 in 1994, 253 in 1995 and 154 in 1996 (T. Traill-Thomson, 1998).

Contributing to this perceived dynamic of limited bush meat related law enforcement is the generally low fines paid by the large majority of those arrested. For example, during 1995, of the 253 people convicted of any offence under the *Fauna Conservation Act*, 31, 12.2% were acquitted and found not guilty, 197 (77.9%) were fined, and only 25 (10%) were imprisoned. Sentences resulting from convictions generally increase as the scale of the charge increases. For example, during the 1996/97 period, the illegal possession of a tortoise led to a caution, illegal hunting of a duiker led to four months imprisonment wholly suspended, and two people charged with hunting five Eland (a protected species) during the closed season without a license were imprisoned for 18 months each. The level of fines, however, are not excessive when taking into account that the chances of being apprehended are negligible. For example, the average fine imposed for possession of one Red Hartebeest was BWP 100 (USD 36) during 1996/ 97. The economic value of one Red Hartebeest on the open formal market in Botswana for its meat alone is approximately BWP 1,054 (USD 375) (average dressed weight 70.3 kg at value of BWP 15 per kg). These limited fines hold true for other species such as warthog with average fines of BWP 450 (USD 159) but an economic value of about BWP 597 (USD 212), and wildebeest with an average fine of BWP 800 (USD 284) but an economic value of BWP 1,620 (USD 575) on the open market (T. Traill-Thomson, 1998).

Hence in Botswana bush meat related conviction rates are low and penalties imposed are limited in relation to meat values of species, and generally result in a negligible deterrent. The implications of limited bush meat related convictions suggest that although policy and legislation are comprehensive, in reality local communities are not excessively controlled on their informal off-take from protected areas. Regulatory and prohibitive legislation has a limited impact on bush meat off-take due to a lack of capacity and/or willingness by personnel to prosecute bush meat related offences.

IV. SUMMARY/CONCLUSION

The total economic value of the legal game meat sector in Botswana is substantial, primarily due to the provision of licensed hunting to many rural communities for free or at subsidized prices. Hence, licensed hunting represents the greatest source of legal game meat, accounting for an estimated 73.4% with a potential supply of 2,397.5 mt worth USD 2,023,267. Problem animal control, cropping/culling, and the game ranching and farming sectors result in negligible game meat supply, although community-based quota allocations are increasingly replacing Special Game Licenses throughout the country and accordingly are responsible for larger quantities of game meat supply. Due to the vastness of the country, large transport distances between supply areas and markets, veterinary cordon fences and meat movement restrictions, most wild meat use is localized and the trade of legally supplied game meat and illegal bush meat is limited throughout the rural and especially urban areas of the country.

Wildlife policy has promoted the view by communities that it is their right to benefit from the wildlife resource and correspondingly the contribution of licensed hunting and illegal hunting to rural community livelihoods is high, and in part may be motivating unsustainable off-take from a long declining wildlife resource. This has resulted not only in conservation implications, but also in community development concerns where the wildlife meat resource is insufficient to meet financial and nutritional needs.

Wildlife authority personnel burning illegal bush meat hunters camp.
Freidkin Conservation Fund

V. RECOMMENDATIONS

- A review of the licensed hunting sector in Botswana is required that should include the revision of all categories of license fees to be more in line with either commercial objectives (open market safari hunting values) as well as social objectives (meat product values). Government policy of replacing Special Game Licenses with community-based natural resource management quotas should be actively supported due to the increased and more effective meat distribution achieved under such programmes. An increased level of monitoring and regulation of the licensed hunting sector in Botswana is required to combat overshooting of allocated quotas. A requirement that all hunting license returns be submitted to DWNP should be instituted and enforced.

- Currently the potential game meat production and numbers of animals allocated under licensed hunting, community quotas, and landholders privilege permits is far higher than that provided for under the Recommended Allowable Off-take wildlife quota issued each year by DWNP. As such the possibility of the legal use of wildlife reaching unsustainable levels if all quotas are realized is apparent, and effort should be made to incorporate all licensed hunting within the RAO quota that includes Special Game Licenses, Small Game Licenses, and Bird Licenses. An assessment of the sustainability of the bird license quota should also be undertaken as a matter of priority to determine the sustainability of this hunting sector.

- For the districts of Kweneng and Kgalagadi to continue to obtain benefits to their food security, nutritional and household economy status, a greater level of responsibility and accountability for the bush meat resource is needed. This has been largely missing during the current Special Game License period because of a confusion surrounding the laws relating to ownership and accessibility of wild meat through licensed hunting by communities. Hence rural communities have retired from active sustainable management of the resource that in the past was such an integral part of their daily living. Initiatives such as community quota allocations under community-based natural resource management programmes should be fully supported as they are likely to result in greater community ownership and accountability for the wild meat resource leading to improved community wildlife management.

- The considerable conservation impacts of illegal bush meat utilization occurring mainly through overuse of hunting licenses should be made apparent to the wildlife authority, law enforcement agencies, and the judiciary within Botswana. An increase in bush meat related arrests should occur and be facilitated by the revision of fines and prison terms to more realistically reflect the true value of wildlife illegally utilized. Mechanisms should be introduced that will reduce the high level of acquittals presently experienced within the judicial system. Better law enforcement and more realistic sentences should result in a greater deterrent to unsustainable off-take in the future.

- A more equitable distribution of government support to the wildlife utilization sector should be instigated, especially in light of the country's present reliance on the beef industry and exports under the lucrative EU/ Lome convention that may not always be applicable in the future. Restrictions imposed by the beef industry in ensuring the EU/Lome convention requirements are met, such as restrictions on wildlife product movement throughout the country and the detrimental effects of cordon fences on wildlife populations themselves, should be reviewed in detail. An assessment of possible solutions to reduce negative impacts on the wildlife utilization sector should be undertaken, as in the future this sector may represent one of the few viable options for development if beef production continues to decline and the EU/Lome Convention is not renewed.

- Although it is recognized that Remote Area Dwellers use of Special Game Licenses will gradually be replaced by community quota allocations under community-based natural resource management initiatives, in the foreseeable future it is likely that they will continue to play a crucial role in the subsistence provision of meat protein to communities characterized by low incomes and high levels of poverty. Research conducted in 1997 suggests that the increasing emergence of trade that occurs predominantly within the localized environment, and the resulting benefits accruing to traders through provision of additional cash income in areas characterized by limited potential for business or wage employment, are factors that should be taken into consideration. An assessment to review policy to allow a localized trade from Special Game License hunted meat should be undertaken.

- The contribution of veld products to rural community development in Botswana is well documented, although the contribution of smaller bush meat species such as insects, rodents, birds and reptiles is largely unknown and ambiguous. A more comprehensive definition of the term "veld product" is needed that would in addition to flora include suitable mini-fauna species. A wealth of anecdotal evidence suggests that wild meat mini-fauna is critically important to rural communities livelihoods, although quantifiable research with the exception of mopane worm use is extremely limited. The inclusion of mini-fauna as a veld product would increase the possibility of future research being conducted on this important topic.

- In relation to the mopane worm industry, it is important for collectors to improve their processing techniques. End market sellers of mopane have emphasized the demand for good quality mopane, which is dependent on the use of adequate levels of salt, and hygienic processing, among others. Improved processing based on scientific facts should be promoted among collectors. The Biology Department in the Science Faculty of the University of Botswana has compiled materials in Setswana and English for use by collectors. The suggested processing improvements are low cost and affordable in nature but will prolong the shelf life of processed mopane.

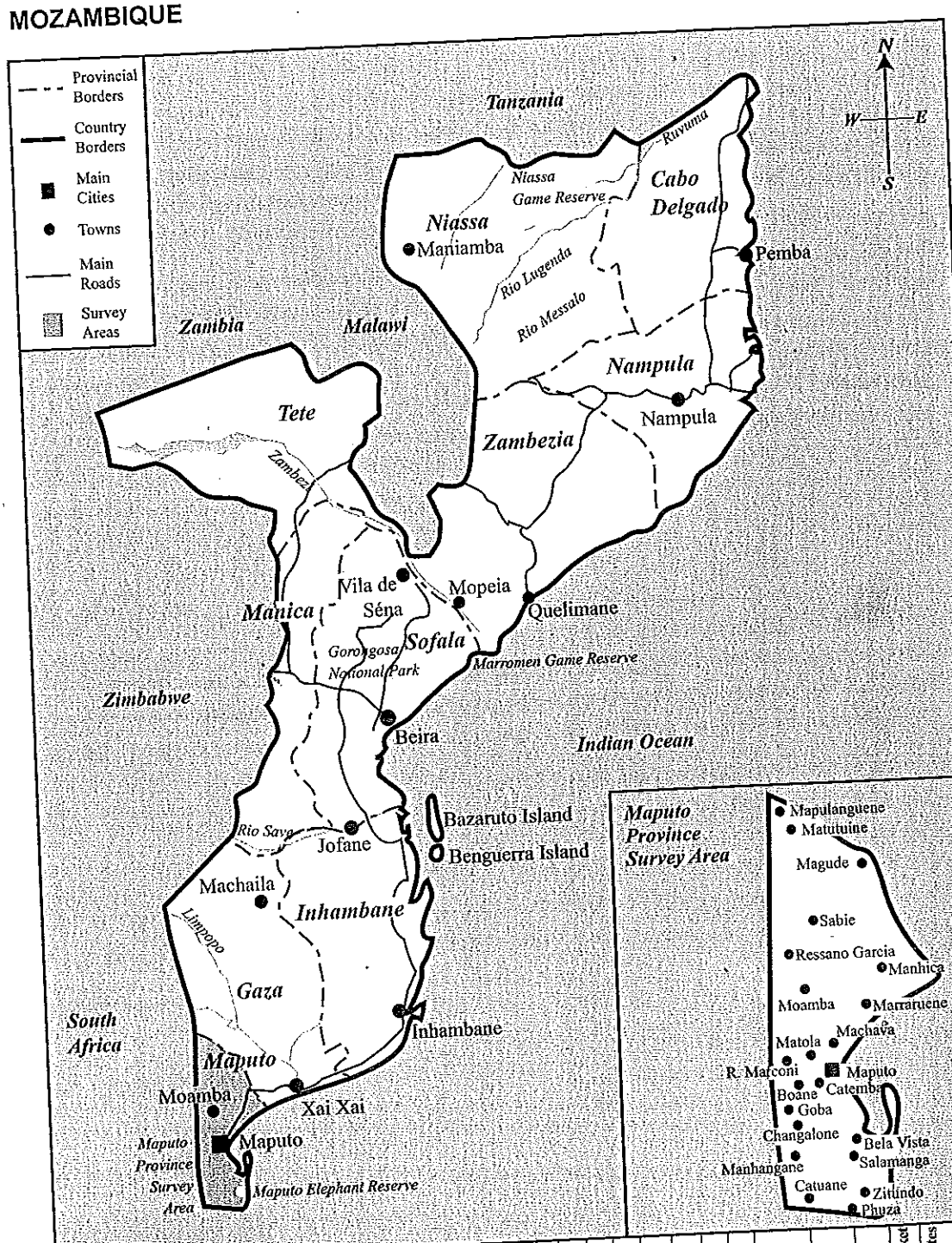
- Mopane as a good source of protein should be promoted in Botswana to improve nutrition and promote domestic demand among the poor in urban and rural areas. Areas of the Kgalagadi and other districts affected by food insecurity could benefit from this locally available and affordable food item. The wider use of mopane as an important and inexpensive source of protein and as an employment and income generator is recommended. Its long shelf life has a distinct advantage over other food stuffs although traditional processing practices as observed in Botswana (where most harvesters sun dry the worms on bare earth and bag them in used hessian bags) often introduce spoilage microorganisms, which shorten the shelf life of mopane and in some cases cause food poisoning. Quality control measures should be adopted to offset these public health concerns.

- Mopane collectors have demonstrated substantial resourcefulness as producers, working under difficult physical and other conditions, without any form of state assistance. Financial and other development assistance sectors should acknowledge that mopane production has the potential to refinance itself under improved market conditions; and should therefore be mainstreamed into the loans or credit market, without overlooking the special circumstances of the collectors. Pre-harvest short-term loans repayable immediately after mopane sales to avoid high default rates, would ensure collector access to key inputs. Mopane occupies an important and significant slot in the export market and should be acknowledged for this in national accounts and development planning. Similarly mopane collectors should be accorded the same acknowledgment as other producers in the national economy. Mopane collection commences with a raw material, which is converted, by laborious processing into a product that is transmitted through various formal and informal market channels to the end consumer. Thus mopane should be recognized in this light and should receive support through packages such as the Financial Assistance Policy.

- Mopane collectors as producers should receive NGO support to be organized into a union or co-operative to articulate their concerns, needs and problems. As mopane is harvested mainly by women, NGOs who have experience with women's income generating programmes should assist the collectors through seminars at the village level .

Wildebeest.
Nina Marshall-TRAFFIC

MOZAMBIQUE



Maputo Province Survey Area: 31 areas surveyed throughout province; 22 bush meat trade locations identified (refer map)

Bush meat trade locations	Catuane	Goba	Zitundo	Moamba	Ressano Garcia	Magude	Mapulanguene	Salamanga	Bela Vista	Phuza	Manhangane	Machana	Boane	R. Marconi	Changalane	Sabie	Manhica
No. traders	47	5	8	2	11	5	7	2	2	1	9	1	3	2	2	6	2
Open market	2	4	-	1	-	-	-	-	-	1	2	-	-	-	-	-	2
Cooked food stall	2	-	6	1	11	5	-	-	2	-	7	-	2	2	-	3	-
Restaurant	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
House sales	43	1	-	-	-	-	7	2	-	-	-	1	-	-	2	3	-
Roadside sales	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Maputo City (5 trade locations identified)	Xipamanine market	Janet market	Khalane market	P. Combatentes market	Catembe
	19	10	10	5	2
	19	10	10	5	2
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

CHAPTER THREE
MOZAMBIQUE

I. BACKGROUND

Area: 799,380 km^2. ***Population***: Estimated at 15.8 million; annual growth rate of 3.5%. ***Density***: 19 per km^2.

Mozambique is a large country with a rich and varied land and marine environment (Grandbois and Raposo, 1996). It shares borders with Tanzania, Malawi, Zambia, Zimbabwe and South Africa, and has a long coastline bordering the Indian Ocean (Smither and Tello, 1976). Mozambique consists of a central plateau which steps down to extensive coastal plains representing 44% of the country, with the remainder comprising coastal plains (43%) and montane regions (13%) (Agostini, 1993).

Of the total Mozambican human population, 75% live in rural areas and about 40% in the northern provinces of Zambezia, Nampula, Niassa and Cabo Delgado, which have the richest soils and greatest agricultural potential (Grandbois and Raposo, 1996). The southern provinces of Maputo, Gaza and Inhambane are drier and less productive (UICN, 1997). Mozambique's economy is heavily dependent on agriculture and about 90% of the population are engaged in agriculture, which contributes about 44% to Gross Domestic Product (GDP). It is estimated that only 5% of available arable land is currently under cultivation. Therefore, Mozambique could be self sufficient in food production, and could likewise produce surplus for export (ACARTSOD, 1987; T IUCN, 1998).

However, between 1976 and 1992 Mozambique suffered civil war that largely destroyed the economic and social infrastructure, and inhibited agricultural production. Mainly as a result of the devastating conflict, Mozambique is still striving to meet its development potential (T Macuacua, 1998). In 1995, the GDP per capita was only USD 90, one of the lowest in the region, and indeed, globally. While Mozambique is still characterized as an under-developed poor nation, the country's economy has experienced improved performance in recent years, with the inflation rate decreasing from 54.15% in 1995 to 16.6% in 1996. Currently the country operates under a sound macro-economic environment, with a reduced role of the state and the liberalization of prices under a free market economy (World Bank, 1998).

Despite development assistance from external donors, low wealth, food insecurity and poor nutritional status are still the norms among the majority of the country's rural and urban inhabitants (T Macuacua, 1998). Mozambique's history of conflict, combined with the prevalence of tsetse and trypanosiomasis in about 75% of the country, has resulted in the limited availability and production of domestic livestock (Agostini, 1993). Livestock production occurs to a much greater extent in the southern region where over 60% of cattle populations occur in an area representing only 20% of the country (DINAP/MAP, 1994). Limited livestock production is subsistence based, with the majority of domestic livestock being owned by small landholders (MAP, 1997). Although livestock numbers are still limited on the national scale, price liberalization of the economy has resulted in livestock production figures doubling from 1992 (581,655 mt) to 1996 (1,119,026 mt) (DINAP/MAP, 1994; MISAU/MPF, 1997).

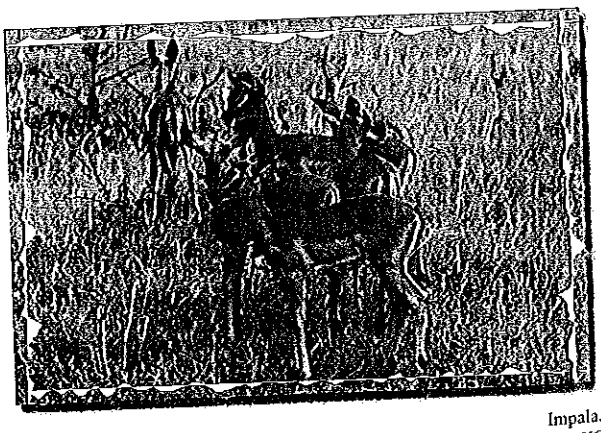
The northern regions of Mozambique have fertile soils and adequate rainfall (1,200 mm per year), and consequently food availability is good, lasting approximately seven months of the year. In contrast, the central and southern regions are characterized by lower food security and nutritional status with relatively infertile soils and average rainfalls of 1,100 mm and 500 mm per year for the two regions respectively. Production of staple crops spans a four to five month period, and for the remainder of the year inhabitants rely to a large extent on natural resources for their protein requirements (McEwan, 1997). The size of land holdings is generally larger in the northern region (>2 ha) than the central and

southern regions (<1ha). As such, reduced food security is apparent in the central and southern regions. According to MISAU/MPF (1995), households with less than 1.5 ha have little or no food security. Poor agricultural production over large areas of the country has resulted in the dynamic that 98% of crop production is subsistence and smallholder based, with only 16% of farming households having a surplus stock of produce to sell commercially (Addison and McDonald, 1995).

Recurrent droughts such as those last occurring during 1992/93 have also affected food security (McEwan, 1997). Nutritional status is low with national estimates of stunted growth high at 10.8% of infants during 1996, indicating excessive levels of malnutrition (MISAU/MPF, 1997). Household sizes are large at 5.5 members, and the ratio between economically active and passive members (less than 15 years or more than 60 years) of the population is high with a dependency ratio of 1:1 (UAP, 1996). Limited livestock numbers and poor agricultural productivity have resulted in a population that places a great reliance on natural resources, especially for those lucky enough to be located near to wildlife and protected areas (MISAU/MPF, 1997; T Macuacua, 1998). Such dependence is significant with 85% of the energy and between 30% and 70% of the protein requirements of rural communities being derived from the natural resource base (UNCED, 1992; Addison and McDonald, 1995; Grandbois and Raposo, 1996).

A greater reliance on natural resources has in part been made possible by low human population density (19 per km^2), and over half of the country (420,195 km^2) is described as wilderness area (UICN, 1997). Just under two-thirds of this area (307,000 km^2) is outside of protected areas. Currently there are four national parks, five game reserves, 12 hunting *coutadas*, and 14 forest reserves representing approximately 12% of the country and some 104,150 km^2 that is under some form of wildlife management (MICOA, 1997). The civil war has constituted the largest single impact on wildlife populations within the country, where combatants and rural communities alike relied heavily on wild meat supplies in a period when wildlife authority management in protected areas was non-existent due to the insecurity of the times (DNFFB, 1994). The limited capacity of the country's wildlife authority continues to this day, resulting in a negligible level of effective wildlife management and law enforcement in most protected areas (T Macuacua, 1998; T Longamane, 1998).

The extent of wildlife utilization and trade currently occurring within Mozambique is substantial. The reasons are numerous and complex, and range from the prevalence of tsetse fly over 75% of the country which corresponds to reduced availability of domestic meats, a traditional association of utilizing wild meat by many of the country's ethnic groups, the low socio-economic and nutritional status of most inhabitants, and the civil war legacy of reliance on natural resources for sustenance (T Macuacua, 1998; T Longamane, 1998). Because of the low human population density and limited livestock production, land degradation and habitat encroachment in general represent a less significant impact on wildlife populations than hunting for meat. Combined with a limited capacity to enforce wildlife laws, unsustainable wild meat off-take represents by far the largest impact on wildlife populations within Mozambique (Dutton, 1995; DNFFB, 1993; Agostini, 1993; Addison and McDonald, 1995). The result has been a severe decline in wildlife numbers throughout the country. A reduction by



Impala.
Nina Marshall-TRAFFIC

89% of the wildlife population in Marromeu Game Reserve has been observed between 1977 and 1990 (Dutton, 1991), and is believed to be representative of many areas (T Macuacua, 1998) and to have been caused predominantly by the demand for wild meat (Agostini, 1993; Dutton, 1995).

II. POLICY AND LEGISLATION

The National Directorate of Forestry and Wildlife (DNFFB) lies within the Ministry of Agriculture and Fisheries (MAP), and is the principal government institution with the jurisdiction to protect, conserve and promote the sustainable use of natural resources. The DNFFB manages almost 80% of the whole territory (T IUCN, 1998). It is organized into three departments: the Forest Department, the Economics and Forest Industry Department and the Wildlife Department (Agostini, 1993). At the provincial level, DNFFB is represented by the Provincial Services for Forestry and Wildlife (SPFFB), which is integrated within the Provincial Directorate of Agriculture and Fisheries (DPAP) (T IUCN, 1998). The DPAP directly controls the SPFFB and, given the emerging policy of decentralization by DNFFB, the SPFFB will become more important, especially in executing field operations (Attwell, 1992; Agostini, 1993; T Longamane, 1998; T Macuacua, 1998).

Prior to independence in 1975, colonial wildlife policy focused on protection and the creation of protected wildlife areas. After independence, much of the colonial legislation was revised to include the multiple use of the wildlife resource for the benefit of rural people (SADCC/GTZ, 1989), although the commercial trade of wildlife products was largely prohibited (*Decree Law No. 7 of 1978*) and restricted to the government company EMOFAUNA which was established in 1981 (*Decree Law No. 13 of 1981*) and allowed to trade in Cape Buffalo meat and hides in the Marromeu Game Reserve. With the onset of civil war (1976-1992), progress in developing Mozambique's wildlife policy and legislation stagnated, and by 1992 there was still no formal wildlife policy for the country (T Macuacua, 1998). The end of the war, however, heralded the beginning of a more concerted effort to reformulate wildlife policy. Still, progress was slow because government failed to establish the legal regulatory instruments for policy implementation (FAO/World Bank, 1995).

Since then, wildlife policy guidelines have been developed through the National Programme for Agrarian Development (PROAGRI). The PROAGRI outlines the long term objectives of the wildlife sector as the "protection, conservation and utilization of the wildlife resource...through greater participation of rural communities, the private sector and non-governmental organizations" (MAP, 1997). Initial steps to realize a more comprehensive wildlife strategy and policy were taken with the adoption of the "Strategy for Forestry Development" of 1991. This shifted emphasis from exploitation of forest resources for export to a more integrated and sustainable resource management strategy. "General Guidelines for Wildlife Strategy" were produced in 1994, recognizing the need to re-establish government control over the wildlife sector, securing conservation areas and encouraging private sector investment and community participation in sustainable wildlife utilization (FAO/World Bank, 1995).

These initial policy and strategy guidelines culminated in 1997 under the five-year "Programa Quinquenal" development programme, with the government adopting a more comprehensive policy and strategy to develop the wildlife sector that included a National Strategy for Forestry and Wildlife, and a Forestry and Wildlife Policy (MICOA, 1997). Of particular importance to game meat production, the "Strategy" specifically cites sustainable use and wildlife utilization as a major social and economic objective in achieving greater management of the wildlife and forestry resource. *Article 3* specifically defines an increased role for community participation and decision making in wildlife management. The "Policy" contains a social objective of sustainably using the forestry and wildlife resources for

poverty alleviation, and an economic objective of increasing Gross Domestic Production through taxation of increased effective and sustainable use of these resources. Hence, the role that game meat can play in meeting the social and economic objectives of the Forestry and Wildlife "Strategy" and "Policy" is evident, although changes to the forestry and wildlife laws which are currently under review need to be formalized (T Macuacua, 1998; T Longamane, 1998).

Currently, the principal legal instrument for the management of conservation areas and wildlife utilization is the *Decree No. 40 of 1955*, which is supported by Wildlife Regulations (*Legislative Diploma No. 1982 of 1960*). These laws established the custody of all wildlife resources to be vested in the government, and set license fees for authorized forms of wildlife utilization (FAO/World Bank, 1995). During the post-independence period, the principal legislation controlling the hunting of wildlife has been the *Decree Law No. 7 of 1978*. This law allowed for subsistence hunting by citizens for consumption only and safari sport hunting by non-residents under licesnse with the restriction that any form of commercial trade in game meat was prohibited (T Macuacua, 1998).

Other laws that have an impact on the utilization of game meat within Mozambique are the *Land Utilization Decree of 1987*, and the *Municipal Decree Law No. 3 of 1994*. The land law allows DNFFB to establish hunting areas (*coutadas*) under conditions set in the *Forestry Diploma Legislation of 1965* in which provincial administration assumes responsibility for the management of natural resources within hunting areas. However, FAO/World Bank (1995) maintains that the extent of this responsibility is not clear and generally ambiguous, and the legal status of the *coutadas* is not well defined and open to speculation. In reality, *coutadas* are simply identified blocks of land in which commercial and private individuals conduct safari hunting with DNFFB monitoring their activities. Land tenure policies and legislation within Mozambique also critically affect the potential of game meat utilization. Wildlife is owned by the state and land cannot be the subject of sale, pledge or lease (*Decree Law No. 19 of 1997*), and as such is also owned by government. This same legislation also stipulates that the only non-agricultural uses of land should be for housing, industry, trade, environment protection and social activities, with no reference to wildlife utilization through game ranching or farming specified, indicating a limited level of importance associated to wildlife management through utilization as a land use (T Macuacua, 1998).

Until recently, DNFFB wildlife management activities were focused on forest related issues, with wildlife conservation and utilization programmes being regarded secondary in importance (Attwell, 1992). Donor aid for DNFFB was almost always tied to forestry related issues, with the needs of wildlife remaining at the bottom of a long list of priorities. Recently, however, the wildlife sector has assumed greater importance. This is due in part to the increasing role that game meat plays in food security, and nutritional and economic status, and has resulted in a more equitable distribution of external assistance across the forestry and wildlife sectors during the past six years (T Macuacua, 1998). Assistance has primarily taken the form of institutional support and development (education and training), leading to increased capacity within DNFFB and SPFFB. In more recent years, with the improved security situation in the country, assistance has focused on support to local community wildlife management and utilization initiatives (FAO/World Bank, 1995). Initiatives such as the "Tchuma-Tchato" community based natural resource management project is seen as a pilot initiative that will result in valuable experience for further formulating policy and modifying legislation to lay the framework for greater community participation and management of natural resources.

III. CONSUMPTIVE WILDLIFE UTILIZATION CONTEXT

In a country characterized by limited livestock production, low socio-economic status of the population, and a traditional and present day reliance and preference for wild meat, the utilization and trade of wild meat represents a substantial industry. Most use is technically illegal, but in contrast to other countries of the study, is undertaken in a relatively open and indiscreet manner reflecting the limited capacity of DNFFB to enforce wildlife laws. Although wild meat utilization and demand are extensive, little progress has been made in Mozambique in promoting and developing the legal game meat sector which has the potential to be a major industry within the country due to existing high demand and economic values associated with its wild meat product. Additionally, over 75% of the country is likely to be suitable for formal game meat production systems due to the prevalence of tsetse fly. Progress has been limited because of the history of conflict in the country and reduced wildlife management capacity for implementing suitable game meat production systems.

i.) Legal Game Meat Utilization

Legal game meat production in Mozambique is limited. However, in contrast to non-consumptive tourism values it represents an important social and economic sector within the country that yields greater revenues to government treasury, and provides more effective mechanisms for alleviating poverty (Agostini, 1993). Tourism does have the potential to achieve these aims, but currently performs a limited but increasing role in the economy. Insecurity caused by civil war put an end to a once thriving and lucrative tourism industry that attracted southern African as well as international visitors (DNFFB, 1991). In order to re-establish its tourism industry, Mozambique will have to rebuild its destroyed infrastructure, and attempt to address the drastic declines in wildlife populations. Efforts to revive tourism are currently restrained by the intensely competitive nature of the industry, especially from within the region and from countries with well developed, established and lucrative international tourism sectors such as Tanzania, Zimbabwe, and Kenya (T Longamane, 1998).

Table 14

Estimated annual legal game meat production in Mozambique, 1991-1997

Description	No. Per Annum	Estimated Game Meat Production Per Annum (mt)	Average Price per kg (USD)	Estimated Total Value per Annum (USD)	Contribution to National Estimate(%)
Licensed Hunting, 1991-1997	4,494 animals	299.4	USD 0.77	USD 230,538	n/a
Citizen Hunting: (Licenses A-D)	2,968 animals (potential off-take)	197.6	USD 0.77	USD 152,152	66%
Non-Resident Safari Tourist Hunting: (License E)	1,526 animals (potential off-take)	101.8	USD 0.77	USD 78,386	34%
Game Ranching/Farming:	2 Ranches 2 Farms	Negligible	Negligible	Negligible	n/a
Problem Animal Control:	Limited	Limited	Limited	Limited	n/a
Total:				**USD 230,538**	**100%**

Source: TRAFFIC survey data, 1998.

The only significant supply of legal game meat within the country is supplied from licensed hunting, which can be broken down into citizen licensed hunting (66%) and safari tourism trophy hunting (34%). Problem animal control is not officially monitored, but is believed to represent a minimal supply, and the game ranching and farming sector is under-developed and results in almost no game meat production for human consumption. Ecological culling has not occurred since 1987, and community-based cropping schemes are a new initiative that currently are carried out in only one area through allocated citizen hunting license quotas (T Macuacua, 1998; T Longamane, 1998).

Culling and Cropping Schemes:

Mozambique has a long history of undertaking large-scale cropping and culling operations for tsetse fly and trypanosomiasis control, and for poverty alleviation through game meat distribution to rural and urban communities (T Longamane, 1998). As large areas of the country were infested, such control culling involved the extermination of large numbers of wildlife animals, believed to be the carriers and hosts of trypanosomiasis. Between 1947 and 1969 a total of 233,513 animals were culled at an average of 10,600 per year, with Nyala (42.4%), kudu (42.1%) and elephants (9.5%) being culled in the largest quantities (Rosinha, 1990). Currently, wildlife culling for disease control does not occur within Mozambique, with management strategies being confined to trapping and insecticide spraying of the tsetse fly (T Longamane, 1998).

Cape Buffalo and Waterbuck cropping was also undertaken in the Marromeu complex in the late 1970s as part of a government poverty alleviation policy. During the first three cropping operations (1977, 1978, and 1979), a total of 8,400 Cape Buffalo were cropped, yielding over 335 mt of dried meat and almost 400 mt of fresh meat. During this period a policy decision was taken to produce dried meat to facilitate supply to more distant areas where alternative domestic meat was unavailable. Dried meat was also particularly directed to refugee camps, re-education centres and hospitals (Bindernagel, 1980). Both fresh and dried meat were sold in the towns of Beira and Maputo as well as the Marromeu district and surrounding areas (T Longamane, 1998). These cropping operations were undertaken by private operators on a lease agreement with government and during the three years of operation yielded revenues of about MZM 66 million which was paid into government treasury (Rosinha, 1990). In 1981, however, a government owned company – EMOFAUNA, was created to undertake the sustainable utilization of wildlife on a commercial basis through game trophies and meat. The company was mandated to internally and externally trade such products, conduct safari hunting, and to develop game farming and ranching initiatives (Chambal, 1989).

The last culling activity in Mozambique was conducted in 1987 and was ecologically motivated. A total of about 500 hippo were culled over a three-month period because they were diseased (Chande, *in litt.*, to R. Barnett, 1998). The culling represented a possible meat supply of over 292.1 mt. Meat was salted and dried and sold at USD 0.50 per kg to refugee camps; potential revenue could have amounted to USD 146,050 (MZM 17.5 million). Since 1993, EMOFAUNA has ceased to exist, together with large-scale cropping programmes (T Longamane, 1998).

Problem Animal Control:

Due to low human population density and poor agricultural potential in large parts of the country, conflict between humans and wildlife is of less concern than elsewhere in the region (T Longamane, 1998; T Macuacua, 1998). Antagonism caused by wildlife-human conflict is believed, however, to have increased since the end of the war. Displaced peoples have moved back to remote areas, and crop

raiding and endangerment to life are cited as problems (Abacar and Tilley, 1996). Conflicts occur to a greater extent in the northern region where population density is higher and cultivation more intensive, and are especially prevalent near protected areas such as the Maputo Elephant Reserve. Boyd (1996) indicated that conflict between communities and wildlife in this area had resulted in considerable antagonism, with 48% of respondents indicating a need to cull more elephants. Although fencing is a possible management option as proposed for Maputo Elephant Reserve, throughout the country in general, culling remains the only viable option.

Increased wildlife management capacity in some areas such as Niassa Game Reserve has resulted in more SPFFB assistance for problem animal control, with for example four elephants shot over three months during 1996 (Abacar and Tilley, 1996). However, SPFFB capacity remains limited with only a few districts such as Macanga and Mutare in Tete Province, and Moma, Lalaua and Muecate in Nampula Province maintaining SPFFB personnel who have the equipment to undertake problem animal control (PAC) culling. In these areas, only three hippo and one Lion were reported culled during 1997. In most cases, lack of transport, equipment and professionally qualified SPFFB personnel result in most PAC culling being undertaken informally by communities. A questionnaire survey conducted during 1997 confirmed that monitoring of PAC culling throughout the country is non-existent, with records at the provincial level generally not kept, and never submitted to DNFFB (T Longamane, 1998).

Game Ranching and Farming:

Currently there are only two game ranches that are reported to utilize plains game, one in Zambezia and one in Manica Province. Ranches primarily rely on the safari trophy hunting value of animals, with some hunting safaris conducted during 1997. Game meat utilization and trade is uncertain, although some degree of meat use is likely to occur as one ranch requested a quota from DNFFB to cull 14 animals for meat production during 1997 (DNFFB, 1997). Production, however, is negligible, and thought to be mainly for ranch consumption (T Longamane, 1998). The almost non-existent game ranching sector has not developed due to major constraints imposed by land tenure and wildlife ownership laws, which prohibit necessary long term financial investment. Likewise the game farming sector is similarly limited with only three crocodile farms currently operating within the country (one on Benguerra island in the Bazaruto archipelago, and one each in Maputo and Manica Provinces). Farms are mainly involved in the production and export of skins, and meat is a by-product fed back to crocodiles although in some cases distributed freely to local communities. With a reduction in world prices of crocodile skin, production has decreased since 1997, although even during the sector's most productive years (between 1987 and 1992) only 4,195 skins were exported (Mulolani, 1995; T Longamane, 1998).

Licensed Hunting:

Licensed hunting in Mozambique is regulated under *Decree Law No. 7 of 1978* which allows citizens access to game meat for subsistence consumption through hunting licenses, and non-residents (tourists) to undertake safari hunting. The official hunting season is from 1 April to 30 September (*Article 8 of Decree No.7 of 1978*). Hunting is permitted under five different categories of licenses:

Licenses A-D are issued only to citizens of Mozambique, with License E issued to non-resident tourists. License E is only issued by DNFFB headquarters in Maputo, although exception has been made for the "Tchuma Tchato" project to issue licenses at the provincial level (T Longamane, 1998).

All other licenses are issued at the provincial level by SPFFB, who also allocates hunting quotas to each hunter. The SPFFB are also responsible for carrying out the inspection of hunting activities within the province. These inspections are reported to the Department of Inspection at DNFFB, and records of revenues raised from licenses are submitted to the Department of Economy and Forest Industry at DNFFB. Existing legislation also states that the President of the Republic, the Speaker of the National Assembly and, in the municipalities the Ministers, General Secretaries, Provincial Governors and the District Administrators all have every type of license by default (Farinha, 1972), and can therefore hunt at their own discretion.

Table 15

License categories and fee payable, 1995

License	Description	Fee for Issuance
A	Citizen Hunting for family's own consumption	MZM 19,320
B	Citizen Hunting for collective consumption	MZM 48,300
C	Citizen Limited Hunting	MZM 96,000
D	Large Scale Hunting	MZM 289,800
E	Safari Hunting by Non-Residents (Tourists)	MZM 772,800

Source: T Longamane, 1998.

For all categories of license, fees are payable for issuance of the license as well as for the animals specified to be hunted. Issuance fees were last reviewed in 1995 (*Ministerial Diploma No. 13 of 1995/ Official Gazette, series 6*) and listed in Table 15. Additional costs include the hunting tax that differs according to each animal hunted (*taxa de abate*). Although non-resident category E license fees were revised and increased in 1994 with, for example, the price of a Cape Buffalo being increased from MZM 150,000 to MZM 600,000, the price, including the license issue fee, is still low at about MZM 1,372,800 (USD 152.50) and much lower than other countries in the study (Agostini, 1993). Such prices for trophy hunting do not even represent the value of the meat. In 1997, the meat from one Cape Buffalo was estimated to be worth approximately USD 750, four times more than the trophy hunting value (T Macuacua, 1998; T Longamane, 1998).

For citizens the disparity between the price of licenses and the meat product value of the species is even higher, and reflects the extent to which government is currently subsidizing the hunting sector within the country. Presently the citizen hunting tax for a Cape Buffalo is MZM 60,000 per animal and even when combined with the highest license issue fee for a category D license amounts to only MZM 349,800 (USD 38.90) which at 1997 prices represents a cost equating to only 5.2% of its meat value. Even taking into consideration costs of hunting such as transport and ammunition, licensed hunting can be a lucrative activity within Mozambique when trade of meat is undertaken illegally (T Longamane, 1998). Such enticing returns are believed to have increased the abuse of this sector (T IUCN Beira, 1998).

The issuance of licenses A to D by SPFFB has increased significantly from 1991 to 1997, with an average of only 34 licenses issued annually throughout the country for the period 1991 to 1994, and 129 issued annually during the period 1995 to 1997 (DNFFB, 1997). A review of the SPFFB allocation of licenses according to category for five provinces (Sofala, Nampula, Cabo Delgado, Tete and Maputo) during 1997 revealed that License D is issued in the largest numbers (45%), followed by License A. (20.1%), License B. (15.9%), License E (12.7%), and License C. (6.3%). Hence large-scale licensed hunting occurs to a greater extent and could suggest that hunting may be motivated to obtain the largest supplies of meat for possible commercial trade, which is illegal under license regulations (T Longamane, 1998).

The number of animals actually reported to SNFFB as being hunted from allocated license quotas is limited, because hunters in most cases do not submit hunting returns. For example, in 1997 in Maputo Province, only 400 plains game were reported hunted, in Gaza Province 348 plains game and 55 birds,

Table 16

Hunting quotas allocated for all licences (A to E) and estimated annual potential game meat production, 1991-1997

Species	No. of Animals, 1991-1997		No. of Animals, Annual Average	Dressed Carcass Weight (kg)	Annual Estimated Weight (mt)
	Licenses A-D	License E			
Bustard	1,360	87	207	n/a	n/a
Cape Buffalo	1,140	1,449	370	314	116.2
Duiker	4,028	1,471	786	7	5.5
Reed Buck	758	539	185	36	6.7
Blue Wildebeest	0	56	8	108	0.8
Crocodile	869	99	138	100	13.8
Kudu	334	435	110	57	6.3
Eland	19	73	13	257	3.3
Warthog	1,570	816	341	40	13.6
Francolin	1,055	97	165	0.2	0.03
Water Fowl	1,475	139	231	0.2	0.04
Red Hartebeest	27	123	21	70	1.5
Hippo	541	259	114	584	66.6
Bushbuck	481	430	130	21	2.7
Impala	2,076	1,290	481	32	15.4
Waterbuck	207	611	117	120	14
Nyala	249	245	71	75	5.3
Lion	0	278	40	n/a	n/a
Leopard	79	262	49	n/a	n/a
Baboon	1,615	869	355	8	2.8
Sable	0	304	43	127	5.5
Bush Pig	2,831	564	485	29	14
Zebra	64	187	36	146	5.3
Total:	**20,778**	**10,683**			**299.4 mt**

Source: TRAFFIC survey data, 1998.

in Sofala Province 672 plains game and 2,278 hares and birds, and in Cabo Delgado only 75 plains game. The most popular plains game hunted under license are duikers and Bush Pig (DNFFB, 1997; T Longamane, 1998). Reported hunting returns are believed to be a considerable underestimate of actual numbers hunted under license. Quotas allocated for licenses A to E are believed to be fully utilized, especially when taking into consideration anecdotal reports that in most cases hunting license quotas are actually overused (DNFFB, 1993).

MAP and DNFFB base allocations of hunting licenses on annual quotas that are developed on a district and provincial basis. These are submitted to SPFFB for issuance of licenses A to D and are used by DNFFB directly for issuance of license E (*Articles 16 and 4 of clause 17 of Directive No. 117 of 1978*). However, lack of accurate wildlife population demographic data and aerial census data result in quotas being allocated on a rule of thumb basis and generally using only biological criteria. Total potential meat production from allocated quotas for the period 1991 to 1997 for resident hunting (Licenses A to D) and for safari non-resident tourism hunting (License E.) which is mainly conducted in *coutadas*, is provided in Table 16.

Total estimated potential game meat production from the licensed hunting sector in Mozambique represents 299.4 mt per annum. Citizen hunting accounts for almost double the number of animals allocated to safari hunting by tourists, although a greater number of preferred trophy species are provided to safari hunting in contrast to citizen hunting. Species resulting in the greatest potential supply of meat are Cape Buffalo (116.3 mt), hippo (66.6mt) and Impala (15.4 mt). For citizen licensed hunting, a greater proportion if not all meat derived from hunted animals is likely to be efficiently utilized legally through subsistence consumption by hunters and dependents, and illegally through commercial trade.

In contrast, meat supplied from safari trophy hunted animals is not effectively utilized, and meat, especially from the larger animals, is often left in rural areas and wasted. Distribution of meat to rural communities by safari operators in *coutadas* is often negligible, due to the large distances between hunting areas and rural human populations. However, during 1997 two safari companies in *coutadas* 11 and 12 indicated supplying 26 duikers, seven bushbuck, two Bush Pig, one zebra and one reedbuck. Although limited, this amount does suggest that safari operators are amenable to providing meat benefits to rural communities (T Longamane, 1998; T Macuacua, 1998).

ii.) Illegal Utilization of Bush Meat

The utilization of bush meat has always constituted an integral role in the lives of the people of Mozambique. This role was perhaps intensified during the civil war when soldiers both from RENAMO and FRELIMO relied on meat for survival and profit, and the illegal trade in elephant ivory increased dramatically (DNFFB, 1991). The period was characterized by insecurity and negligible capacity within the wildlife authority to protect wildlife and enforce wildlife laws (T Macuacua, 1998). During this period the wildlife resource was critically depleted (Rosihna, 1990; Dutton, 1995), with 1986 estimates (15,500-27,000 elephants) indicating a 60% reduction in elephant numbers compared to 1974 (50,000-60,500 elephants) due to poaching (DNFFB, 1991). Wildlife populations in protected areas such as the Gorongosa National Park and the Marromeu Game Reserve were heavily affected, and remain at significantly lower than pre-war levels (Agostini, 1993; DNFFB 1994; Dutton, 1995; Abacar and Tilley, 1996)

Although excessive levels of unsustainable bush meat and trophy off-take characterized the civil war period, the conclusion of the war did not result in the end of such abuse. Indeed, improvements in the security situation and infrastructure, and especially in the road and train networks, helped to re-establish connections between bush meat production zones and commercial market centers, thereby facilitating

the commercialization of bush meat (DNFFB, 1994). At present demand for bush meat remains high, and illegal hunting is prevalent throughout the country. Although legislation allows for licensed hunting at cheap, affordable and subsidized prices, total quota allocations are minimal in comparison to national demand. Limited DNFFB and SPFFB capacity to implement effective law enforcement has resulted in wildlife being viewed as an open access resource in and outside of protected areas. The commercial trade in wild meat is prohibited under citizen licensed hunting, although trade permits (Trade License A) are provided for under legislation at a cost of USD 5.00 each. These should only be used for selling small quantities of meat to families for home consumption, rather than for a more commercial trade. With reports that only a handful of trade permits are actually issued (Dutton, 1995), the vast majority, if not all trade in wild meat undertaken in Mozambique, can be safely classified as illegal. Although policy and legislation are clear, trade occurs openly and at a significant level in restaurants, hotels, markets stalls and roadsides throughout urban and rural Mozambique, reflecting the dynamic that law enforcement acts as a negligible and even non-existent deterrent (T Macuacua, 1998; T Longamane, 1998; T IUCN, 1998; T IUCN Beira, 1998).

The consumption of bush meat is critically important to maintaining food security and the nutritional status of many inhabitants throughout the country (McEwan, 1997). During the early 1990s it was estimated that about five million people in Mozambique were dependent on wildlife for meat protein, with rural communities deriving between 40% and 80% of their protein requirement from bush meat (UNCED, 1992). There is little doubt that bush meat represents the most significant and valued wildlife resource. Agostini (1993) suggested that the total amount of bush meat consumed annually within Mozambique could represent as much as 182,000 mt to 365,000 mt at an economic value of between USD 365 and USD 730 million per year.

Addison and McDonald (1995) reflect the importance of the bush meat resource by indicating that up to 70% of protein in many rural areas is provided through bush meat. This reliance on bush meat can also be associated with a traditional heritage of utilizing wild meat. The ba-Ronga and ba-Changane ethnic groups in Maputo and Gaza Provinces were well known as hunter/gatherers (Junod, 1996), as were the Zimba, Chewa, Nhungue, Chicunda and Angoni who lived along the Zambezi river valley. In northern Mozambique, the Makonde in Cabo Delgado were also renowned as proficient hunters. Hence peoples with a tradition of hunting and use of wild meat can be found throughout the country (Ferreira, 1954). The ethnic group distribution of traditional hunting societies matches closely those areas that currently are reported to maintain substantial bush meat utilization levels and derive over 25% of their monthly income from bush meat (MISAU/MPF, 1997).

Although Agostini (1993) maintains that subsistence is probably the most important value of wildlife, trade is also critical to many people and provides in many cases additional and sole sources of cash income (T Macuacua, 1998; T Longamane, 1998). In an assessment of the nutritional status and source of income of the population carried out in 60 districts (mainly in rural areas), the utilization of bush meat as a source of cash income was identified in many districts, especially those located near protected areas. In the six zones of northeastern Niassa Province, northern and central Cabo Delgado Province, southeastern Zambezia Province, northern Manica Province and southern Inhambane Province, bush meat was found to contribute more than 25% to household income, with poor households benefiting from bush meat income to a greater extent. An additional seven zones were identified as relying extensively on bush meat as a coping strategy during times of famine or hardship, usually caused by recurrent drought (MISAU/MPF, 1997).

Subsistence and trade motivated bush meat hunting occurs in protected and non-protected areas. For instance, people living around Maputo Elephant Reserve hunt mainly for subsistence using traditional methods such as snares and traps. Commercial trade motivated hunting also occurs but is generally

undertaken by people from outside the area using more sophisticated weapons such as firearms (GTA, 1990). In the Lagoa Piti zone close to the Reserve, Baquete (1995) estimates that subsistence is still the primary use although off-take for commercial trade accounts for about 12% of all animals hunted. In Niassa Game Reserve, commercial bush meat off-take is also mainly undertaken by outsiders such as Tanzanians crossing the Ruvuma River, and hunters from Cabo Delgado crossing the Lugenda River (Tilley and Abacar, 1996). Trade motivated bush meat off-take in many cases is externally motivated.

Commercial market supply has always been an important source of bush meat to communities in Mozambique. Dutton (1995) reported, for example, that bush meat off-take for commercial trade was the single largest factor affecting wildlife populations in the Gorongosa/Marromeu integrated management area. Drastic declines in wildlife populations, especially the larger species, have been observed (Anderson, *et al*, 1990; Dutton, 1991; Dutton 1995). Although declines were more severe during periods of conflict and insecurity, in 1994, two years after the war, substantial levels of bush meat off-take were still occurring. Off-take was subsistence motivated by communities surrounding the Gorongosa National Park, and commercially motivated to supply outlying areas and the town of Beira. Communities living near the protected area derived many benefits from the natural resources of the park, in addition to smaller mammals such as rodents in the cultivated and fallow fields surrounding the villages. Large ungulates, however, were primarily obtained from the protected area and a considerable proportion sold. During 1994, it was estimated that approximately 27 mt of dressed bush meat was transported from supply areas in and around the Gorongosa National Park for sale along the main road to Beira (Dutton, 1995). Anderson *et al.* (1990) attributed excessive off-take of wildlife from the park as being commercially orientated rather than for subsistence.

Such substantial quantities of meat commercially traded confirm the view that bush meat trade represents a substantial industry within the Gorongosa/Marromeu area, one that is likely to be indicative of other similar wildlife areas within the country. The situation has severe conservation implications for the future viability of wildlife in these areas (T Longamane, 1998; T Macuacua, 1998). The likelihood of bush meat motivated off-take being unsustainable is high, as aerial surveys conducted in the Marromeu complex during 1990 revealed high numbers of rotting carcasses due to excessive wire snaring, and at least ten hunting parties using military weapons (Dutton, 1991). One of the legacies of the civil war has been the continuing availability of semi-automatic weapons, which to this day, constitute the most common weapon for hunting (Tomás, 1996; DNFFB, 1997; Tomás, 1997). Such weapons result in excessive and unsustainable off-take of many of the larger species (T Macuacua, 1998; T Longamane, 1998). A review of limited law enforcement data for Maputo Elephant Reserve during 1996 and 1997 confirms the prevalent use of semi-automatic military weapons with all recorded arrests during the period involving the confiscation of AK 47 assault rifles. These military weapons are used for elephant poaching and for bush meat. For example, two separate groups of poachers were arrested during 1996 with AK 47s and large quantities of bush meat, amounting to 32 duikers, four reedbuck, and two Bush Pig (DNFFB, 1991; Tomás, 1996; Tomás, 1997; T Longamane, 1998).

Demand and use are extensive, but law enforcement is negligible. Although increasing in some protected areas such as Maputo Elephant Reserve and Niassa Game Reserve (Boyd, 1996; Abacar and Tilley, 1996; Tomás, 1997), law enforcement is still below required levels to be an effective deterrent, especially in the *coutadas* and free wildlife areas of the country (DNFFB, 1997). A review of all 1997 law enforcement data revealed the lack of any monitoring system, and an assessment of law enforcement in seven provinces confirmed that limited arrests and seizures are made by the DNFFB Inspection Department and SPFFB in the field (T Longamane, 1998). For example, in Maputo Province, no records are kept and law enforcement activity by SPFFB is limited, although personnel reported being aware of a substantial bush meat trade in both the urban and rural areas (Cuco, *in litt.*, to M. Longamane, 1998). In Gaza, Manica, Sofala, Tete, Zambezia and Cabo Delgado provinces, SPFFB personnel also reported the existence of identified rural and urban illegal bush meat utilization for subsistence and

commerce. Throughout all of these provinces, SPFFB personnel were well aware of the dynamics and parameters of bush meat use, with markets identified as roadsides, hotels, restaurants and *barracas* (informal market kiosks). Fresh meat is preferred in the urban markets, and prices range from MZM 10,000 to MZM 30,000 (USD 1.10 to USD 3.30) per kg (Mussengue; Camessa; dos Santos; Moises, *in litt.*, to M. Longamane, 1998).

Although the government is aware of the occurrence of bush meat utilization and trade, no official records are kept. Roadblock inspection points and mobile inspection units are implemented throughout most provinces but limited bush meat related arrests and seizures occur due to insufficient resources such as transport and staff (T Longamane, 1998). The lack of capacity to implement effective law enforcement is perhaps best shown by Quadros (1990) who reports that the Zambezia provincial department did not have a single vehicle for supervising a territory of some 103,000 km^2. Although improvements have been made since this time, the infrastructure is still limited. The number of inspection and law enforcement staff is insufficient; in 1997 there were only 421 officers for the entire country. The level of technical expertise among DNFFB and SPFFB personnel is also low, with DNFFB (1997) reporting that only 103 personnel had some form of basic training. In addition to negligible law enforcement effort, fines for bush meat related offences do not reflect the meat product value of species poached (Agostini, 1993). For instance the scheduled fine (*Decree No. 19 of 1987*) for illegally hunting a Cape Buffalo is MZM 225,000 (USD 22.20). In comparison to the meat value of USD 750 for a dressed Cape Buffalo carcass on the informal market during 1997, fines do not represent a deterrent to any trade motivated hunter.

Table 17

Dynamics of bush meat trade in four selected survey areas of Mozambique, 1997

Dynamic	Maputo Province Urban: Maputo City	Maputo Province Rural Districts	Sofala Province Beira Town	Sofala Province Zambezi Delta Rural Area
Species traded	22 species: 59% large, 41% small		10 species: 70% large, 30% small	19 species: 63% large. 37% small
Quantities Traded	302 mt over six months		14.8 mt per year	11.4 mt per year
Economic Value	USD 890,000 over six months		USD 41, 820 per year	
Where Bush Meat is the Most Important Meat	62.9%		-	-
Reasons for **Demand:** ¥ Cheaper ¥ Prefer Taste ¥ Available ¥ Other	Prefer Taste	Cheaper/Available	Prefer Taste	Cheaper/Available
Price of Bush Meat (BM) versus Domestic Meat (DM) per kg	BM = USD 3.40 DM = USD 1.08 BM 214% more expensive	BM = USD 1.03 DM = USD 1.28 BM 24% cheaper	BM = USD 2.17 DM = USD 1.08 BM 100% more expensive	BM = USD 1.00 DM = USD 1.08 BM 8% cheaper
Supply	Trade	Trade and Subsistence	Trade	Trade and Subsistence
Main Customers	Higher Wealth	All	Higher Wealth	All
Conservation Implications	1) high and increasing demand; 2) bush meat viewed as traditional and free resource; 3) negligible law enforcement; 4) extensive, lucrative and open trade; 5) increasing prices; 6) use of ex-military weapons; 7) high off-take from protected areas; 8) limited CBNRMP initiatives; 9) reliance on larger, higher priced species; 10) severe declines in wildlife populations.			

Note: Small bush meat species cetegorized as those having a dressed carcass weight of less than 5 kg;
DM = Domestic Meat; BM = Bush Meat
Source: TRAFFIC survey data, 1998.

Because of the above mentioned factors, trade in bush meat is significant and carried out openly throughout the country. This is reflected in research conducted in 1997 on the trade of bush meat in villages and towns of Maputo Province, and in the rural community areas of the Zambezi Delta and urban areas of Beira town in Sofala Province. A summary of the key parameters and dynamics of the trade and utilization of bush meat in these survey areas is provided in Table 17.

Importance of Bush Meat Utilization:

Throughout Maputo Province, subsistence utilization of bush meat represents an important nutritional contribution to many inhabitants, and performs an increased role for poorer households. In addition, the commercial trade is extensive and substantial, especially in the Matutuine, Moamba, Boane and Namaacha areas of the province (T Guissamulo, 1998). The province has a high human population in contrast to other areas of the country with 1,940,000 people, the majority of whom live in urban areas. Land degradation and loss of suitable wildlife habitat are apparent; some estimate that over 1.5 million mt of woody biomass have been removed from within a 90 km radius of Maputo city in the last 25 to 30 years. As a result, the forest has almost disappeared, giving way to scrub or non-woody vegetation (Smither and Tello, 1976; Ribeiro, 1992; Agostini, 1993; MICOA, 1997). Regardless, much of the population still derives considerable income from the bush meat resource within the province, with all medium to poor households obtaining some income from bush meat, and all districts containing a bush meat supply and marketing sector (MISAU/MPF, 1997).

During six months of research in 1997 in eight of the nine districts of Maputo Province, the bush meat trade was found to be large-scale, amounting to over 302 mt with an economic value of USD 890,000. The approximate annual estimate is therefore 604 mt valued at USD 1,780,000, which reflects the extensive nature of the industry. Dependence on the bush meat resource by many inhabitants is evident, and this situation is also apparent in the town of Beira, and in the Zambezi Delta, although smaller human populations in these areas reduce the overall quantities utilized. A total of 14.8 mt and 11.4 mt of bush meat (total value of USD 41,820) were recorded as traded in the survey areas of Beira town and the Zambezi Delta, respectively. Bush meat use in the urban and more rural areas of the country outside of Maputo Province is also an integral part of many people's lives (T IUCN Beira, 1998).

Bush Meat Species Utilized:

The bush meat trade in Maputo Province comprises a relatively large number of species, and this could be due to the decline in suitable wildlife habitat for larger plains game. A reliance on the relatively smaller antelope species such as duikers, reedbuck and bushbuck occurs; these species are more readily available in cultivated and modified habitat. In contrast, larger species such as Nyala, kudu, and zebra are primarily confined to the province's remaining wildlife areas and protected areas.

During 1997, a total of 22 species was recorded as being traded frequently in the province. The Common Duiker is sold by more traders (28%) than any other animal, suggesting that this species has been able to adapt well to the increasingly modified and in some cases degraded habitat of the province. The Red Duiker is the second most traded species (9.4%), and, as with the Common Duiker, is available throughout the year. This species is apparently able to survive and maintain viable population numbers within the farm and scrubland of the province, which increasingly is becoming the main habitat type, particularly in areas surrounding Maputo city.

Larger species providing greater quantities of meat per carcass are, however, still popular, with the likelihood that most are supplied through illegal hunting from the remaining pockets of wildlife habitat

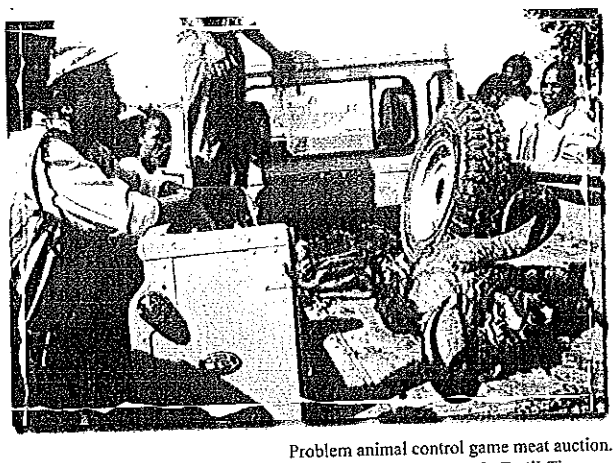
and protected areas within the province. Some are transported to the lucrative Maputo city urban markets from outside the province. Species such as Nyala and Sharpe's Grysbok are sold by 8.4% of traders, and the Impala (7.5%), kudu (6.5%) and Bush Pig (5.6%) also represent popular species sold by traders. Larger quantities of meat per carcass from these species may in part explain their greater frequency of trade, as on average traders reported these species being less available with only (30%) indicating their frequent supply throughout the year.

Not surprisingly, species that have a reputation for crop raiding are also traded frequently. These include Cane Rat (7.4%), Scrub Hare (7.4%) and porcupine (4.7%). Protection of crops and incentives for trade seem to have increased the supply of these species. An array of other species ranging from Cape Clawless Otter, Honey Badger, and Samango Monkey are also traded and consumed, although by fewer traders (1.6%) and at lower frequencies. This suggests that bush meat demand is not overly choosy with regard to species consumed, and that traditional management strategies such as taboos and totems may not play that significant a role in defining which species are traded.

In the rural areas of the Zambezi Delta and in Beira town, more traders deal in larger numbers of smaller species. In Beira, a total of ten species were observed as utilized during 1997, with bushbuck (34%), Bush Pig (25%), Red Duiker (18%) and Common Duiker (9%) representing the most popular species traded. Communities in the Zambezi Delta are fortunate to have a larger wildlife resource base than the southern region, but they still demonstrate a reliance on smaller animals, with the Cane Rat (14%), Suni (12.5%) and bushbuck (10.5%) being traded most frequently. Hence even with the varying habitat and wildlife availability in Beira and the Zambezi Delta, smaller species that are likely to be relatively available in areas surrounding human settlement are hunted and traded in the greatest numbers (T IUCN Beira, 1998).

Bush Meat Demand:

In Maputo city, bush meat was reported to be favored by a large proportion of people because of its preferred taste (21.9%). Alternative domestic meat and especially cheaper marine fish supplies are widely available in the city, and therefore bush meat represents a luxury item that is purchased because it is perceived as a superior product. Wealthier households constitute the majority of bush meat buyers within Maputo city. In contrast, in the province's rural districts, tsetse fly has inhibited livestock production, and domestic meat prices are higher than the national average (USD 1.28 vs. USD 1.08 per kg). In these areas, bush meat is 24% less expensive and more available to residents. The Changalane, Salamanga, Ressano Garcia and Zitundo areas produce little if any livestock, hence bush meat is generally cheaper with the largest proportion of respondents (22.2%) utilizing bush meat because it was cheaper and more available. In rural areas, the importance of bush meat in comparison to domestic meat and fish is high, with 62.9% of all bush meat buyers rating bush meat as the most important source of meat protein to their households. Only in some areas of the province, such as Catembe, where cheap marine fish is available, was bush meat ranked of lower importance. Buyers in the rural districts attributed a high



Problem animal control game meat auction.
Jo Traill-Thomson

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importance to bush meat supply due to economic factors whereas those in Maputo city associated greater levels of use with a preference for the product (T Guissamulo, 1998).

In Beira town and the Zambezi Delta similar demand dynamics are found, with poorer members of the rural community relying on bush meat because it is cheaper and more available than domestic meat. In Beira town, however, greater domestic meat and fish availability has resulted in bush meat being utilized mainly because of a preferred taste, and all socio-economic groups of the town purchase and utilize bush meat. Hence the demand parameters affecting rural areas as opposed to the urban areas of Maputo Province are also reflected in the rural areas of the Zambezi Delta and the town of Beira (T IUCN Beira, 1998).

Bush Meat Trade:

The trade in bush meat is undertaken in eight of the nine districts in Maputo Province. A total of 22 main trading locations were identified ranging from one in Matola, Manhica and Magude Districts, to up to five and seven major trading locations in Maputo city and Matutuine District respectively.

Bush Meat Trader Profiles: Men primarily trade, although women and children account for 4.4% and 2.2% of traded supply respectively. The profiles of bush meat traders in the province can be categorized as that undertaken by subsistence hunter/traders, commercial hunter/traders, intermediate traders and market traders. Bush meat represents in most cases the sole source of income for these traders. Ad hoc and opportunistic trading also occurs and in such cases represents an important additional source of income.

Subsistence hunter/traders sell bush meat that they have hunted themselves and thus secure good profit margins. Trade is mainly conducted within the small towns and villages of the rural districts and subsistence hunter/traders generally supply cooked food stalls, local markets or sell bush meat on roadsides. In many cases, the male head of household hunts meat, and after family dependents have been fed, any excess meat is sold. This contributes an important additional income to the economy of the household. In some cases, the wives and children of the hunter will sell excess bush meat. The occurrence of this type of trader is widespread and was identified in nine out of 22 trading locations (41%) within the province.

Commercial hunter/traders rely on bush meat trade profits for all or the majority of their annual income, and are highly organized in the manner in which they conduct business. All meat is hunted directly by traders using sophisticated weapons (usually ex-military semi-automatic rifles). Such traders operate throughout the province, and have their own vehicles, which they use to transport large quantities of meat into the Maputo city's markets. Bush meat is sold in bulk from these open markets, and to larger restaurants and hotels, but also to cooked food stalls. In some cases commercial hunter/traders will sell directly to intermediate trader middlemen. Profit margins are generally high, but running costs of the operation are kept to a minimum with reports of commercial hunter/traders not transporting meat if quantities are too low. Fuel is the major cost, and if hunted supplies are limited the trader will sell locally in order to obtain fuel money to go out hunting again. Commercial hunter/traders were observed to be concentrated in the Catuane, Mapulanguene and Zitundo areas where availability of larger ungulate species is still relatively good.

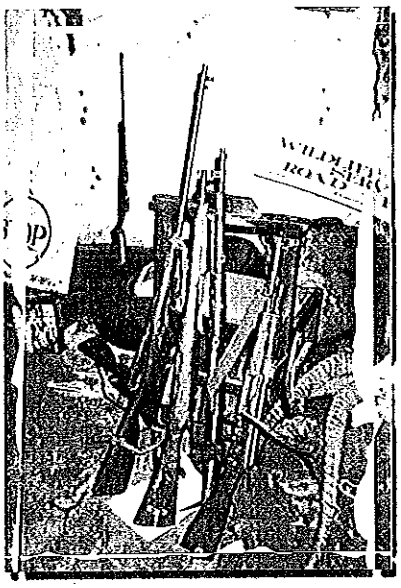
Intermediate traders are classified as middlemen who generally buy from commercial hunter/traders in the rural districts. Commercial hunter/traders in some cases will deal only with intermediates and when sufficient quantities of meat have been hunted will call the intermediate trader who is usually based in Magude or Mapulanguene to come and collect the entire quantity. Intermediate traders buy in bulk and then distribute supplies to end market sellers mainly in Maputo city. In some cases, hunters

and intermediate traders undertake long-term arrangements with, for example, a commercial hunter transporting bush meat (mainly Nyala) by bus from Sabie to Boane on a regular basis. Bus crews take charge of the transport of the bush meat and ensure that it reaches its destination and the intermediate buyer safely. This also occurs from Sabie to Moamba where intermediate buyers then go on to sell in open markets at Ressano Garcia.

End market traders are usually located in Maputo city and the more urbanized areas of the province. They are largely comprised of cooked food stall owners and open market stall traders. In general, all meat supplies are purchased from subsistence, commercial and intermediate traders. In some cases, however, especially in Maputo city, end market traders will travel by public transport (usually by train) to rural district supply areas such as Magude to purchase supplies at lower prices, thus increasing their overall profit margins.

The above traders generally rely on bush meat as their main source of income. In contrast, opportunistic or ad hoc traders obtain more infrequent revenues from bush meat trade. Such trade is often conducted by charcoal and fuelwood traders who purchase supplies from South Africa. On their way back from the South African border and as they pass through the rural districts of the province, they purchase bush meat mainly from subsistence hunter/traders at reasonable prices. Back in the urban area to sell their charcoal and wood, they also trade the bush meat to earn additional profits. This type of trade is undertaken mostly by women, with bush meat hidden in sacks and transported by local taxi known as *chapa*, or by train. A total of six main locations in which this type of bush meat trade is undertaken were identified, with Maputo city being the major selling area.

Bush Meat Marketing Mechanism: Throughout Maputo Province, the methods used for marketing bush meat are varied, and target different sectors of the market. These include open markets, cooked food stalls, household sales and roadside sales. The sale of bush meat from open markets is the most popular method with 11 out of the 22 trading locations (50%) in the Province trading in this fashion with an average of two open markets in each location. The popularity of this indiscreet method of marketing, where bush meat is openly displayed on market stalls, suggests that law enforcement is negligible. The largest numbers of open markets (five) were found in Maputo city (Xipamanine market, Janet market, Khalane market, A. Combatentes market and Catembe). The average number of bush meat traders operating regularly in these markets was nine. Xipamanine market hosted the greatest number and on average 19 traders were present. With DNFFB Inspection (Law Enforcement) Department and SPFFB provincial representatives being located in Maputo city and a short distance from many of these markets, it is perhaps surprising that illegal trade is so open. Outside of Maputo city, six open markets were located throughout the province with an average of two bush meat traders per market.



Seized semi-automatic machine guns and rifles used by bush meat hunters.
Rob Barnett-TRAFFIC

Cooked food stalls are also a popular method of trade, but are restricted in their location to areas in which a large number of people require cheap and affordable meals. In many cases, food stalls that sell prepared meals containing bush meat are located close to factories or industrial areas where a large labor force is employed. A total of ten (45%) such areas were identified as having bush meat cooked food

stalls (Catembe, Boane, R. Maconi, Sabie, Ressano Garcia, Bela Vista, Zitundo, Magude, Manhangane, Catuane). Areas such as R. Maconi are located close to factories and supply cheap, nutritious and affordable meals to workers on a daily basis. Other areas such as Zitundo and Ressano Garcia are located near the South African border crossings and supply cooked bush meat to large numbers of legal and illegal travelers entering and departing from South Africa. In these three trading areas, located close to large markets, the average number of bush meat cooked food stalls was six, with the remaining seven trade locations in the province having three cooked food stalls on average. Although most are located close to larger markets, a number of bush meat cooked food stalls also cater to smaller markets such as those in Manhangane who supply meals to charcoal producers, wood traders and truck drivers, and those in Bela Vista whose customers are generally town and village people.

The open occurrence of bush meat markets and cooked food stalls in the more urbanized areas throughout the province indicates limited law enforcement in certain areas of the province. However, the trade in bush meat takes on a more underground and secretive form when it occurs in close proximity to protected areas such Zitundo and the Maputo Elephant Reserve. Increased anti-poaching efforts in recent years have reduced the overt trade, and consequently open bush meat markets and bush meat cooked food stalls no longer occur in these areas. The result has been a move by bush meat traders to restrict trade to trusted and known customers through household sales. In many cases, the traders (who may also be the hunters) sell bush meat in larger quantities and to fewer known and trusted customers. Generally, customers are themselves bush meat trader middlemen and will transport bush meat into urban markets such as Maputo city for resale. In areas such as Salamanga and Changalane, where the few permanent inspection posts operated by DNFFB and SPFFB occur in the province, bush meat traders have also turned to household sales. However, the number of areas that can be categorized as such are few and far between.

It is apparent that increased law enforcement does have an impact on the utilization and trade of bush meat, although traders are adaptable and find ways to ensure that the lucrative trade continues unhindered by finding alternative and more secretive trading mechanisms. This adaptability is well reflected in the area of Goba and Magude where law enforcement levels are perceived to be higher. Traders in these areas have overcome the increased chances of apprehension when transporting meat by road to urban markets, by transporting the meat by train and conducting business at railway stations, where law enforcement is non-existent. Roadside sales also occur throughout the province, but are generally conducted on an *ad hoc* and opportunistic basis. Such an array of marketing mechanisms results in bush meat being available in just about every market sector within the province. Mechanisms range from sale of snack mini-fauna bush meat on roadsides, to fresh and dried meat sales to households at open markets, to prepared cooked food sold in restaurants, hotels and stalls.

Quantities of Bush Meat Traded: The quantities of bush meat traded on a regular basis throughout Maputo Province are substantial and represented a total of over 302 mt traded as fresh and cooked meat during a six month period in 1997. Fresh meat was traded in the largest quantities at 238.6 mt (79.1%) in contrast to cooked meat at 63.1 mt (20.9%). Due to their proximity to supply areas, the rural districts of the province account for the largest trade in bush meat at 74% (224.8 mt). However, Maputo city as the primary end market accounts for a considerable proportion of all trade at 26% (77 mt). The total traded account for many animals, especially when considering that smaller bush meat species such as the duikers are sold in greater numbers. However, the most popular smaller and more available species account for a limited proportion of overall quantities traded, due to their small dressed carcass weights. Larger species provide by far the greatest contribution to the overall supply traded. For example, one kudu on average supplies 124.3 kg of dressed meat in contrast to the Common Duiker supplying only 6.7 kg.

The 302 mt recorded in trade, was mainly comprised of kudu at 80 mt (644 animals), reedbuck at 70.9 mt (1,972 animals), Impala 57.7 mt (1,821 animals) and Nyala at 26.7 mt (356 animals). These four species represent 77.9% of the total quantity of meat traded. Smaller antelope species such as Common Duiker are hunted in greater numbers. The Common Duiker at 19.6 mt (2,931 animals), the Suni at 11.6 mt (1,452 animals) and the Red Duiker at 5.8 mt (694 animals), although being traded more frequently, only represent 12.2% of total quantities traded due to their small dressed carcass weights. Other species such as rodents, carnivores and primates are traded in much smaller quantities representing the remaining 9.9% of total quantities traded in the Maputo Province survey.

With larger, less available species such as the kudu still being supplied in large quantities by commercial and subsistence hunter/traders, the impacts of the bush meat trade on these populations are likely to be considerable, with the additional likelihood that many supplies originate from outside the province.

Economic Value of Bush Meat Traded: The economic value of bush meat is substantial with the average price (taking into account price variation between species) in the Province amounting to MZM 21,529 (USD 1.87) per kg of fresh dressed meat. This price is high when compared with the national average prices of alternative domestic livestock meats such as beef, which during 1996 was MZM 12,431 (USD 1.08) and for chicken was MZM 11,247 (USD 0.98) (DNPO, 1997). The price of bush meat, however, varies greatly between the time of year it is sold, the form in which it is sold (fresh or cooked), the species of bush meat, and especially between the area of the province where it is purchased.

During the period September to February significant differences in prices of bush meat were observed, with the majority of species priced significantly higher during the lead up to the Christmas and new year period as customers seek preferred meat for the season's festivities. For example, the average price of all main species traded in September was MZM 23,423 per kg but by December the price had more than doubled, reaching MZM 53,960 per kg. Species such as the Red Duiker actually quadrupled in value. Customer willingness to purchase meat at such exorbitant prices reflects the demand dynamic in many areas of the province were bush meat is regarded as a luxury and superior product.

Cooked bush meat sold from restaurants, hotels and especially food stalls is sold at considerably higher prices than fresh meat, because of the value added processing involved with preparing the meal. Even when subtracting the costs of meat accompaniments such as oil, seasoning, vegetables and carbohydrate, the value of cooked bush meat alone is over four times more expensive than fresh meat. Average prices of cooked bush meat throughout the province are MZM 89,108 (USD 9.90) per kg. Prices of cooked meat tend to be higher in areas such as R. Marconi and Boane where food stalls selling cooked bush meat are in high demand from large work forces.

Prices of fresh bush meat per kg vary significantly according to species, with the smaller and more available animals being offered at an average price of MZM 18,738 per kg. Specific prices per kg for selected species are as follows: reedbuck (MZM 14,553), Common Duiker (MZM 21,141), and Suni (MZM 20,520). Larger species command higher prices, with the average price being 37% higher at MZM 25,666. Nyala was found to cost MZM 24,307, kudu MZM 25,484, and Impala MZM 27,206 per kg. Taste preference and high demand for certain species of bush meat is not generally apparent within the province, and all bush meat is generally regarded as one and the same, with the exception of Common Duiker. According to traders, this species has a greater "shelf life" and can therefore be stored for longer periods without refrigeration. Differentiated fee structures for bush meat are therefore unlikely to be due to increased demand for particular species. Rather they may be more associated with ease of supply, availability of species and the areas in which they are sourced. Larger more expensive species are less available within the province and so may be transported from areas outside of the province.

More importantly, these species may be primarily obtained from protected areas in the province where they are still available. Greater transportation costs and increased chances of law enforcement apprehension may explain the higher costs related to these species. Of interest is that most kudu meat observed during this survey was spoiled or rotting, suggesting that meat from this species is often transported over long distances.

The area in which bush meat is sold also impacts significantly on the price of bush meat. The 22 main trading locations within the province were categorized according to source areas, trade centers and city markets. The source areas included six locations that were responsible for supplying the majority of bush meat. The destination centers where active commercial trade was conducted included 11 locations in the rural districts of the province that were categorized as trade centers, and five locations in the urbanized Maputo city that were categorized as city markets.

Trading Locations	Average Price	Price Increment (%)
Source (Supply) Area	MZM 11,892 per kg	-
Trade Centers (in the rural districts)	MZM 18,044 per kg	51.7% Increase
City Markets (in Maputo city)	MZM 39,086 per kg	117% Increase

Prices in the rural source areas are significantly lower and in most cases are cheaper than domestic meat, which is unavailable and expensive in these areas. Even in the rural district trade centers, bush meat is regarded as cheaper than domestic meat, and only in Maputo city markets where cheaper and more available domestic meat and fish supplies are found does bush meat represent a considerably more expensive product. Hence, bush meat is in demand because it is preferred, and a wealthier clientele pays higher prices for it. As such, Maputo city markets represent the most lucrative bush meat markets within the province. Of interest is the finding that no cooked bush meat food stalls were identified in Maputo city, suggesting that cheaper prices of domestic meat and fish in the city and the more expensive bush meat prices preclude any advantages that lower-income groups could obtain from consuming cooked bush meat.

Maputo city is the end market in most cases and represents the most lucrative trade center. As such, traders in Maputo city reported a greater availability of bush meat throughout the year. For example, Common Duiker was reported to be available throughout the year by 100% of the traders in Maputo city, in comparison to only 59% of traders in the more rural districts of the province reporting availability throughout the year. In general, a total of 60% of traders in Maputo city reported bush meat species to be available throughout the year in contrast to 52% of traders from outside of the city. Greater profit margins and larger demand in Maputo city results in a more frequent supply of bush meat. The Maputo city market accounts for the largest proportion (45%) of the province's total economic value in contrast to source areas (37.9%) and other rural district trade centers (17%). Species such as the kudu and Impala that maintain higher than average prices and are supplied in the largest quantities contribute the most to total values of the bush meat trade industry at 14.6% and 11% respectively. The trade of bush meat represents a profitable industry, with traders of all categories realizing substantial monthly earnings that for commercial hunter/traders, intermediate traders, cooked food stall traders and open market traders result in a high standard of living. For example, the average quantity of fresh meat sold daily by all traders throughout the Province during the survey period was 19.5 kg. As the majority of traders sold bush meat on a daily basis this represents a possible gross turnover of MZM 419,815 (USD 36.50) per day and MZM 8.8 million (USD 766) per month (21 days per month). Traders in

cooked bush meat accrue an even greater turnover with 7.95 kg of cooked meat sold on average per day, representing a daily turnover of MZM 708,408 (USD 61.60) and a possible monthly turnover of MZM 14.9 million (USD 1,293.70).

Even taking into account costs of bush meat purchase and running costs of the trade, profit margins are likely to be enticing. A possible scenario of a Maputo city open market bush meat trader buying fresh bush meat from rural trade centers at MZM 18,044 (USD 1.56) per kg and selling at average prices of MZM 39,086 (USD 3.40) would result in a profit margin of 117%. This represents a possible monthly gross profit of MZM 3.5 million (USD 753), when selling 19.5 kg per day at 21 days per month. In contrast to a national annual GDP per capita of USD 190, this amount is substantial. In Maputo Province, the bush meat industry can be valued at an estimated USD 1,785,406, which reflects the important role bush meat trade plays in the overall economy. This figure takes into account varying prices pertaining to species, and supply, purchase and processing levels.

In Beira town and the Zambezi Delta, the trade of bush meat also represents a highly organized and lucrative industry. As with Maputo, prices in the rural areas of the delta are lower at an average of MZM 11,526 (USD 1.00) in contrast to Beira town prices of MZM 25,000 (USD 2.17). In general, fresh meat is preferred and is more expensive than dried or smoked meat. Traders within Beira try to ensure fresh meat supplies to increase profits. Traders in Beira are reported to purchase bush meat at MZM 20,000 per kg on average, and their profits margins are smaller than in Maputo Province at only 25%. This may be attributed to a comparatively smaller market within the area. However, within the context of Beira town and the delta, bush meat represents an important resource because it provides supplementary protein to rural communities in the delta, and additional income to people in both the delta and Beira town. In some cases, trade in bush meat serves as the only source of income.

Bush meat is supplied by subsistence and commercial hunter/traders, and intermediate traders from the delta to the urban markets of Beira and Quelimane, by way of public transport and increasingly by logging trucks. The trade in Beira town is well organized with four major supply trade routes identified. These routes are: 1) South of Sofala Province (*Coutada* 5, Buzi, Nhamatanda), which due to weak law enforcement effort in the area is a preferred supply area; 2) Savane/Muanza, in which bush meat is transported by logging trucks to Beira (this is undertaken somewhat discreetly due to the presence of Gorongosa National Park officials in the area); 3) Cheringoma/Caia, where public transport (mainly buses) are used to transport bush meat into Beira from the northern provinces of Zambezia and Nampula; and 4) Marromeu, where most bush meat traded is believed to be internal although some supplies are transported by local taxi *chapa* into Beira.

Conservation Implications of Bush Meat Utilization and Trade:

Extensive trade in bush meat carries significant conservation implications. Although a wide variety of smaller species (such as the duikers) are utilized frequently, these species are believed to still maintain viable populations within Maputo and Sofala Provinces (Beira town and Zambezi Delta) because of their ability to adapt well to modified habitats. However, demand for the rarer large species also remains high, primarily because of their larger dressed carcass weights. Commercial traders have ensured a continuing supply of these larger species due to greater profit margins, but their status outside of protected areas is being questioned.

Taboos and totem restrictions on the utilization of bush meat species seem to be negligible, and hunting and trade is undertaken throughout the year. This has resulted in limited periods for population recovery. In Sofala Province, hunters also primarily target females, and therefore wildlife populations have a decreased ability to sustain current off-take levels. Access to ex-military semi-automatic weapons,

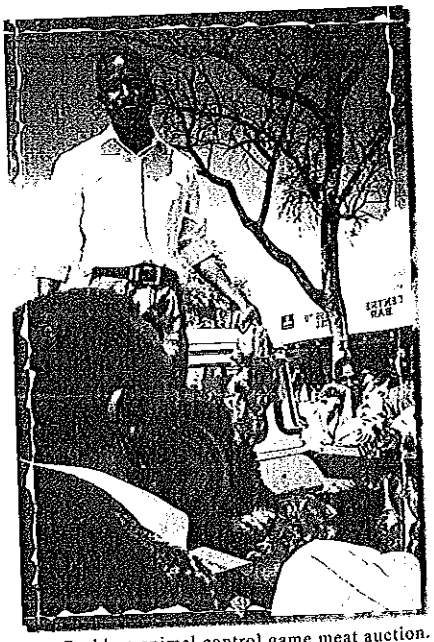
and the reported use of more sophisticated hunting techniques in Sofala Province, such as night torch hunting, have also increased the possibility of unsustainable off-take of these species. With a limited law enforcement deterrent, commercial hunters and traders are likely to continue to harvest from dwindling resources in light of high and increasing prices found in the urban markets of the province. In Maputo and Sofala Provinces, demand is reported to be increasing, supply is regarded as insufficient, and prices are consequently increasing (T Guissamulo, 1998; T IUCN Beira, 1998).

Without external regulation of the trade it is more than likely that wildlife populations will continue to dwindle at increasing rates, and pressure on bush meat resources within the protected areas of the provinces will rise. High demand and lucrative profits, and the likely occurrence of unsustainable off-take rates especially for the larger species, is of major conservation concern for the future viability of wildlife populations. Unfortunately this situation will only get worse in provinces such as Maputo where a continuing trend of land clearing and habitat encroachment is apparent. Species such as the Sharpe's Grysbok and Red Duiker are of particular concern due to their vulnerable status within the country (Smither, 1976).

IV. SUMMARY/CONCLUSION:

The legal game meat industry within Mozambique is largely under-developed and makes a minimal contribution to the economy. Currently only 299.4 mt of meat is produced at an economic value of USD 230,538. Licensed hunting does, however, provide legal access to wildlife for communities that are generally poor and have limited access to domestic meat. Low human population densities and the prevalence of tsetse and trypanosomiasis throughout large areas of the country do provide considerable potential for expansion of the legal game meat production sector, especially through game ranching/ farming as well as community-based cropping initiatives. Currently this potential is not being met, and the likelihood of significant progress in this field is low due to fundamental constraints and restrictions imposed by current legislation, land tenure and wildlife ownership regulations.

Illegal utilization of bush meat occurs at an extensive level throughout the country and can be attributed to limited livestock production, cultural affiliations with bush meat, low socio-economic status of rural and urban communities and a fundamental lack of capacity by wildlife authorities to regulate illegal bush meat harvest and trade. Trade is the major source of bush meat nationwide, and is characterized by being highly commercialized and lucrative. The legacy of the war is still evident with both physical and social infrastructure limited, and a reliance on the natural resource base by the majority of rural Mozambicans. Bush meat provides a significant portion of the nation's protein requirements and its trade constitutes important cash incomes in a country characterized by limited opportunities for alternative and more formal employment. Such reliance on the bush meat resource has resulted in declines in wildlife populations, and unless action is taken through increased law enforcement and the establishment of community-based natural resource management programmes, the likelihood is that a fundamentally important community development resource will be lost.



Problem animal control game meat auction.
Jo Traill-Thomson

V. RECOMMENDATIONS

- A countrywide monitoring system needs to be established to collect data on the bush meat trade throughout Mozambique. This monitoring system should be a relatively simple data collection process, which can be combined with other data collection systems currently being undertaken on producers, consumers, markets and products from an agricultural perspective. This monitoring system would be best established and undertaken through the NGO, University and Government collaborative groups already involved in national surveys.

- There is a need for specific research into aspects that could not be covered by this study. Suggested topics include:

  Analysis of the impact of hunting on the density and status of different species. The assumption that bush meat hunting is unsustainable or threatening to species of high conservation importance needs to be further studied. This research will assist in identifying which species are under what hunting pressure, what habitat is most resilient to exploitation, and which species are more vulnerable. These studies will require a matrix approach (e.g high hunting areas/low hunting areas, modified habitat or farm bush/wild habitat) to identify key variables.

  Investigation into alternative wild species to supply the bush meat trade. One of the results of current research has been the general indication that there is no specific selection for particular species but that harvesting depends on the availability and cost benefit (size of animal or meat products vs. effort to hunt). This suggests that it may be possible to promote the supply of meat to the bush meat trade through species of lower conservation concern such as rodents, bushbuck and guinea fowl. Studies of the productive capability of these species under varying conditions (wild habitat, farm bush, domestication) and off-takes would help to indicate whether management methods could be used to take the pressure off more vulnerable high-value species (i.e. Cape Buffalo and Nyala).

  Documentation of bush meat trade in additional Provinces of Mozambique. Specific provincial level studies are necessary to clarify if the results of this study focused largely on Maputo Province are valid for the country as a whole particularly in relation to the urban demand and consumption of bush meat and the species in the trade. These specific studies are best carried out through the University, NGOs and research branches of government agencies rather than by DNFFB, given its regulation and law enforcement mandate.

- The few official licenses issued for the hunting of small game obviously do not reflect the actual level of hunting in Mozambique. A summary of the information on the bush meat trade needs to be produced to enable the objectives and success of management systems to be monitored and if necessary adapted. This report should include the results of the monitoring process, summaries of further specific studies and information from the management and enforcement body (DNFFB) on reports from the provincial law enforcement services (SPFFB) on seizures and arrests, licenses issued for hunting and management activities undertaken.

- The current lack of clarity in the legislation applying to hunting of wildlife for meat and the transport and sale of wild meat needs to be addressed in the new Law for Forestry and Wildlife (currently under development) and the Regulations to this law. It is recommended that the following process be followed:

Elaboration of Government policy towards wild meat and its production and sale. This should be developed by DNFFB but include the participation of other sectors in Government and those involved in rural development, food security, conservation and law enforcement.

Elaboration of sections in the new Forestry and Wildlife Legislation identifying the role of Government agencies in the control of species in trade, the rights of producers and consumers to wild meat, the method of controls and the law enforcement mechanisms to be used. Specific Regulations to the new Law will have to be evolved bearing in mind the limited capacity of the state to undertake effective law enforcement due to staffing and financial constraints.

Inform law enforcement bodies and the general public about the new laws and regulations including penalties and why they are necessary.

- While some of these points have been covered above, the key management issues identified during this study are the sheer volume of the trade (up to 300 mt in one province in six months), the economic significance (over USD 800,000 in one province over six months), and the dependence of the population on this trade for protein. Therefore an important recommendation is that management of the bush meat trade should not only be based on negative deterrent methods but also the identification of management options to increase the sustainability of the trade through:

  Identification of which species are most threatened by the trade, and focusing law enforcement, protection measures or public awareness campaigns on these species; and

  Identification of whether options exist to provide cheap protein from other sources and implementing activities to provide these alternatives;

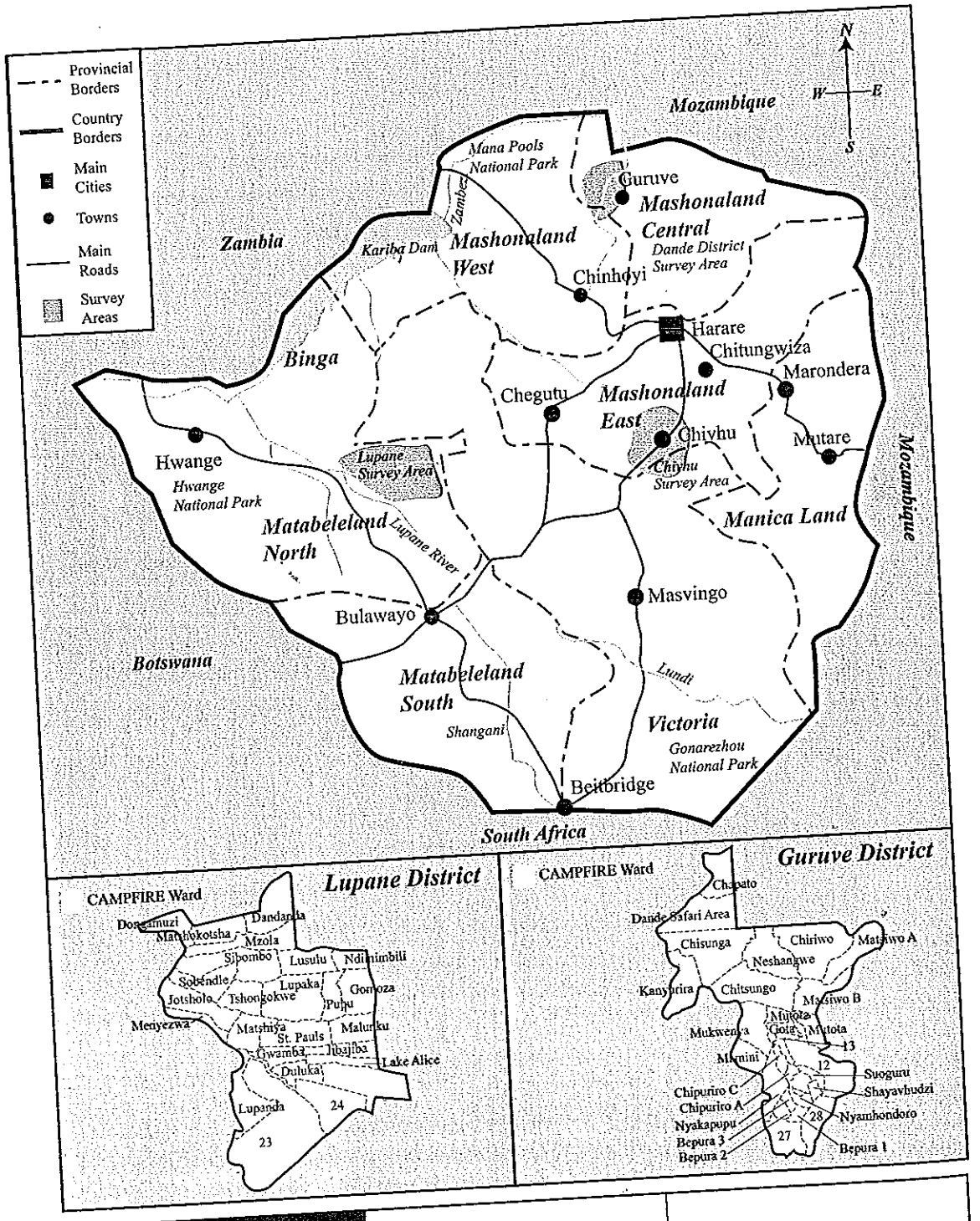
  Identification of those species resilient to hunting pressure and habitat modification (and of low biodiversity conservation importance) for which no regulations or law enforcement need to be applied;

  Investigation of the options for domestication of wild species to supply the demand; and

  Investigation of the options for local community law enforcement (community guards) and community-based natural resource management programmes.

  An additional management related recommendation is to undertake a public awareness campaign to clarify why it is necessary to regulate or manage the bush meat trade. This could include radio programmes and posters identifying the impact of the trade on wild resources and biodiversity in Mozambique, given the general misconception that such resources are limitless. It is also recommended that the results of studies on the bush meat trade and its impact on biodiversity, its economic and financial value and its role in food security should be disseminated widely so that it becomes part of wider discussion in areas such as agricultural policy, rural development and urban management and is not limited to the sector of biodiversity conservation. Very few sectors outside of those interested in biodiversity conservation have yet considered the bush meat trade as a significant issue and this study identifies the need for them to do so.

ZIMBABWE



Survey Areas	Lupane and Chivhu Districts	Dande District
Survey Sample	850 Households	90 Bush Meat hunters, traders, consumers

CHAPTER FOUR
ZIMBABWE

I. BACKGROUND

Area: 389,000 km^2. ***Population:*** Estimated at 10 million with an annual growth rate of about 3.13%. ***Density:*** 29 per km^2

Zimbabwe is a landlocked country, bordered by Zambia, Mozambique, Botswana and South Africa. There are four land types unique to Zimbabwe which are the Midlands Plateau, Southern Lowveld, Zambezi Valley and the Eastern Highlands (Pinchin, 1992). Zimbabwe is predominantly savanna woodland with a small isolated area of montane forest in the Eastern Highlands (Apps, 1996). Miombo woodland is also a dominant and important vegetation type (IIED, 1992). The mean annual rainfall is 685 mm (Gore, *et al.*, 1992), which can be unreliable with Zimbabwe experiencing periodic droughts. The country is divided into five natural regions, with Regions I and II having a good to moderate suitability for the production of crops and livestock; Region III is fit only for drought resistant crops and livestock production; Region IV is generally suited only to livestock and wildlife; and Region V sustains only extensive livestock production and wildlife. Of the total land area in Zimbabwe, 17% falls in regions I and II, 18% in region III, 38% in region IV, and the remaining 27% into region V (Murindagomo, 1990; Murphree and Cumming, 1996).

In comparison to other countries of the study, Zimbabwe is a relatively wealthy country with GDP per capita estimated to be about USD 740 (World Bank, 1998). The economy is largely based on primary commodities with the agriculture and mining sectors providing a large proportion of the country's exports (Gore, *et al.*, 1992). Although Zimbabwe has good mineral natural resources of which gold, chrome, nickel and coal provide the highest output value, by international standards the mining industry is still small-scale. Agriculture provides the mainstay of the economy with 73% of the labor force within this sector, and accounts for about 20% of GDP, and 36% of total wage employment (Murindagomo, 1990; IIED, 1992). Mining contributes 7% of GDP and manufacturing represents 25% of GDP based on 90% of inputs from local agriculture (Hifab, 1989, Ack and Child, 1993). Zimbabwe's population is predominantly rural with 77% of the population living in communal and commercial farming areas and 11% within Harare and Chitungwiza, the two main urban centers of Zimbabwe (IIED, 1992).

The country has some of the richest wildlife resources left in Africa (IUCN, 1988). The fauna and flora reflect the environmental gradient from the wet savannas in the higher rainfall areas of eastern Zimbabwe to the arid savannas of the Kalahari in southwestern Botswana (Child and Child, 1986; 1995b). Deforestation, overgrazing and soil erosion are the main environmental issues facing Zimbabwe, especially in communal areas (IIED, 1992). Deforestation due to demand for fuel wood (77% of total wood demand) is high at an annual loss of 1.5% per year. Fuel wood accounts for 31% of Zimbabwe's energy consumption, and as much as 50% decline in stocks have occurred in communal areas (Gore, *et al.*, 1992). Soil erosion in both the commercial and subsistence agriculture sectors is considered one of the country's most critical problems (Whitlow, 1987; UNCED, 1992). Although there are degraded habitats and species under threat (i.e. Wild Dog and Liechtenstein's Hartebeest) wildlife populations have generally increased in regions III, IV and V, and especially in protected areas and on large-scale commercial farms (Hifab, 1989; Murindagomo, 1990; IIED, 1992).

The area occupied by national parks, safari areas, recreational parks and sanctuaries (collectively called the "wildlife estate") totals 46,000 km^2 or about 12.7% of the country's total land area (Murindagomo, 1990; Taylor, 1990b). About 6.9% of the country comprises 11 national parks that enjoy the highest

protected conservation status in which extractive or consumptive forms of wildlife utilization are not permitted except for ecological cropping (T Davies, 1998). Sixteen safari areas representing 4.9% of the country are designated protected areas that allow for consumptive wildlife utilization that currently involves licensed trophy hunting. National parks and safari areas usually occur within the agro-ecological regions IV and V that are characterized by low rainfall, poor agricultural soils and are not suitable for extensive crop or livestock production (Cumming, 1989). The remainder of the wildlife estate comprises botanical reserves, gardens, sanctuaries and recreational parks that constitute only 0.96% of the country (T Davies, 1998). Protected forest areas (977,000 ha) comprise 2.5% of the land area (Ack and Child, 1993; Murphree and Cumming, 1996)

A substantial wildlife resource also occurs in commercial private lands and communal lands, with Zimbabwe being unusual among African states in that much of the wildlife resource still occurs outside the wildlife estate (Hill, 1994). In addition to the wildlife estate, about 17% of the country's land area has been largely devoted to wildlife in both commercial and communal lands (Chindori-Chininga, 1996). The success in instigating a greater level of wildlife management outside of the protected areas network has been largely attributed to policy and legislative change leading to greater wildlife user rights being conferred upon commercial and communal land residents. This has enabled a greater level of wildlife management within the two diverse land tenure systems (T Mukamuri, 1998).

The country inherited a dualistic land use and agricultural sector from its colonial past (Muir, 1990). Communal land in Zimbabwe is owned by the state through the *Communal Lands Act, 1982*, where residents do not own the land, in the sense that it cannot be sold or leased without the permission of the state. Commercial farmland, both large and small-scale, is land on which residents exercise private tenure (Murphree and Cumming, 1996). Land privately owned in the commercial sector comprises 4,500 large-scale farms, and 9,000 small-scale farms together occupying 17 million ha. Commercial farmland is predominantly situated in natural regions I and II on more fertile soils and is responsible for over 90% of the country's market surplus (T-Davies, 1998). The communal land sub-sector comprises some 840,000 households occupying over 16 million ha (Murindagomo, 1990, T Davies, 1998). Over 75% of Zimbabwe's inhabitants live in communal areas (42% of the country) mainly in semi-arid less productive portions of the country where subsistence agriculture is the principal activity (Child and Nduku, 1985; Kreuter, 1988).

II. POLICY AND LEGISLATION

Wildlife in Zimbabwe is administered by the Ministry of Environment and Tourism through the Department of National Parks and Wildlife Management (DNPWLM). The *Parks and Wildlife Act (No.14) of 1975* as amended in 1990 with the *Parks and Wildlife (General) Regulations, 1990*, and as read with the *Development of Tourism Act (No.36) of 1975*, as amended by Act No. 10 of 1984, constitutes the legal framework for the conservation and utilization of wildlife resources in Zimbabwe (T Davies, 1998). The *Parks and Wildlife Act, 1975*, (1996 Revised Edition) transferred utilization rights, but not ownership rights, to private landholders thus providing greater management incentives to many large-scale commercial farmers (Kreuter, 1988; Dean, 1990; Attwell, 1992; SADC/GTZ, 1989; Murphree and Cumming, 1996). However, prior to the mid-1980s, communal land residents were excluded from taking advantage of the Act, not only because of the free access nature of the resource in these areas which would have lead to over-exploitation, but also due to the absence of demonstrated capacity to manage wildlife sustainably (Murindagomo, 1988).

There was an absence of institutions that truly represented communal residents until the creation of District Councils, Ward Development Committees (WARDCO) and Village Development Committees (VIDCO) in 1984. It was only after this development, and particularly since 1985 with the establishment of the CAMPFIRE Association (Martin, 1986), that the advantages of the wildlife legislation were transferred to communal areas (Pangeti, 1986, Taylor, 1990a). The *Parks and Wildlife Act, 1975* allows for the District Councils to be custodians of their wildlife, after councils have demonstrated a willingness and ability to manage and administer the resource correctly. In districts not granted this status, the Ministry of Environment and Tourism acting through DNPWLM retains appropriate authority (Muir, 1989).

With the promotion and growing importance of wildlife utilization on private lands, wildlife has been declared a commodity by the Commercial Farmers Union (CFU). Under the umbrella of the CFU, the Wildlife Producers Association (WPA) was formed to represent the interests of large-scale commercial game ranches. The Ostrich Producers Association of Zimbabwe (TOPAZ), the Zimbabwe Ostrich Producers Association (ZOPA), and the Crocodile Farmers Association (CFAZ) have been formed to support the growing game farming industry (T Davies, 1998). The counterpart to the WPA and other game farming associations in the communal farming sector is the CAMPFIRE Association which assists the communal District Councils who have been granted appropriate authority to manage and utilize their wildlife resource.

As clearly shown by current legislation, Zimbabwe incorporates wildlife utilization as an integral component of its wildlife policy. Although DNPWLM's mandate is to protect, manage and administer wildlife in Zimbabwe's protected area parks and wildlife estate, it also encourages the development of an industry based on the sustainable use of wildlife throughout the country and supports the activities of the Wildlife Producer Associations in private lands and that of CAMPFIRE in communal lands (Taylor, 1990a; Child, 1995a). The objectives of the Government's *Policy for Wildlife* (1989, later revised in 1992) are: to permit the controlled use of wildlife for the benefit of the people; to promote rural-based wildlife industries; to harmonize protected area management with efforts of neighboring communities who are developing wildlife as a sustainable form of land use; and to transform land use through CAMPFIRE programmes under which rural communities benefit from the sustainable use of wildlife (T Davies, 1998).

In addition to recognizing that rural communities within Zimbabwe should be the primary beneficiaries of all returns and laying the foundations for greater user rights to a wider spectrum of Zimbabwe's people, the *Parks and Wildlife Act* also regulates the harvest, possession, sale and trade in wildlife products, and contains schedules specifying specially protected animals, problem animals and dangerous animals (Government of Zimbabwe, 1990). Certain provisions of the *Forest Act (Cap. 125) of 1949*, amended in 1981, also impact the utilization of wildlife in Zimbabwe by regulating the trade in forest produce and wild meat and providing for accompanying penalties for offences identified in the Act (T Davies, 1998).

III. CONSUMPTIVE WILDLIFE UTILIZATION CONTEXT

Under the favorable policy and legislative framework, wildlife utilization and the formal supply of game meat within Zimbabwe is well developed in contrast to other countries of the study (Pangeti, 1986; Child, 1988b, Attwell, 1992, Child, 1995b). A greater interest in protecting a valued wildlife resource in both private and communal lands by stakeholders has resulted in a higher level of regulation from illegal bush meat off-take, although reliance on bush meat especially in communal lands is still believed to constitute the largest supply of wild meat within the country (T Mukamuri, 1998; T Ballan, 1998; T Davies, 1998).

i). Legal Game Meat Utilization:

The legal supply of game meat in Zimbabwe can be clearly defined as that firstly originating from private lands which include large-scale commercial farms in excess of 200 ha (LSCF) and small-scale commercial farms under 200 hectares (SCCF). Secondly, legal game meat supply also originates from communal lands under the umbrella of the CAMPFIRE initiative. In both private and communal lands, game meat is obtained through cropping, licensed trophy hunting, and problem animal control, with game farming of Ostrich and crocodile occurring mainly on private lands. Other specific areas of legal game meat supply occur as a result of licensed hunting in the 16 Safari Areas of Zimbabwe, and in the form of game meat provided to DNPWLM personnel as staff rations, training and proficiency quotas (T Davies, 1998).

As seen in Table 18 the most significant legal source of game meat in Zimbabwe derives from game ranching on LSCFs (55.4%) with the game farming industry also providing substantial supplies of crocodile (16.6%) and Ostrich (16.5%) game meat. Game meat produced on communal lands is mainly undertaken through the CAMPFIRE programme as other communal areas are now largely devoid of wildlife populations (Gotosa, *in litt.*, to H. Davies, 1997). Although representing a smaller value (6.4%) it is still critical in contributing to the transfer of direct tangible benefits from wildlife to local communities. Less important supplies of legal game meat are obtained through licensed hunting in safari areas (3.7%), DNPWLM staff rations, training and proficiency quotas (1.4%) and small-scale commercial farms (T Davies, 1998).

Table 18

Estimated annual legal game meat production in Zimbabwe during 1993-1998

Sources of Game Meat	No.	Estimated Game Meat Production per Year (mt)	Average Price per kg (USD)	Estimated Total Value per Year	% Contribution to National Estimate
Private Land:					
LSCF's	4,500	2,413	0.73	1,771,248	55.4
Crocodile Farms	45	345.2	1.50	532,251	16.6
Ostrich Farms	700	218.8	2.40	526,865	16.5
SSCF's	n/a	n/a	n/a	n/a	n/a
Communal Land:					
CAMFIRE Districts	36	874	0.23	203,926	6.4
Protected Areas:					
Safari Area Trophy Hunting	n/a	512	0.23	117,760	3.7
DNPWL Staff	n/a	190.5	0.23	43,815	1.4
Ecological Cropping	none	none	none	none	none
Total:		**4,553.5mt**		**USD 3,195,865**	**100%**

Source: TRAFFIC survey data, 1998.

Game Ranching on Large-Scale Commercial Farms (LSCFs):

The *Wildlife Conservation Act, 1960,* gave commercial farmers increased freedom to utilize wildlife commercially (Murindagomo, 1990; Child, 1993a), and farmers began to benefit mainly through game meat production with cropping on ranches expanding up until the mid-1960s (Child, 1988a; Child 1993a). Despite the ability of game populations to utilize a multitude of habitats, resist disease and

withstand drought conditions (Pinchin, 1992), the initial enthusiasm for wildlife ranching waned (Bond, 1993). In the commercial sector, it was found that using wildlife for meat production alone was not viable (Child, 1988b, Cumming 1990b). Initial experiments with game meat production were unsuccessful because of resistance from the beef industry, irregularity of supply, and problems encountered with processing and marketing of game meat (Pitman, 1990; Bond, 1993; Hill, 1994).

This led to the view that wildlife's comparative advantage was not solely in the production of meat, but also in the use of more lucrative recreational activities such as tourism and trophy hunting (Child, 1988a; Cumming, 1990b). LSCFs began to explore a greater multi-use approach to wildlife ranching that was catalyzed in the mid-1960s by the introduction of trophy hunting (Cumming, 1989; Hill, 1994). This provided the potential for LSCFs to obtain revenues from other sources in addition to meat production and improved the financial viability of ranches (Pinchin, 1992; Bond, 1993). A greater multi-use approach to wildlife ranching was established that built on the potential of a single animal being able to be firstly sold to photographic tourists, secondly to a client as a hunting trophy, and finally as a meat product (Pitman, 1990; Child, 1993b). By 1974, and despite heavy subsidization of the competing land uses and a poorly developed wildlife infrastructure, this approach had led to about 183 ranches being licensed to utilize wildlife commercially from only 50 or so in the 1950s that utilized game primarily for population control (Mossman and Mossman, 1976; Child, 1988a; Muir, 1989; Child, 1995b).

The first initial steps in conferring greater economic incentives to commercial land owners culminated with the introduction of the *Parks and Wildlife Act* in 1975 which further boosted the industry by effectively transferring ownership of wildlife from the state to private landholders (Cumming, 1988). Between 1975 and 1984, the industry expanded at about 6% per year (Child and Child, 1986; Muir, 1989), and between 1984 and 1986 the annual value of hunting on commercial farms increased at a rate of 120% from USD 2.5 to USD 5.6 million (Child, 1988b). By the early 1990s, the result had been a significant shift from livestock mono-cultures to a greater integration of wildlife species, with the Hwange National Park for example being effectively increased in size by about 250,000 ha by neighboring ranchers devoting their land entirely to wildlife (Child, 1993a).

In semi-arid areas occurring in regions IV and V, LSCFs with a wildlife management component were found to be financially more viable than cattle enterprises (Bond, 1993). The use of a variety of wildlife use options, had resulted in wildlife out-competing beef with 54% of game ranches making significant profits in contrast to only 5% of cattle ranches in 1989/90 (Jansen, *et al.*, 1992). The rapid expansion of the industry during this period was facilitated by the declining viability of beef production brought about by government price restrictions, and the impact of several major droughts (Dean, 1990; Bond, 1993). By the mid-1990s, about 25% (27,000km^2) of large-scale commercial farm land was being managed as multi-species wildlife systems which constituted nearly 31% of the total land area allocated to wildlife in the country second only to national parks and safari areas, and contained the majority of plains game species (Bond, 1993; Child, 1993a; Hill, 1994; Murphree and Cumming, 1996).

The development of the industry has largely been based on trophy hunting (Hill, 1994), with about three quarters of gross income estimated in the late 1980s to come from trophy hunting with the remainder from meat sales (Child, 1988b). Ecological cropping for directed game meat production has in the past been minimal (Bond, 1993). The value of meat as a primary product has not justified the culling of surplus animals, especially when other more lucrative returns could be obtained through live sales or trophy hunting (Jansen, *et al.*, 1992; Hill, 1994). With the expansion of the industry and the need for many commercial farms to increase breeding stocks through restocking, live game sale prices increased greatly between 1985 and 1990 (Cumming, 1990a). Accordingly, live game sales of surplus animals were a first option for most farmers rather then cropping for meat production (T Davies, 1998).

In 1986, a Wildlife Producers Association (WPA) was formed under the auspices of the Commercial Farmers Union (CFU), and four years later there were about 436 members (Muir, 1989; Bond, 1993). By 1995, this number had increased to 680 members (Child, 1995b), and by 1997 the number of members had stabilized (WPA, *in litt.*, to R. Barnett, 1997). Of the 4,500 LSCFs in the country about 10% are members of the WPA (Cumming, 1990b). In 1996, a total of 429 LSCFs representing an area of 17,635 km^2 were members of the WPA, and all farms could be classified as maintaining some form of wildlife management activity. An additional 8,523 km^2 of non-member LSCFs were also identified as maintaining some form of wildlife enterprise on their farms resulting in a total estimate of 26,158 km^2 or 19.7% of large-scale commercial land (T Davies, 1998).

During 1996, 49% of LSCFs in Zimbabwe that consisted of a large representative sample (n270) of WPA (active and passive) members and other non-WPA member LSCFs, utilized game meat. As in the past, game meat is primarily supplied as a by-product from trophy hunting (49.2%) and problem animal control (25.7%). However, the extent of directed ecological cropping of surplus animals and the sale of game meat at 25.1% currently represents a substantial source of game meat indicating an increase in its importance that may be associated with decreases in live sales prices, and a satiation of hunting potential for some of the more abundant species. This is reflected in the trophy hunting species of Impala providing the greatest quantity of game meat out of a total of 14 species utilized. Specifically, Impala (36.6%), kudu (19.6%), Eland (18.4%) and Giraffe (8.5%) are responsible for providing the bulk of game meat produced. The success of commercial game ranching in Zimbabwe relies on the efficient use of all available options for increasing revenues from wildlife. Regardless of the primary use, game meat production results in an important contribution to maintaining the financial viability of many ranches (T Davies, 1998).

The quantities of game meat produced and utilized during 1996 by a representative sample of LSCFs in eight provinces of Zimbabwe testify to the important role that game meat increasingly plays. A total of 19,800 km^2 of LSCFs were sampled, resulting in reported game meat production of 0.15 kg per hectare. Active WPA members not surprisingly have a higher game meat productivity represented by 0.26 kg of dressed meat per hectare, in comparison to passive or in-active members of WPA at 0.097 kg/ha. However, all WPA members at 0.233 kg/ha produce far greater average quantities of game meat in contrast to non WPA LSCFs whose production of game meat was only 0.063 kg/ha. The total production of game meat from all LSCFs of different sizes and production capabilities was estimated during 1996 to be 2,413 mt. If all game meat were sold at prevailing prices this would represent an economic value of ZWD 26,568,726 (USD 1,771,248) (T Davies, 1998).

The potential for increasing the value of the game meat resource on LSCFs is, however, restricted. A bias towards cattle production is still prevalent in Zimbabwe legislation (Dean, 1990, Murphree and Cumming, 1996). Beef is highly subsidized and marketed through the parastatal Cold Storage Commission, whereas game meat enjoys no such subsidies and has no formalized marketing structure (Hill, 1994). Veterinary and health restrictions geared towards maintaining a viable beef industry also limit the movement and marketing of game meat. These restrictions were imposed to facilitate exports of beef to the EU under the Lome convention and aim to ensure FMD free domestic meat products that are a prerequisite for obtaining trade benefits under the Convention (Murphree and Cumming, 1996). These restrictions include fenced wildlife corridors, zoning of the entire country, and strict veterinary requirements for the movement and processing of all wildlife which are viewed as potential carriers (Foggin, 1989). As stipulated under the *Animal Health Act, 1960*, Zimbabwe has been divided into five zones in which movement of cloven hoofed livestock and wildlife are restricted in order to reduce the risk of FMD outbreaks (Kock, *et al.*, 1998). These zones range from the "Wildlife Zone" in which FMD is endemic to the "EU off-take zone" which is a zone clear of FMD and beef produced can be exported

under the conditions of the EU/Lome convention. Zones in between require different levels of vaccination, and a restriction on movement of livestock, wildlife and their meat and trophy products (Foggin, 1981).

The marketing of game meat is also heavily regulated and requires that all game meat sold in urban areas must derive from a Department of Veterinary Services (DVS) approved abattoir, have been inspected by a Registered Meat Inspector, have a DVS movement permit for any game meat from an FMD control zone, and whole carcasses or meat with bones must be cooked unless the head and feet have been inspected by a DVS official (Foggin, 1981; Foggin, 1989; Kock, *et al.*, 1998). Without an EU-approved abattoir for the processing of plains game, markets to the European Union remain closed (T Davies, 1998). Strict health and veterinary requirements and bureaucracy involved with transporting meat have restricted the external export of ranch-produced game meat to more lucrative markets not only within the country, but regionally as well as internationally (Cumming, 1990a; White, *in litt.*, to H. Davies, 1997). Indeed the Standard International Trade Classification (SITC Revision 3) and the Customs Harmonized Code System in Zimbabwe do not make provision for game meat, which has to be classified under a general heading of "Non-bovine other meats". Apart from Ostrich and crocodile meat very little plains game meat is exported. The only recognizable export appears to be that of individuals carrying biltong into South Africa of which up to 30 kg are allowed per person to be exported without a commercial export license. As biltong is dried meat, no special veterinary regulations apply to its movement and export (T Davies, 1998).

Due to movement and marketing restrictions, game meat produced on LSCFs in Zimbabwe is predominantly marketed locally. Commercial farmers have adapted to these prohibitive conditions, and currently obtain revenues and other benefits from the majority of game meat produced. During 1996, approximately 86.2% of all game meat produced was sold, with the remaining being consumed directly by owners and families and provided for free to ranch staff. All game meat, whether obtained as a by-product or through directed ecological cropping, is efficiently used in the local setting. The majority of ranches (90%) benefit from game meat through its sale at subsidized prices to ranch staff. Although revenues realized are proportionally lower, ranches obtain management benefits through providing incentives, bonuses and increasing staff morale, as well as illustrating the value of wildlife to staff and helping to reduce levels of illegal off-take from the ranch. About 72% of LSCFs sell game meat through on-site ranch butcheries and lodges/restaurants, to ranch staff, and to local butchery and restaurant markets. Only 5% of the ranches sell game meat at higher prices to external urban markets (T Davies, 1998).

Game meat is primarily purchased because it is cheaper than domestic meat (78%) and is as a result more accessible to customers. The perception that it is cleaner, less contaminated meat also contributes to its overall demand. During 1996, game meat prices varied from ZWD 15 per kg for Waterbuck to ZWD 7.6 per kg for Giraffe with an average price for 11 species being ZWD 11.01 per kg. The predominant demand dynamic of the low price of game meat is understandable when comparing domestic meat prices ranging from ZWD 20-35 per kg (T Mukamuri, 1998). Biltong production is undertaken widely representing about 6% of all game meat produced and may be due to a reduced level of veterinary and health restrictions on the movement of dried meat facilitating a greater level of external urban trade at high values of between ZWD 60-120 per kg (T Davies, 1998).

Although game meat production is often a secondary by-product of other more lucrative wildlife uses and generally relies on local markets, it's contribution to maintaining the economic viability of game ranching in LSCFs should not be underestimated. One of the largest producers of game in Zimbabwe, Cawston Block of Matabeleland Province, obtains considerable returns from meat production. Wildlife related activities that include trophy hunting, tourism, live sales and meat production are the most important income generating activities. Although trophy hunting and tourism generate the bulk of income, all meat produced as a by-product from hunting and through directed ecological cropping is

considered an important revenue earner and is processed in the ranch butchery before sale. The importance attributed to game meat production is reflected in the efficiency of the culling and slaughtering process. The average cost of culling representing only ZWD 21.82 (7.9%) in comparison to income of ZWD 277 per carcass during a 1996 culling. About 20% of meat is sold to urban markets with the majority (75%) being sold locally through the ranches' own shop, country hotels, factory canteens, and meat processors. Five percent is sold to ranch staff. All meat produced is efficiently utilized, with offal being sold at lower prices (ZWD 4 per kg) to neighboring crocodile farms for food, as fishing bait, and as dog food to security firms.

During 1996, average fresh game meat prices were ZWD 12 per kg and ZWD 150 per kg of biltong. In general, urban markets are associated with higher prices in contrast to local markets, although "value added" meat processing into biltong, sausage, etc., occurs on the farm and has increased overall meat revenues substantially. Impala, Eland, Cape Buffalo and Giraffe result in the largest supplies of game meat derived from cropping and trophy hunting, and in 1996 resulted in a total of 31.2 mt of meat at a value of ZWD 375,456 sold for human consumption and ZWD 90,000 sold as animal feed. Game meat represented an amount equal to 38.8% of the ZWD 1.2 million revenue earned from trophy hunting and tourism, and as such is critical to the financial running of the ranch. In addition, 14.5 mt of meat were provided for free to staff workers during the year. Such non economic benefits of game meat to the ranch are realized, firstly, through providing needed protein, and secondly, through illustrating the high value of wildlife to provide an incentive to workers to stop poaching from the ranch. Meat sales are very important to the running of the ranch, especially when supplied (as the majority is) as a by-product from trophy hunting where the value of the animal has already been paid for by the hunting client and additional meat sales revenue represents additional income (T Davies, 1998).

The scale of production is an important factor. Large ranches, such as Cawston Block (13,469 ha), are able to finance (through meat sales) the building of on-site butcheries and local shops that result in the more efficient and lucrative use of the meat produced. Smaller ranches, such as Chiparawe in Marondera (3,077 ha), produce smaller quantities of game meat as a by-product of trophy hunting, and revenues realized are less significant. During 1996, ZWD 37,688 was obtained through sales to local customers, neighbors and farm employees. However, even for smaller ranches, game meat production is taken seriously, as percentage contributions to overall profitability of the ranch are still important, albeit on a much smaller scale. All meat produced is efficiently utilized, even on very small ranches. For example, on Mona Farm in Manicaland Province (1,500 ha) sustainable meat production was limited to about 1.4 mt during 1996, but considerable effort was made to identify the most lucrative urban markets where meat is sold at ZWD 14 per kg. Meat was also offered as a subsidized benefit to ranch workers at about half its retail value (T Davies, 1998).

Although most returns from wildlife are generated through recreation, game meat produced as a by-product or through the increased use of ecological cropping is playing a greater role in contributing to the overall financial viability of game ranching as a predominant land use on LSCFs of all sizes. The future of the industry, however, has three major problems. The first is associated with land tenure and the government programme to acquire under utilized large-scale commercial land for resettlement (Pitman, 1990, Hill, 1994; Murphree and Cumming, 1996). The second relates to the feeling of many policy makers that wildlife ranching is displacing cattle ranching in semi-arid zones of the country and hence contributing to decreased food production. Thirdly, the financial rewards of wildlife utilization accrue to only a small percentage of more affluent ranch owners (Hill, 1994). To the rural African, the benefits derived from the greater use of wildlife on LSCFs has been limited and in some cases even negative with for example staff levels and employment on game ranches being characteristically less than that required on cattle ranches (Jansen, *et al.*, 1992). The supply of cheap sources of game meat represents the food production capability of the ranching industry and the most tangible benefit accruing

to rural communities. A better understanding of the role game meat production currently plays should help to reinforce the positive attributes of game ranching, not only to ranch owners but also to rural communities in Zimbabwe.

Game Farming:

The game farming sector in Zimbabwe also results in significant supplies of game meat. In Zimbabwe, Ostrich and Nile Crocodiles are the two most commonly farmed species, which are usually kept in artificial enclosures at far higher densities then natural populations and involve some form of management (Bond, 1993). The Ostrich and crocodile industry is well developed with strict health and veterinary guidelines in place to ensure that the future viability of the sector is maintained (T Davies, 1998).

Ostrich Farms: Ostrich farmers are supported in their day-to-day management by TOPAZ, the Ostrich Producers Association of Zimbabwe (large-scale) and ZOPA, the Zimbabwe Ostrich Producers Association (small-scale). TOPAZ also has a trade and marketing arm called COPRO Ltd. Historically, the industry relied on the export of skin and feathers, and this still represents the largest proportion of the economic value of each bird processed at 65% in contrast to 35% from meat sales (Anon., 1997a). However, the importance of meat sales has increased dramatically in the past few years with the construction of the first European Union-approved Bulawayo Ostrich Producers (BOP) abattoir in 1994, and a second COPRO European Union-approved abattoir during 1996 which have allowed for Ostrich meat exports to higher valued markets in Europe (TRAFFIC survey data, 1998).

The Ostrich farming industry within Zimbabwe is well regulated, with veterinary control being strict from the Ostrich chick being born on the farm, to the packaged meat product destined for export. All farms wishing to have their Ostrich meat exported have to be approved and registered by DVS that implement the importing requirements of the country concerned. Generally this requires: all farms to be fenced; that no poultry exists within one kilometer of the farm; that Ostriches must be identified with a chip or tag; and that up to date stock registers are kept. There must be no indication of excessive mortality, and any outbreak of Newcastle Disease (NCD) and Avian Influenza (AI) within 50 km of the farm in the last 12 months is taken into consideration. Of importance is the requirement that all farms have isolated tick-free pre-slaughter holding facilities constructed to required specifications so that birds may be "quarantined" effectively for a period of 14 days to ensure that they are disease and tick free. A permit from DVS is required for movement of Ostriches to the abattoir and will only be issued if Ostriches have been quarantined. On arrival at the abattoir strict hygiene controls are maintained and Ostriches are subjected to rigorous veterinary examination both before and after slaughter. If ticks are found on birds prior to slaughter they are returned or condemned. These high levels of veterinary and health regulations are enforced to protect the growing importance of the export meat market (T Davies, 1998).

Elephant accidentally snared by bush meat hunters.
Freidkin Conservation Fund

Currently export sales represent about 82% of Ostrich meat sold and consist of the higher valued prime cuts, with only 18% of annual income generated from local sales of the generally cheaper cuts of meat (COPRO, *in litt.*, to H.

Davies, 1997). A negligible regional export market exists with most higher-valued prime cuts being exported to Belgium and other European markets (Edwards, *in litt.*, to H. Davies, 1997). With greater access to European markets the sale of meat has increased steadily, and the total contribution of meat in relation to total revenue realized by the industry has improved accordingly from only 0.2% of income in 1994 to more than 31% in 1997 representing an increase of over 150 fold (TRAFFIC survey data, 1998). For the period 1995 to 1997, a total of 31,954 Ostriches were slaughtered in Zimbabwe. During 1996, 8,769 Ostriches were slaughtered totaling 218.8 mt of meat with a potential economic value of ZWD 7,902,986 (USD 526,865), although not all consumable meat is sold with only ZWD 1,700,000 being earned by COPRO Ltd. during 1996. In 1996, COPRO Ltd controlled 85% of meat sales within Zimbabwe (Anon, 1997b).

Increased access to export markets, and a continued increase in the demand for Ostrich meat both locally and abroad has resulted in the Ostrich industry in Zimbabwe expanding with COPRO projecting slaughter projections of 18,000 birds for 1998 in comparison to only 8,769 in 1996 (Edwards, *in litt.*, to H. Davies, 1997). Increased revenues realized from Ostrich meat have contributed profoundly to the overall economic viability of Ostrich farming and have in part been responsible for the increase in Ostrich farmers from 200 in 1992 to over 700 in 1997 (TOPAZ, *in litt.*, ZOPA, *in litt.*, to H. Davies, 1997).

Crocodile Farms: Crocodile management in Zimbabwe is legislated by the *Parks and Wildlife Act, 1975,* (1996 Revised Edition). The sector represents a substantial industry within the country, and government policy reflects the importance of crocodile farming to both the national economy and the conservation of crocodiles (T Davies, 1998). All crocodile farmers are required to be members of the Crocodile Farmers Association (CFAZ), which has grown in the last decade from 3 to 45 members illustrating the rapid growth of the industry. As with Ostrich farming, the commercial rearing of crocodiles in Zimbabwe is mainly geared towards the production of skins for export markets. However, in 1996 there was a drastic decline of about 20% in the global skin prices which resulted in farmers having to rely to a greater extent on the meat production potential of their crocodiles (Ferguson, *in litt.*, to H. Davies, 1997).

Hence there was a rapid development of the crocodile export meat industry in 1997, and the ratio of meat to skin sales increased considerably. For meat to be exported to the main markets in Europe they have to be processed in EU-approved abattoirs of which there are currently seven in Zimbabwe. Strict veterinary and health procedures are undertaken in these abattoirs, to ensure that meat does not contain *trichonella* and *salmonella*, two major diseases affecting crocodiles (Blake, 1982). During the period 1994 to 1997, a total of 162,443 crocodiles were slaughtered for their skin or about 40,610 per year, of which a total of 223.3 mt of export quality meat processed in the EU-approved abattoirs was exported at a total economic value of USD 1,897,500. This represents an annual meat export of 55.8 mt at a value of USD 474,375. A marked increase in the quantity of crocodile meat exports was observed in 1997 at 91.8 mt in contrast to 38.6 mt in 1996 (T Davies, 1998).

Only about one-third to one-half of crocodiles are slaughtered at EU-approved abattoirs. Meat processed on farms without EU-certified abattoirs is not tightly regulated and although some meat finds its way to local hotel and restaurant markets, the vast majority is fed back to crocodiles as animal feed (Ferguson, *in litt.*, to H. Davies, 1997). For the period 1994 to 1997, the total quantity of un-exportable meat that was of inferior quality or not processed at an EU-approved abattoir amounted to 1,157 mt or 289.4 mt per annum at a lower feed value of USD 57,876 (T Davies, 1998). As such, the export and local crocodile feed markets of the industry result in 345.2 mt of meat per annum at an economic value of about USD 532,251. Especially since 1997, this represents an important contribution to the continued viability of the crocodile farming industry within Zimbabwe.

Game Meat Production from Small-Scale Commercial Farms:

Small-Scale Commercial Farms (SSCFs) are defined as being 100 to 200 ha in size, and there are approximately 9,000 in Zimbabwe (Muir, 1990). SSCFs are characterized by subsistence modes of production, although in some years surplus is sold, and by high human densities due to farms relying on manpower for the bulk of farming activities. The Zimbabwe Farmers Union (ZFU) is the governing body for SSCFs and also represents 1.5 million communal and resettlement farmers. The ZFU has no sub-association that deals with wildlife, although plans are in progress to promote the utilization of wildlife on SSCFs following the lead of CAMPFIRE on communal lands (Ungwe, pers. comm., to H. Davies, 1997). Although SSCFs consist of small areas of land that are not compatible with multi-species game ranching management systems requiring large tracts of land, wildlife still occurs on SSCFs and is utilized through licensed hunting and problem animal control which results in supplies of game meat. However, wildlife numbers are limited and generally represent smaller species such as hare, duikers and bushbuck. Crop protection from raiding birds and other smaller species constitutes the bulk of game meat supply in SSCFs (T Mukamuri, 1998).

The utilization of game meat within Chivhu District of Zimbabwe of which there are 436 SSCFs was examined in this study. A representative sample of farms (21%) indicated that SSCFs undertake cattle and poultry production (90%) as their main income generating activities, with only 12% practicing some form of wildlife management that included hunting and problem animal control. No cropping/ culling of wildlife for meat production occurs due to the small resource base and widely declining populations of all larger species. Due to high levels of conflict occurring between farming and wildlife, both hunting and problem animal control (PAC) are directed at crop and livestock protection (T Mukamuri, 1998). Bushbuck and hare are the key species targeted for hunting and meat supply, with the majority of species such as Bush Pig, African Wild Cat, monkeys, jackals and vultures being culled as problem animals for crop and livestock (especially poultry) protection. All game meat is either consumed directly on the farm or sold to private individuals, with 10% of all farms consuming on a subsistence basis, and 5% trading game meat to individuals. Due to the infrequent nature of supply and low population densities of most wildlife species, quantities of game meat supplied from SSCFs are negligible in Chivhu District. However, because of the sheer number of SSCFs throughout the country, they may be an important national source of game meat, although still far lower than the Large-Scale Commercial Farms and other legal game meat production sectors (T Davies, 1998).

Game Meat Production from Communal Lands:

Communal lands in Zimbabwe comprise 42% of the country but harbor 76% of the population (Hoare and Mackie, 1993). A large portion of the country's wildlife resource resides in these areas (Child, 1993b). Human populations in communal areas are growing fast, both from high birth rates and migration which has increased human-wildlife conflicts (Musokotwane and Rehoy, 1992). The central tenet of the CAMPFIRE programme recognizes that greater custodianship of wildlife is required by rural communities who are best placed to manage the resource (Child, 1991a, Murphree, 1994). As emphasized in *Zimbabwe's Policy for Wildlife* (Ministry of Environment and Tourism, 1992) which states that "rural landholders...as wildlife producers, should be the primary beneficiaries of wildlife" (DNPWLM, 1989), CAMPFIRE actively promotes the realization of greater wildlife benefits to communities with the aim that the resource becomes perceived as an asset rather than a cost (Murindagomo, 1990; Ack and Child, 1993).

Currently, 36 District Councils are under the CAMPFIRE programme covering about 30,700 km^2 of Zimbabwe. This area includes most communal lands that still maintain some level of wildlife presence (Hoare and Mackenzie, 1993, Fonza, *in litt.*, to H. Davies, 1997). District Councils with appropriate authority produce revenues through a variety of wildlife related activities that include photographic safaris, eco-tourism, trophy hunting and cropping schemes for game meat production (Pangeti, 1988; Murphree, 1994). In 1994, CAMPFIRE communities across Zimbabwe received ZWD 6 million from wildlife related activities (Murombedzi, *in litt.*, to H. Davies, 1997), and by 1997 this had increased to ZWD 25 million, of which 89% was raised from trophy hunting, 9% from eco-tourism, and 2% from timber production and the collection of edible caterpillars (Anon., 1998).

Trophy hunting is the most important income generator (Murphree, 1994), with game meat not representing a significant cash benefit (Taylor, 1993). Revenues from game meat sales are rarely calculated or included in CAMPFIRE revenue records (Murphree, 1994), being regarded as a sub-economic but socially necessary activity (CAMPFIRE, 1990). Game meat supplied through directed cropping, or as a by-product from trophy hunting and PAC, is sold at cheap prices reflecting a policy to supply meat "at cost" to protein deficient communities rather than as a revenue generating exercise (CIRAD, 1995; Maudet, 1997, WWF, 1996). In districts characterized by high wildlife population densities such as Nyaminyami and Binga, cropping schemes result in the largest supply of game meat (T Davies, 1998).

Suni duiker on sale in village market.
IUCN Mozambique

Meat production and distribution is typically the primary aim of formal cropping programmes (Murphree, 1994; Child, 1995a). Distribution of inexpensive meat is facilitated, as the stringent health requirements that are imposed for urban or international markets are not required (Taylor, 1990a). Large-scale cropping schemes have been undertaken in Nyaminyami District since 1989 with an average of 31.2 mt of game meat (about 1,500 Impala) supplied per year up to 1992 (Taylor, 1990a; Taylor, 1993; Maudet, 1997). Inequitable distribution of meat was apparent, however, with greater supplies in Nyaminyami being distributed to higher income wards such as Bumi-Chalala (1.89kg per head) than poorer wards such as Mola (0.47 kg per head) (Taylor, 1990a; WWF, 1996).

The situation has been addressed since 1993, with small-scale, more frequent, sustained cropping in Nyaminyami and Binga Districts using mobile shooting, slaughter and distribution vehicles. About 800 kg of meat and offal were produced each week for about 40 weeks each year from 1993 to 1996 resulting in a total supply of 44 mt from 2,187 Impala (CIRAD, 1994; WWF, 1996; Maudet, 1997). This approach has been less costly (resulting in a 3% income, where none has been achieved before), is more hygienic, and has enabled the distribution of both offal and dressed meat that was not possible previously as offal was sold to nearby crocodile farms for feed (Taylor, 1993; WWF, 1996). The development of meat distribution points and improvements in slaughtering procedures have improved the equitable distribution of meat with production from two districts being distributed equally among 11 districts (28,000 people). However, problems still persist with cheap meat (one-sixth the cost of domestic meat) being purchased by non-resident outsiders for resale in urban centers (CIRAD, 1995).

In Nyaminyami, which has one of the highest incidences of malnutrition and protein deficiency in Zimbabwe, game meat supply contributes profoundly to the food security status of many (Farmer, 1991; CAMPFIRE, 1994). In such districts as Binga where suitable game populations are large, cropping results in the largest potential supply of game meat at 73% in comparison to PAC and trophy hunting supplies during 1992 (Child, 1992). The supply of cropped game meat is important to these few districts in which they occur, but generally requires a considerable level of external management assistance to ensure efficient and equitable meat distribution (CIRAD, 1995).

In many CAMPFIRE districts especially in marginal areas, game populations are frequently too small to sustain viable meat cropping schemes, and trophy hunting and PAC are responsible for the bulk of game meat supply to residents (TRAFFIC survey data, 1998). Trophy hunting has the potential to supply the greatest quantities of meat due to large animals being targeted and a preponderance by districts to assign much of their quotas to this more lucrative activity (Rigava, *in litt.*, to H. Davies, 1997). Even in communal areas such as Nyaminyami that maintain cropping schemes, quantities of game meat derived from trophy hunting and PAC constitute the bulk of potential game meat supply. During 1992, over 63% of total potential meat production was from trophy hunting (53%) and PAC (10%) with less than 37% derived from cropping (Child, 1992; Mudimba, 1994; T Davies, 1998). Problem animal control still constitutes an important management activity in communal areas and despite the culling of many thousands of animals throughout the country, the success at reducing conflict levels has been uncertain (Bell, 1984; Taylor, 1993). Although compensation schemes, "conversion" of PAC species such as elephant to trophy hunting, and technical approaches such as electric fencing have been introduced, a reliance on culling is still the main management option (Murphree, 1994; Mackie, 1992; Hoare, 1992; Thomas 1992). The targeting of larger problem animals such as elephant (70%) and Cape Buffalo (17%) result in substantial meat supplies per carcass and overall, for a district such as Nyaminyami where some 1,000 problem animals were culled between 1989 and 1991 (Taylor, 1993).

The equitable distribution of game meat to rural communities is far higher from directed formal cropping schemes that maintain distribution centers and management strategies such as selling in small quantities as a part of the whole cropping procedure (Taylor, 1993, CIRAD, 1995). Due to the nature of culling caused by animal-human conflict, a considerable amount of meat supplied from PAC animals finds its way to rural communities, although in some cases there is wastage (Murphree, 1994). Trophy hunting generally results in the poorest level of meat distribution (Taylor, 1990a, T Davies, 1998). Hunting occurs infrequently and only during hunting seasons (April to October) with animals often being hunted considerable distances from rural communities. Hence logistical and financial constraints contribute to restricting the distribution of meat. In some cases, companies sell meat to recover transportation costs as in the case in Gokwe North, but in general meat supply is often limited (Rigava, *in litt.*, to H. Davies, 1997). Some district councils such as Binga, have included meat distribution clauses within Safari Hunting Lease Agreements, although in most cases loosely defined social arrangements are the norm with most concession holders being less than proactive in ensuring greater meat distribution (T Davies, 1998).

Until 1993, DNPWLM specified for each district on an annual basis, the proportion of the quota that should be allocated for the activities of trophy hunting, PAC and cropping. In 1994, District Councils were given responsibility for determining these proportions on a species basis themselves, with a prerequisite that quota returns be submitted every year (Child, 1994). Unfortunately, quantities of game meat distributed from used quotas have not in the past been monitored, although CAMPFIRE initiated a system of hunt returns in 1994, and a system for recording meat distribution in 1997 (Hucho, *in litt.*, to H. Davies, 1997). However, District Councils themselves maintain limited records of actual game meat distribution. During field research and questionnaire surveys in 1997, only minimal game meat supply data was found, indicating a limited importance associated with meat supply especially from trophy hunting and PAC (T Davies, 1998).

The initiation of quota setting by districts themselves in mid-1996 (WWF, *in litt.* To H. Davies, 1997) resulted in a change in attitude of communities in relation to the benefits derived from wildlife (Rigava, *in litt.*, to H. Davies, 1997). In the past, DNPWLM used the example of provision of meat to locally "starved" people as a tangible illustration of the benefits of sustainable wildlife management in communal areas (T Davies, 1998). In recent years, and with greater responsibility for setting quotas, local people and district councils have realized that on a per animal basis, proceeds from trophy hunting far outweigh that derived from cropping for meat supply, resulting in a perception by stakeholders, especially in non-cropping districts, that meat supply is unimportant (Rigava, *in litt.*, to H. Davies, 1997). However, as a by-product, game meat from trophy hunting and PAC represents a considerable potential resource in all districts in addition to that derived from directed formal cropping schemes (T Davies, 1998).

The potential supply of game meat to all CAMPFIRE rural communities in 1996 was some 874 mt of dressed game meat from trophy hunting, PAC and cropping (TRAFFIC survey data, 1998). Although an overestimate as not all quotas are fully utilized, and meat is often not distributed, this quantity represents a substantial potential contribution to rural community livelihoods. However, potential meat supply to individual residents is less impressive due to high human population densities (FEWS, 1993), but in some districts, supply would contribute meaningfully to the food security status of the district as a whole. Binga, Guruve and Nyaminyami districts had a potential supply of game meat of 3.22 kg, 3.59 kg, 6.63 kg per person per year, respectively, during the period between 1990 and 1997 (T Davies, 1998). The estimated total annual animal protein requirement for Omay communal area was 680 mt in 1988, and the total sustainable off-take from cropping a range of large ungulates was estimated to be 223 mt. Hence, potential supply would have met about 30% of the protein requirement, although the practicality of undertaking such levels of cropping and distribution remain uncertain (Parker, 1985; Taylor, 1993). In fact, potential meat production is highly site specific and depends largely on the status of suitable wildlife populations in each district, with some districts having lower potential supplies ranging from 0.04 to 0.15 kg per person per year for the period under review (TRAFFIC survey data, 1998). Negligible potential quantities per capita in all but three CAMPFIRE districts do not, however, undermine the importance of game meat to certain sectors of the community, especially those with lower livelihood status and purchasing power (Taylor, 1993).

Currently, game meat in communal areas is under-valued, with prices reflecting a desire only to cover operating costs (Taylor, 1990a; Taylor 1993; Maudet, 1997). These prices do not reflect the real value of game meat which on the open legal game ranching/farming market fetches on average ZWD 11.01 per kg (weighted price of nine species, 1997) (T Davies, 1998), or for that matter the rural illegal bush meat prices in Dande CAMPFIRE communal area of approximately ZWD 15.1 (weighted price of 12 species, 1997) (T Ballan, 1998). With alternative domestic meat prices ranging from ZWD 20-35 per kg in rural areas, the provision of cheap supplies of game meat at ZWD 2-5 per kg during 1997 (WWF, 1996; Rigava, *in litt.*, to H. Davies, 1997; T Mukamuri, 1998) represents a considerable contribution in savings to rural communities household meat expenditures. At current CAMPFIRE district game meat prices (ZWD 3.5 per kg on average), the value of potential supply in 1997 was ZWD 2,539,600, but at a more realistic price of ZWD 11.01 per kg indicates that the more realistic economic value was ZWD 7,988,856, representing an amount equal to 10% of all revenues realized by CAMPFIRE districts during the year (TRAFFIC survey data, 1998). As seen in Binga during 1993, the potential supply of 213 mt of game meat represents ZWD 2,344,799, which was in excess of ZWD 1,121,250 derived from concession and trophy fees for hunting (Child, 1992; CIRAD, 1995). This suggests that with improved distribution, game meat supply could play an important role in generating larger benefits from wildlife to local communities.

The potential quantities and economic value of game meat derived as either a by-product from hunting and PAC, or through directed cropping, represents an important resource to CAMPFIRE districts. Although this potential value of game meat would not be realized in cash if present policies of providing cheap subsidized meat continue, the greater use of this resource could substantially increase the benefits accruing to communities from game animals already utilized through trophy hunting and PAC (T Davies, 1998).

Game Meat Production from Protected Areas:

In national parks and safari areas, legal supplies of game meat may be provided through ecological cropping, cropping for DNPWLM staff rations and proficiency training exercises, and from trophy hunting in safari areas. Problem animal control also occurs in safari areas although predominantly in communal lands.

Ecological Cropping from Protected Areas: There have been no large-scale ecological cropping exercises in Zimbabwean national parks and safari areas since 1992 (TRAFFIC survey data, 1998). In the past, ecological cropping from protected areas was an important management option especially for controlling elephant, Cape Buffalo and hippo, with over 18,000 elephants cropped in the 1960s, 1970s and 1980s (Child and Child, 1986). This increased to 46,775 elephants cropped mainly to relieve overcrowding in protected areas by the early 1990s (Martin, 1990; Child, 1995b). Prior to 1978, it was government policy to channel benefits derived from ecological cropping through the private sector that paid a royalty on each carcass cropped. In 1978, DNPWLM launched Wildlife Industries for All (WINDFALL) and sought to return more of the proceeds of wildlife from national parks and communal lands to residents of those areas (Ack and Child, 1993; DNPWLM, 1989).

Part of the programme included the distribution of game meat to local communities as direct tangible benefits derived from wildlife, with an ecological cropping of some 755 elephants undertaken in the Chirisa Safari Area during 1980/81 (Wasawo, 1987; Murindagomo, 1990). A total of 39.1 mt of meat was sold locally at subsidized prices (Drury, 1982), and although there was thought to have been an immediate drop in illegal bush meat off-take, in the long term the programme suffered from the unequal distribution of meat and other wildlife proceeds (Murphree, 1990; Ack and Child, 1993). Other ecological cropping schemes have been conducted in the Zambezi escarpment (1,250 elephants) in 1988 (SADC/GTZ, 1989), and another in 1992 in Mana Pools which faced similar problems in the distribution of meat (Gotosa, *in litt.*, to H. Davies, 1997). As ecological cropping is undertaken infrequently, necessary infrastructure is often not available for efficient distribution of meat, and in many cases more meat is supplied over a short period than can be consumed by the local people (T Davies, 1998).

Legal Game Meat Production from Staff Rations, Training and Proficiency Quotas in Protected Areas: Currently, DNPWLM issues quotas for each province as a total allowable off-take for rations, staff training and proficiency quotas. Meat supplied constitutes an important part of rations for Game Scouts when on patrol for six days or longer. Each year provincial DNPWLM wardens request their quota, which usually is much higher than provided for by headquarters (Heath, pers. comm., to H. Davies, 1997). For 1998, a total potential quantity of 190.5 mt was made available, which is likely to be close to actual off-take due to provincial wardens requesting a greater demand than provided for on the quota. Indeed, it is suggested that far more animals are culled than listed in quota schedules. Throughout the provinces, Impala are provided with the largest quotas (1,116) followed by guinea fowl (420), although larger species such as elephant (68), Cape Buffalo (60) and wildebeest (42)

represent considerable potential quantities of meat during 1998. Meat from the quota is not traded but forms an important source of protein to park personnel who live in isolated areas and have little access to domestic meat. Game meat supplied to wildlife authority staff currently represents the only form of legal game meat supply derived from national parks, although ecological cropping remains a management option (T Davies, 1998).

Game Meat Production from Trophy Hunting in Safari Areas: There are 16 safari areas within Zimbabwe comprising approximately 20,000 km^2 of Zimbabwe's land area. Hunting is the main formal wildlife use within safari areas, and these are located in remote and arid parts of the country that are unsuitable for conventional agriculture. The majority (87%) of safari areas are hunted by safari operators, the Hunter's Association and under public tender for hunting (Cumming, 1989). During 1993, the total potential production of game meat was 512 mt with Matesi (197.9 mt) and Chewore (138.3 mt) Safari Areas providing the largest potential quantity (DNPWLM, 1992a; Taylor, *in litt.*, to H. Davies, 1997). Quotas do not vary much from year to year so the annual potential production is likely to be the same for the last few years. As with trophy hunting in communal areas, some quotas may not be fully used. Meat distribution varies with some concession agreements between DNPWLM and safari hunting operators containing formal conditions that meat is distributed to rural communities. However, the extent that this is undertaken is variable with wastage of meat especially from larger animals being common (T Davies, 1998).

ii.) Illegal Utilization of Bush Meat:

Zimbabwe is distinct when compared to other countries of the study in that it has extensive areas under some form of wildlife management. In addition to the parks and wildlife estate which comprises about 12.7%, a further 17% of land in Zimbabwe maintains some form of wildlife management either through game ranching/farming on commercial lands or through the CAMPFIRE initiative in communal lands (Chindori-Chininga, 1996). In the parks and wildlife estate, the DNPWLM is responsible for law enforcement. The greater user rights and value attributed to the wildlife resource in both commercial and communal lands has resulted in a higher level of law enforcement and regulation of illegal wildlife off-take (TRAFFIC survey data, 1998).

Nevertheless, illegal bush meat use represents the largest wild meat supply within the country. The level of law enforcement that occurs within the parks and wildlife estate is not thought to be a deterrent (T Mukamuri, 1998). In addition, increased law enforcement activities by CAMPFIRE districts and the greater provision of wildlife benefits to rural communities has not resulted in the desired reductions in illegal bush meat off-take (Murombedzi, 1992, Musokotwane and Rehoy, 1992; T Ballan, 1998). Bush meat off-take from protected areas in Zimbabwe is regarded mainly as a subsistence activity by most DNPWLM law enforcement personnel resulting in limited convictions, fines or sentences and hence deterrent to illegal bush meat off-take. In addition, fines imposed by courts or directly by DNPWLM staff are very low, averaging about ZWD 100 (USD 6.60) for all species during 1994 and only ZWD 10 (USD 0.70) for setting of wire snares. With the meat value of even smaller species such as Impala being about ZWD 480 (USD 32) fines do not represent a real deterrent (T Mukamuri, 1998).

The findings of a review of law enforcement effort for four protected areas, Hwange, Victoria Falls, Kariba and Gonarezhou, suggest that off-take of bush meat from protected areas is a serious problem. In the past, trophy motivated hunting was the major illegal activity, but in more recent times this has been replaced by bush meat. Reasons for this change are the current socio-economic conditions and persistent droughts in the country. In addition, and contrary to popular opinion, bush meat hunting is becoming commercial (TRAFFIC survey data, 1998).

In Hwange National Park, interviews with wildlife personnel and the assessment of law enforcement data for the period 1985 to 1991 indicated that Greater Kudu, Impala, Cape Buffalo and warthog were the most frequently hunted species. These species coincided with those most mentioned by bush meat traders in Bulawayo who also reported supplies from Hwange, suggesting that hunting in the park is becoming more commercially orientated. From records of arrests, the intensity of bush meat offenses has increased, with only 28 cases brought before courts in 1985 compared to 140 cases in 1991. In the same period, there was a decrease in the severity of punishments. In 1985, fines for bush meat offenses ranged from ZWD 20 to ZWD 400 compared with a range of ZWD 10 to ZWD 100 in 1991. Prison terms were also more severe in 1985 ranging from 20 days to 10 months, whereas in 1991 there were no prison sentences imposed. This increase in bush meat off-take could be attributed to a decrease in severity of fines and sentences. In the Sinamatella area of Hwange National Park, drought and declining food security status have had a major impact on illegal bush meat off-take with the most offences brought before the court being in 1985, 1987, 1992 and 1995, years in which drought was prevalent (TRAFFIC survey data, 1998).

The most common species taken from Victoria Falls are warthog, duikers, Impala and Cape Buffalo, which as with Hwange National Park were also reported to be the most hunted and traded in Bulawayo. Mukamuri (1998) suggests that the area along the main tarred roads and railroads linking Bulawayo, Lupane and Victoria Falls could be a "supply corridor" for bush meat traders in Bulawayo. As in Hwange, drought is an important factor affecting the level of illegal hunting. Illegal bush meat off-take in the Kariba Protected Area also shows a peak in the drought year of 1992, with 23 offenses compared with an average of only five cases per year between 1985 and 1995. Bush meat off-take was generally low between 1985 and 1990, but thereafter increased dramatically due to the influx of immigrants into the area as a result of the boom in Kapenta fishing in Lake Kariba dam. High unemployment lead to increased illegal off-take and sale in Nyamhunga Township. During this period, fines were also lower as in the case with Hwange National Park, which catalyzed the marked increase in bush meat off-take.

Poor agricultural potential in areas surrounding the Gonarezhou National Park result in high demand for bush meat from the park. A commercial trade in bush meat is apparent with the Shangani people maintaining close bush meat trading relationships with the Mahenye people in Mozambique. Bush meat off-take from the park was low during the 1980s, but increased dramatically during the period of 1991 and 1992. This is reflected in the number of snares recovered with an average of only 65 per year between 1985 and 1991, and an increase to 217 and 225 snares in 1991 and 1992 respectively. The drought years of 1991 and 1992 were also the years in which free distribution of game meat was provided to the communities through the CAMPFIRE initiative and suggests that its impact on illegal off-take was negligible.

Bush meat related law enforcement effort in Zimbabwe has been hampered not only by the use of most capacity being directed to trophy poaching, but also by a marked decrease in overall capacity itself. Reduced funding, retrenchment and the AIDS pandemic has resulted in declining DNPWLM staff numbers with, for example, a reduction of 182 employees in the Matabeleland North Province since 1992, and a total of 31 employees for Victoria Falls having been lost and not replaced since 1985. Increased bush meat related offenses observed in the protected areas surveyed, were recorded during a period when law enforcement effort reduced significantly thus indicating a greater real increase. Commercially orientated hunting is an important dynamic in the protected areas assessed. Reduced law enforcement capacity and a general perception that bush meat off-take is subsistence motivated and within acceptable sustainable levels has resulted in one of the largest unregulated off-takes from protected areas currently not being addressed (TRAFFIC survey data, 1998).

Reduced effectiveness of targeted bush meat law enforcement in the parks and wildlife estate as well as communal areas has resulted in a conducive environment for the utilization of bush meat. Usage is widespread, and occurs not only in rural but also urban areas of the country (T Mukamuri, 1998). Most bush meat, however appears to be marketed locally within villages, small towns and business centers (Wilson, 1990). Wildlife in rural areas has traditionally, although illegally, contributed to family income by providing meat, and still performs a critical role in line with increasing human populations and declining standards of living. In Guruve and Mudzi Districts, bush meat has always been an integral part of the livelihoods of the people (Nhira, 1989), and a large variety of small and large species are still targeted (Buchan, 1993; Cunliffe, 1994). In areas where larger species are still available, bush meat can represent up to 74% of the total subsistence income of a rural community, as found in the late 1980s in the Angwa area of the mid-Zambezi Valley. The high reliance on bush meat in Angwa is not restricted to a minority of less well off residents, but to 59% of the majority who hunted and utilized bush meat regularly. A predominant reliance on targeting crop raiding species throughout the year resulted in the supply of 65.6 mt of bush meat and indicates that hunting is also an important component in protecting other alternative sources of livelihood such as agriculture (Murindagomo, 1988). Bush meat is not only utilized in areas that still maintain viable populations of the larger species. A substantial trade and use of smaller species also occurs, such as insects, rodents and birds. This results in a greater perception that the activity is legal. It is conducted in a more open manner and to a larger extent in urban markets (TRAFFIC survey data, 1998).

In households in the Chinamura communal area, smaller species such as rodents and birds were the most utilized species by 50% and 55%, respectively, and were directly consumed in most cases. Only in the event of excess or surplus supplies being gathered was bush meat sold, and bush meat was used mainly as a snack or "relish" during certain periods of the year and did not represent the main food source. However, during harvesting periods of the year, bush meat did contribute to the food security and nutritional status of the community and provided additional income through trade of surplus quantities (Graham, 1995). In Shurugwi communal area, edible insects also represent an important source of protein to local communities in woodland areas, with 6% of households consuming regularly, and 13% less regularly as a snack (McGregor, 1991). A greater commercial trade of smaller insects also occurs in Zimbabwe, with for example two species of mopane worm (*Gynnanisa maia* and *Gonimbrasia belina*) being marketed sometimes formally through registered companies, but mainly through informal rural and urban hawkers (Cheater, 1979; Wilson, 1987). Due to a high urban demand for mopane the vast majority of supply during the rainy season harvest periods is sold in urban centers such as Harare (Hobane, 1994). For rural supply areas such as Bulilmamange District, mopane harvest and marketing is regarded as a lucrative business and plays an important role in sustaining communities' livelihoods (Hobane, 1995).

Seized muzzle loaders.
Rob Barnett-TRAFFIC

Bush meat from a range of species represents an important source of protein and cash income to many rural and urban communities within Zimbabwe. The continuing value of bush meat as a resource to the rural peoples of Zimbabwe is reflected in research conducted during 1997 in the rural quasi-communal districts of Chivhu and Lupane, and the Dande area of Guruve communal district (TRAFFIC survey data, 1998). A summary of the key parameters and dynamics of the trade and utilization of bush meat in these survey areas is provided in Table 19.

Table 19

Dynamics of bush meat utilization in selected survey areas of Zimbabwe during 1997

Survey Areas:	Lupane and Chivhu (n850)	Dande (n90)
Species Utilized:	23 species, 40% large, 60% small	11 species, 65% large, 35% small
Proportion of Users:	100% Hhlds.	100% Hhlds.
Estimated Hhld. Consumption per Month (kg)	1.125 kg	13.8 kg
Bush Meat Most Important Meat Protein Source	29.8%	85.7%
Demand:		
Cheaper	32.9%	
Prefer Taste	33.8%	
Available	13.4%	
Habit	6.3%	
Other	13.6%	
Price of Bush Meat verses Domestic Meat per kg	Bush Meat USD 1.05 per kg Domestic Meat USD 1.84 per kg Bush Meat 57% Cheaper	
Supply:		
% Trade	33%	45%
% Subsistence	77%	55%
Main Customers	Lower Income	Lower Income
Conservation Implications:	1) declining resource; 2) increasing trade and prices; 3) greater use of more efficient hunting techniques; 4) seasonal supply; 5) limited traditional management	

Note: Small game meat species characterized as those having dressed carcass weight of under 5 kg;
Hhld.=Household; n = sample size
Source: TRAFFIC survey data, 1998.

Importance of Bush Meat Utilization:

Rural community reliance on bush meat for food security, nutrition, and economic status, is reflected in the three survey areas (Lupane, Chivhu and Dande). All households utilize and consume bush meat to different extents throughout the year, indicating a high demand for the resource that is regulated only in as much as supply can provide. Quantities consumed by households depend greatly on the species available in the survey area. Ward 2 in Dande was characterized by a greater abundance and availability of larger species, resulting in households consuming larger quantities of meat per month (21.6 kg). In contrast, households in Ward 4, where wildlife numbers are less and represented by smaller species, consumed much less (6 kg). This same dynamic occurs in Lupane and Chivhu, which as quasi-communal districts have higher human population and agriculture densities and corresponding declines in numbers of larger wildlife species. Although all households maintain a demand for bush meat, monthly supply is limited (1.2 kg per person) and primarily provided by smaller, crop raiding species (TRAFFIC survey data, 1998).

Although the scale of utilization differs widely according to wildlife availability, all communities regard the resource as an important component of their day-to-day living. In Lupane and Chivhu, limited supply of smaller species is compensated for by a greater frequency of consumption (60% at least once a week) than was found in areas such as Ward 2 in Dande, where wildlife is more prolific. In Lupane and Chivhu, bush meat is used as an additional relish and snack, providing appreciated variety and protein to staple carbohydrate diets. In Dande, where domestic meat is largely unavailable and expensive, bush meat provides the bulk of all meat protein consumed. Regardless of quantities available and consumed, the majority of rural communities in the survey areas felt that the benefits derived from bush meat were important to maintaining their standards of living. In Dande, the greater reliance on bush meat as the primary provider of meat protein is associated with bush meat being regarded as more important (85.7%) than beef, goat, chicken and fish. Even in Lupane and Chivhu, where alternative meats are more available, 29.8% of the people regard bush meat as their most important protein source. This reliance on bush meat increases during times of economic hardship or drought, where bush meat supplies play an important role in seeing communities through the hard times (TRAFFIC survey data, 1998).

Bush Meat Species Utilized:

In Chivhu and Lupane, a larger variety (23) of smaller species (60% of species) are utilized in contrast to Dande (11), where larger species are still relatively abundant and available for use (65% of species). Residents of Chivhu and Lupane have had to increase the variety of species they use, which has resulted in the greater consumption of hares, rodents, birds, and bushbuck that have successfully adapted to a changing environment induced by greater human and cultivation densities. In Dande, residents are still in the enviable position of being able to target the larger species, with Bush Pig, Cape Buffalo, kudu and Impala being utilized in the largest quantities. However, even in Dande, differences in species utilized between the two wards surveyed are apparent. Ward 4 has a reduced wildlife population in comparison to Ward 2, and hence has had to rely on smaller bush meat species (32%) to a greater extent than Ward 2 (11%). Being largely devoid of larger species, in the Lupane and Chivhu areas a greater proportion of illegal hunting occurs in neighboring commercial farms and protected areas (80.4%), with limited hunting of smaller species within the more communal areas (16.1%). This is especially the case in Lupane where forest reserves provide remaining habitat for the preferred larger species, although greater levels of law enforcement in both protected areas and commercial farms contribute to limiting overall off-take (TRAFFIC survey data, 1998).

Bush Meat Demand:

Demand is based primarily on a preference for taste (33.8%) and the cheap price of bush meat (32.9%), which reflects both an economic and social dynamic associated with bush meat utilization within the survey areas. The economic motivation for consuming bush meat is, however, likely to have increased over the past five years in line with the rising cost of domestic meats in rural areas. In 1992, one kg of beef cost ZWD 8, which by 1997 had increased to about ZWD 30-35. Reduced socio-economic status of many rural communities in recent years due to an increase in the cost of living has also resulted in an increased importance associated with the bush meat resource. As such, most users of bush meat come from lower income brackets in all survey areas, although a significant number of consumers can be regarded as better off within the context of the areas, and reflects the additional demand dynamic of bush meat being viewed as a superior and better tasting product than domestic meat. The predominant reliance on bush meat by lower income members of society is hardly surprising when comparing average bush meat prices across the survey areas of ZWD 16 per kg in comparison to ZWD 28 per kg for domestic meats.

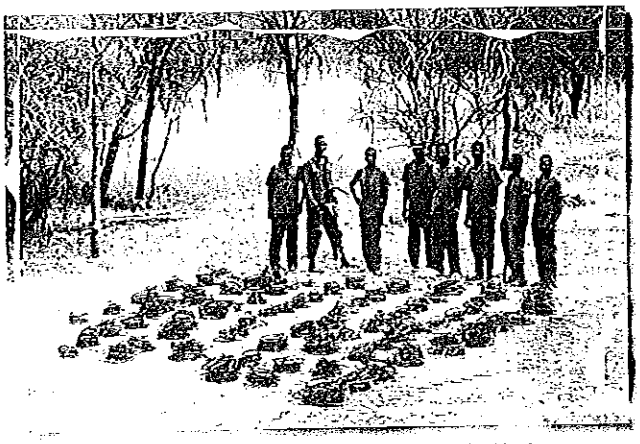
This represents a saving of about 75% to rural households if bush meat is purchased, and considerably more if it is obtained for free through subsistence hunting (TRAFFIC survey data, 1998).

In addition to a preference for taste, other social dynamics associated with the utilization of bush meat also perform a key role in motivating demand, and this is especially apparent within the Dande area. Although legal game meat supplies and other benefits are provided through the CAMPFIRE initiative, illegal bush meat off-take still continues at substantial rates. Communities in Dande are progressively behind the concept and philosophy of the CAMPFIRE programme and positive steps have been made towards a greater community involvement in the management of wildlife. However, this has not extended as far as reducing illegal off-take of bush meat, and suggests that benefits derived from wildlife by communities that include the provision of game meat may not have been sufficient to result in the desired change of attitude from wildlife being viewed as an asset rather than a cost. In Dande, households receive about 24.5 kg of legal supplies of game meat per year in contrast to 166.15 kg of illegal supplies of bush meat. Legal supplies represent a negligible contribution to overall nutritional needs of the community, and illegal bush meat supplies are obtained in part to meet this shortfall (TRAFFIC survey data, 1998).

Although limited legal supplies do contribute to the continuance of illegal bush meat use, a larger motivating dynamic in Dande is due to hunting and the fact that bush meat use is traditionally embedded in the cultural and social structure of communities. In Dande, over 83% of all wildlife meat utilized is obtained illegally. No local or external authority can effectively tell hunters to limit their illegal off-take as they receive the support of the community who perceive hunting as not clashing with any of their other interests. Indeed, hunting is a part of life with hunters holding esteemed positions within society due to the important role they play in providing cheap meat through trade and through the exchange/gift reciprocal network in which local leaders and relatives benefit. Even if communities are aware of the advantages of wildlife through legal use, the embedded social importance of hunting has resulted in CAMPFIRE making little progress in controlling bush meat off-take, and has had to rely solely on coercive anti-poaching patrols (TRAFFIC survey data, 1998).

Bush Meat Trade and Subsistence Use:

The subsistence use of bush meat still accounts for the majority supplied within the survey areas, although the amount of trade is increasing and currently represents an important supply of bush meat at about one-third to one-half of all supplies in the Chivhu/Lupane and Dande areas respectively. Supply has not been able to keep up with demand especially in survey areas characterized with non-availability of large species. This is perhaps best characterized in the Dande area where residents of Ward 4 obtain greater supplies (252 mt per annum) of bush meat from the more abundant resource base and rely to a smaller degree on trade. Supply is greater, and hence prices in this ward are considerably lower at ZWD 10.4 per kg. In contrast, supply levels in Ward 2 (48.5 mt per annum) cannot keep up with demand, resulting in a greater marketing of bush meat that is catalyzed by greater profit margins associated with higher prices at



Seized bush meat snares.
Freidkin Conservation Fund

ZWD 19.85 per kg. This has led to the emergence of Mozambican traders, who supply greater quantities from across the border. Trade is a growing component of bush meat utilization especially in Ward 2 in Dande and increasingly in Lupane and Chivhu where it provides important additional incomes to traders.

Conservation Implications of Bush Meat Utilization and Trade:

The increasing importance of trade as a source of bush meat can to some extent be associated with a declining resource in line with a stable or increasing demand. This seems to be reflected in the rural survey areas where bush meat supply has decreased significantly over the past five years and has been associated with a marked increase in prices throughout the survey areas. The result has been the emergence of a greater trading dynamic that ensures continuing supply from dwindling resources in line with increasing prices and profit margins. In Lupane and Chivhu, the increased value of the dwindling resource has resulted in the greater use of more efficient hunting techniques and weapons such as firearms (45.5%), and night torch hunting (41.8%). This is also apparent in Dande where the majority of hunters use wire snares (80%) and/or firearms (70%) rather than the less efficient and more traditional methods of hunting such as with bow and arrows and traps. Increased use of firearms does, however, have one positive conservation implication in that hunting is more gender selective with male animals (67%) targeted in Lupane and Chivhu. Hunting is also seasonal with most supply occurring during the summer months (51%) leaving off-season periods for bush meat species population recovery. Traditional management through taboos and totems still plays a role within the survey areas, although affecting a limited number of animals and has decreased over the past few decades as communities have had to increase the variety of species utilized to ensure a reliable supply.

IV. SUMMARY/CONCLUSION

Due to conducive policy and legislation initiated in the 1960s, Zimbabwe has developed the largest legal game meat production sector of all the study countries that is capable of producing approximately 4,553mt per annum at a value of USD 3,195,865. However, other more lucrative wildlife activities such as trophy hunting and tourism have been largely responsible for the increase in wildlife use and conservation within commercial and communal lands of the country, and traditionally game meat has been viewed as a low-value by-product. In recent years this attitude has begun to change, especially in the commercial Ostrich and crocodile farming industries where sale of game meat is regarded as a lucrative activity and important to the overall financial success of the farming sector. Access to export markets and corresponding higher revenues realized have been largely responsible for this change in attitude.

In contrast, legal game meat production in commercial and communal lands has been restricted by a lack of such lucrative external markets, and correspondingly game meat revenues realized are much lower. Game ranching in large-scale commercial farms represents the largest legal supply and its sale is increasingly contributing to the overall viability of LSCFs, although a reliance on local markets and especially the sale of meat at subsidized prices to ranch staff has reduced its overall financial contribution. Revenues realized from meat production on communal lands, safari areas and protected areas are also limited due to meat being supplied locally for free or at subsidized prices to protein deficient rural communities. Game meat production in these areas does, however, represent an important social contribution that results in considerable financial savings to many rural community households throughout the country.

The illegal utilization of bush meat represents the largest supply of all wild meat within the country. That said, rates of off-take may have been influenced to some extent by increased supply of legal game meat and increased law enforcement capacity in both commercial and communal lands. These factors, however, do not seem to have hampered demand of bush meat greatly, due to the ingrained social dynamics and an increased value associated with its use by rural communities as standards of living have declined and costs of domestic meat have increased. Increasing demand for bush meat and a decline in the resource are cause for concern. Greater marketing of bush meat and higher prices are likely to result in the continuing use of a larger variety of species from a generally dwindling resource base. Benefits currently realized by rural communities cannot continue indefinitely at current unregulated off-take rates. Action is required to build on the achievements of such initiatives as CAMPFIRE in communal lands to instigate a greater level of community involvement in self-regulation. Positive steps have been made not only in CAMPFIRE communal lands through provision of greater wildlife benefits in the form of financial payments and legal game meat supplies, but also in commercial lands where cheap game meat is available to rural communities resulting in a greater perception of wildlife being regarded as a valued resource that should be used in a regulated and sustainable manner.

V. RECOMMENDATIONS

- A greater awareness of the positive role that cheap supplies of game meat play in transferring tangible and direct benefits to rural communities should be built upon to ensure a continued increase in community wildlife management and self-regulation.
- Progress already made in ensuring more equitable distribution of game meat from ecological cropping in communal lands needs to be continued as a matter of priority. The present marketing policy that regards game meat production as a sub-economic but socially necessary activity should be reviewed. Greater consideration for the revenue earning potential of game meat should be given, and the possibility of identifying more lucrative markets considered, that could result in greater profit revenues and distribution of cash benefits to residents.
- The provision of greater financial benefits from wildlife and the legal supply of game meat to rural communities should not be regarded as the only prerequisite required for reducing illegal bush meat off-take, as hunting also performs an integral and important social role in the culture of many communities. The social demand for hunting is an important dynamic that cannot be reduced in the short term through provision of greater material benefits in cash or in legal game meat supplies. Replacement of mechanisms currently employed to distribute meat such as directed cropping schemes should be reviewed in relation to assessing the possibility of negotiating a controlled hunting access to game meat by communities together with the recognition of certain rights towards the resource.
- Game meat derived as a by-product from trophy hunting and problem animal control in communal and safari areas of Zimbabwe represents a substantial resource that currently is not being adequately utilized. Mechanisms for increasing game meat supply from trophy hunting and PAC need to be developed, together with a greater level of monitoring by DNPWLM, district councils and CAMPFIRE. Legal clauses in hunting concession lease agreements stating a requirement for all safari operators to distribute game meat from hunting would be a first step in realizing this potential. Meat distribution should be regarded as an acceptable additional running cost to safari operators and should be enforced by management bodies as a legally binding activity.
- A greater level of monitoring game meat production, distribution and sale is required in the commercial and communal lands of Zimbabwe, that could be undertaken by the Wildlife Producers Association (commercial lands) and the CAMPFIRE secretariat (communal lands).

- The importance attributed to game meat production in LSCFs needs to result in a greater effort to develop a more conducive business environment for producing and marketing game meat products. This would include a review of veterinary and health regulations with the aim of developing ways to make the movement and marketing of game meat throughout the country more efficient. An assessment of game meat export requirements and a review of customs classifications to include game meat to facilitate future monitoring programmes, should be undertaken. The development of a marketing strategy for legal game meat that involves the possibility of identifying more rural markets should also be considered.

- Greater action is required to promote more equitable government support to the wildlife industry, especially in light of the reduced viability of the beef industry and the possibility that the benefits of the EU/Lome convention may not continue indefinitely. The production of large quantities of game meat at well under half the price of domestic meat in commercial and communal lands represents a significant contribution to food security status of rural communities throughout the country, and should be used to justify policy change.

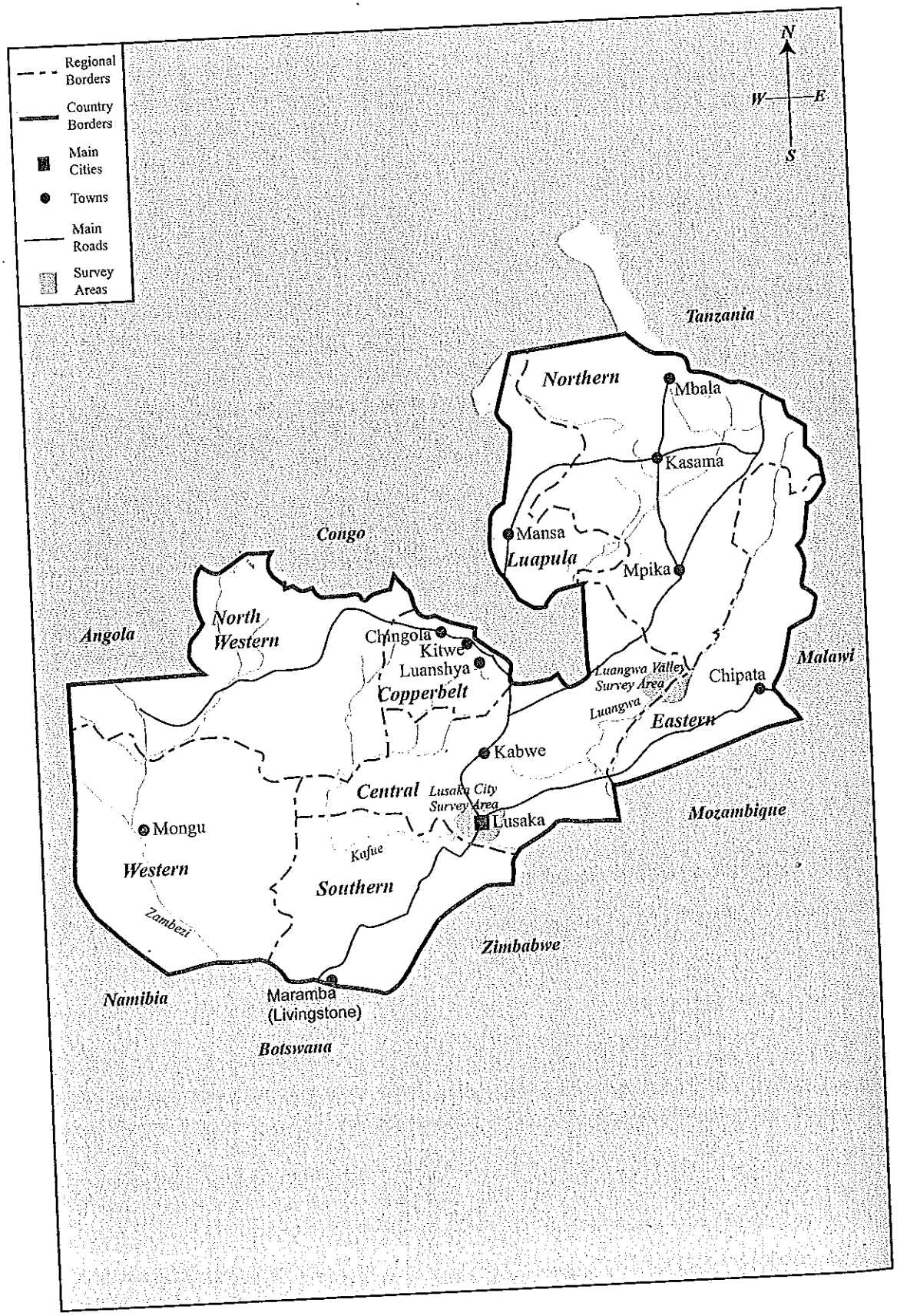
- The importance of game meat production to both private landholders and communal residents should catalyze a greater level of support to Wildlife Producer Associations responsible for commercial lands, and their communal lands counterpart CAMPFIRE, by government institutions and non-governmental organizations. Such support will help to ensure the development of the game meat industry within Zimbabwe.

- A greater awareness of the high demand and increasing commercial trade of illegal bush meat and its effect on increased off-take from protected areas should be developed. Bush meat utilization no longer represents a purely subsistence and harmless activity, and should be regarded as a more serious offence than presently perceived by DNPWLM. Official views that bush meat off-take from protected areas is still within sustainable levels should be reviewed. Increased monitoring of law enforcement encounters and seizures should be introduced as a matter of priority, as present lack of monitoring has contributed to the perception that bush meat off-take is of little concern. A more equitable distribution of law enforcement capacity between trophy and bush meat related illegal off-take should be undertaken. Fines imposed for bush meat offences are currently below the equivalent value of bush meat and should be increased to act as a greater deterrent.

- With DNPWLM being a statutory fund responsible for raising its own operational funds, ecological culling from protected areas may represent a viable option in some cases for raising revenue, if meat is sold at commercially viable rates. Alternatively, culling as in the past may provide the opportunity to provide greater benefits to rural communities. However, substantial obstacles exist in terms of a lack of required infrastructure (i.e. abattoirs, meat storage), and any possible venture into this field should be conducted in close collaboration with institutions and non-governmental organizations such as Wildlife Producer Associations and CIRAD-EMTV to assess the viability of such an operation.

Lesser Kudu.
Nina Marshall-TRAFFIC

ZAMBIA


Regional Borders
Country Borders
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North Western
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Kitwe
Luanshya
Copperbelt
Luangwa Valley Survey Area
Luangwa
Chipata
Eastern
Malawi
Kabwe
Central
Lusaka City Survey Area
Lusaka
Mozambique
Mongu
Western
Kafue
Southern
Zambezi
Zimbabwe
Namibia
Maramba (Livingstone)
Botswana

CHAPTER FIVE
ZAMBIA

I. BACKGROUND

Area: 752,600 km^2. ***Population:*** Estimated at nine million with an annual growth rate of 3.5%. ***Density:*** 11 per km^2.

Zambia is a landlocked country situated south of the Sahara in the sub-tropics, surrounded by Democratic Republic of Congo, Angola, Namibia, Botswana, Zimbabwe, Mozambique, Malawi and Tanzania (Seshamani and Mwikisa, 1994). A large part of Zambia is on the central African plateau between 1,000 and 1,600 m above sea level (NEAP, 1994). Lowlands also occur and are characterized by the major river valleys and alluvial plains of the Kafue, Zambezi, Luangwa and Chambeshi, which form some of the most important and extensive wetlands of the world (Chabwela, 1994). Zambia is part of the Zambezian province of the Afro-tropical bio-geographical realm where the dominant vegetation type is savanna woodland dominated by miombo, which covers about 50% of the country (Chipungu and Kunda, 1994). Mopane and munga woodlands cover much of the hot and dry Zambezi and Luangwa Valleys (NEAP, 1994).

On attaining independence in 1964, Zambia was one of the most prosperous nations in sub-Saharan Africa, its wealth derived primarily from the copper mining industry. Zambia's prosperity enabled the government to embark upon vigorous social and public service infrastructure development programmes, which during the colonial period had been virtually non-existent, especially among rural African communities (CSO, 1990; 1994; 1996). Although a socially justifiable step, problems in sustaining such programmes soon became apparent as the government adopted socialist economic reforms which comprised nationalization, subsidies and price control policies. Industrial and social development policies continued, as in colonial times, to be primarily urban-based, thereby exacerbating urban migration (MOF, 1997; CSO, 1990). Following implementation of these policies, the economy began to deteriorate. This decline was also catalyzed by the fall in global copper prices (mid-1970s through to the 1990s), increases in international oil prices, and by the government's support of liberation struggles in neighboring countries such as Rhodesia. Such support meant that a considerable portion of the country's economic resources were used for national security. Additionally, negative effects of sanctions imposed on South Africa and Rhodesia, Zambia's most dependable trading partners, were also felt. Such factors eroded the financial base of the country, and government reaction was to borrow heavily, which as the years passed resulted in the balance of payments position worsening further due to debt service requirements (T Kalyocha, 1998).

By the mid-1990s, Zambia was considered to be one of the poorest countries in sub-Saharan Africa. Annual GDP growth had fallen from 2.4% in the decade after independence to just 0.17% in the next 15 years, lagging well behind even the modest growth levels experienced in sub-Saharan Africa as a whole (MOF, 1997). The GDP per capita fell from USD 650 in 1980 to only USD 290 in the 1990s. Due to heavy borrowing, Zambia's debt stock as of December 1997 was USD 7.13 billion, demanding a debt service rate of USD 160 million per year (Post, 1998). However, with a new government in 1991, the economy began to make some progress following the reversal of many policies, and this has resulted in a more market-led economy. The Structural Adjustment Programme (SAP) and the New Economic Reform Programme (NERP) emphasise the liberalisation of the economy and the elimination of subsidies, price controls/restrictions, and a greater level of budget discipline in the public social services sector. Such policies have in recent years led to a degree of stabilization in some macro-economic

indicators such as inflation rates, exchange rates and GDP accredited to economic liberalization and a more favorable economic performance (MOF, 1997). However, such progress on the macro-economic level has also been accompanied by declines in the micro-economic level. The level of income and standards of living of many Zambians have declined because of the privatization programme and restructuring of the civil service under the public sector reform programme, leading to an increased level of unemployment (T Kalyocha, 1998).

Measured by all parameters, Zambia has one of the highest poverty levels in the region, with 78% of the total population living below the poverty line (CSO, 1997). Real income levels have declined due to high inflation rates of as much as 50% over the years, and formal sector employment has declined since the 1980s, especially in recent years. Rural households have suffered the most, with average household per capita income three times less than their urban household counterparts. Zambia's economy is agriculturally based, and the agricultural sector is dominated by traditional farming systems. In rural areas, 76% of households are engaged in small-scale subsistence agriculture with the sale of surplus crop produce (<1%) or livestock (2%) almost non-existent. Average areas under cultivation are small (1.5 - 2.0 ha) because of labor and draught power shortages in areas of low human population densities (T Kalyocha, 1998). In addition, only about 12% of Zambia in the central, southern and eastern plateau can be described as having fertile soils for extensive crop and livestock production. Other areas such as the northern high rainfall zone (46%), the western semi-arid plains zone (28%), and the Luangwa Zambezi rift valley zone (14%), are characterized by lower fertility soils. Tsetse fly is prevalent in Zambia, and therefore livestock production is low, especially in valley areas (NEAP, 1994).

Although in the past few years government expenditure on social services support programmes has declined under macro-economic reforms, greater social infrastructure within urban areas and higher household per capita incomes have transformed Zambia into one of the most urbanized countries in the target study countries (GRZ, 1990). Residents of urban areas constitute 37% of the total population. The rate of rural to urban migration is high, and social and physical infrastructure has not been able to keep pace. "Shanty" and squatter compounds, typified by congestion and poor water and sanitation systems, have mushroomed in all urban areas (T Kalyocha, 1998). High unemployment levels, low agricultural productivity and generally limited incomes mean food insecurity for many urban and rural households; over 40% of Zambian children are recorded as stunted because of chronic under-nutrition during extended periods (CSO, 1997). In urban areas high levels of unemployment are the main causal factors, while in rural areas chronic food shortages are a frequent occurrence, caused by poor crop yields, inadequate food storage facilities, and limited ability by many farmers to secure agricultural credit and inputs (T Kalyocha, 1998).

In response to food insecurity and low-income levels, rural and urban households have evolved coping strategies that in many cases involve a heavy dependency on the natural resource base (T Kalyocha, 1998). A reliance on the wild meat resource for meeting basic protein requirements and generating additional cash incomes, has been documented in urban areas (Pope, 1994; Kalyocha, 1996) and in rural areas (Marks, 1973; 1976; 1977a; 1979; 1984; 1996; Steir, 1970; Wilson, 1989; Davies, *et al.*, 1997). In addition, Zambia is ethnically diverse, with 73 ethnic groups comprising seven main tribes of the Tonga, Lozi and Luvale, Bemba, Kaonde, Lunda and Ngoni-Chewa people (T Kalyocha, 1998), many of whom have a strong tradition of utilizing the wild meat resource. This factor to this day plays a strong role in forming the parameters of its use (Simasiku and Kalyocha, 1996; Marks, 1973; Scudder, 1975; Duncan, 1996).. With Zambia experiencing a high rate of human population growth, it is likely that the country's natural resources will continue to play a critical role in maintaining the health and well being of the country's human population (T Kalyocha, 1998).

Because Zambia's human population is relatively small, and to a large extent urbanized and restricted to high production areas, creation of an extensive system of protected and game utilization areas has been possible (Attwell, 1992). Protected areas in Zambia comprise national parks (19), game management areas (34) and forest reserves (ZFAP, 1994). Forestry land hosts a considerable amount of wildlife, and covers 9% of the total land area. Forest reserves are classified as either protection or production reserves. The production reserves represent about two-thirds of the forests and are mainly concerned with the production of timber, whereas the protection reserves are devoted to conserving the water catchment and soil erosion values of the forests. National parks (including bird sanctuaries) cover an area of about 6%, in which no human settlement or consumptive use of natural resources is permitted. Game management areas (GMA) cover an additional 22% of Zambia's land surface. These are sparsely populated subsistence farming areas in which consumptive use of wildlife is intended to be a major form of land use (Chipungu and Kunda, 1994). Protected areas in Zambia comprise over one-third of the total land area, with the greater proportion allowing legal consumptive use of the game meat resource (T Kalyocha, 1998).

The wildlife resource base extends throughout the protected area network (Chabwela, 1986; Chabwela, 1994). Because national level wildlife population demographic data is lacking, the exact status of wildlife is unknown. Nevertheless, scattered counts in various protected areas seem to suggest that populations are on the decline (T Kalyocha, 1998) . Elephant populations have declined drastically, for example, from about 200,000 animals in the 1970s to an estimate of 22,518 in 1996 (ZFAP, 1997). Although declines in most species are likely, in some local situations, increases have been observed. For instance, in the Luangwa Valley, populations of Impala have increased (Jachmann and Kalyocha, 1994; Jachmann, 1997), with hippo populations reaching a maximum ecological carrying capacity. The pressures causing declines in certain areas are mainly believed to be due to over-hunting and habitat loss (T Kalyocha, 1998)

Although the country has a low national human population density, the occurrence of tsetse fly and infertile areas in large parts of the country has resulted in certain agriculturally productive and tsetse-free zones attracting high human populations, leading to densities of over 100 people per km^2 (CSO, 1997). The combined effects of an increasing population, and migration to productive areas, has led to over-exploitation of natural resources, and in such areas habitat encroachment, deforestation and land degradation are major environmental issues. The central, southern and eastern plateau is characteristic of these areas, with wildlife being largely absent due to the elimination of habitat in favor of agriculture and livestock production along the railway line (Attwell, 1992; NEAP, 1994; T Kalyocha, 1998). In such areas, the problem is expounded because it is a sub-tropical ecosystem, which according to Chabwela (1994) has a low resilience to environmental degradation due to limited precipitation, shallow soils and resultant short growing seasons. In the majority of these less densely populated areas of the country, illegal and unsustainable off-take of wildlife species for meat supply, motivated by subsistence and increasingly commercial usage, is likely to constitute one of the largest impacts on wildlife populations in the country (Marks, 1996; Davies, *et al.*, 1997; T Kalyocha, 1998).

II. POLICY AND LEGISLATION

Under the Ministry of Tourism, the Zambia Wildlife Authority (ZAWA) is responsible for the enforcement of existing wildlife legislation and the management of wildlife in and outside of Zambia's protected area network. ZAWA is a semi-autonomous institution that has evolved from the fully government controlled Department of National Parks and Wildlife Services (DNPWS) through recently ratified new wildlife management legislation (*Zambia Wildlife Act No.12 of 1998*). Although wildlife

is still owned by the state, with powers vested in the President on behalf of the people, the new legislation does importantly provide for the greater devolution of wildlife user rights to game ranch and farm landholders, as well as to communities resident in GMAs.

Consumptive wildlife utilization has always been an integral part of government policy, but it was not until the 1970s that progress towards a greater level of community involvement in wildlife management occurred. This was related to the establishment of the Liuwa Game Reserve and the Nsefu Game Reserve, where greater management by traditional authorities was initially attempted (Attwell, 1992). However, such initiatives were limited in extent, but a greater proportion of wildlife revenues accrued directly to traditional authorities in these instances. Prior to 1983, all hunting revenues went straight to central government, and were not generally redirected to wildlife management through the original Department of National Parks and Wildlife Service (DNPWS) or to rural communities living in wildlife areas (Bell, 1987).

However, during the 1970s and early 1980s, the drastic decline in Zambia's elephant and rhino populations (Mwenya and Lewis, 1990) had severe repercussions for the financial viability of tourism and safari hunting, and this catalyzed a change in government attitude. Decision makers recognized that past conservation policies had not been appreciated by rural communities, and that without a greater level of community participation in wildlife management, the resource would continue to dwindle (T Kalyocha, 1998). This change in perception resulted in the proliferation of community-based programmes such as the Lupande Development Project, the Wetlands Project, the Luangwa Integrated Resource Development Project (LIRDP) and the Administrative Management Design (ADMADE) for GMAs. These initiatives aimed at distributing greater wildlife benefits to local communities that in most cases relied heavily on consumptive game meat production from the resource (Attwell, 1992; T Kalyocha, 1998).

In the early 1980s, the change in government policy that integrated wildlife management policy with community development initiatives was facilitated by a decentralization process established through the *Local Administration Act of 1980.* This enabled decentralization of wildlife management control, and culminated in 1983 in the establishment of the Wildlife Conservation Revolving Fund (WCRF). The WCRF allowed for a greater proportion of revenues accruing from wildlife to be managed directly by DNPWS and be redirected to communities living with wildlife (T Kalyocha, 1998).

Currently, ZAWA operates the ADMADE, LIRDP and Wetlands community based wildlife management programmes that promote community participation in terms of revenue sharing, employment and decision-making on wildlife resource management (T Kalyocha, 1998). Government policy continues to be firmly committed to the sustainable utilization of wildlife resources and game meat production for the benefit of rural communities. Sustainable utilization and the integration of wildlife management with community development initiatives is a major theme running through many policies that the government has committed itself to in recent years. Such policy commitments include review of the National Conservation Strategy (NCS) and adoption of the National Environmental Action Plan (NEAP) as the main policy frameworks for the sustainable utilization and conservation of the environment, the formulation of the Environment Support Programme (ESP) as the vehicle for implementing the NEAP, and the formulation of the Zambia Forestry Action Programme (ZFAP) and Provincial Forestry Action Programme (PFAP). Due to the prevalence of tsetse, limited livestock production, low-income and high poverty levels, the meat production potential of wildlife is viewed by government as one of the greatest potential benefits that can accrue to rural and urban populations (T Kalyocha, 1998).

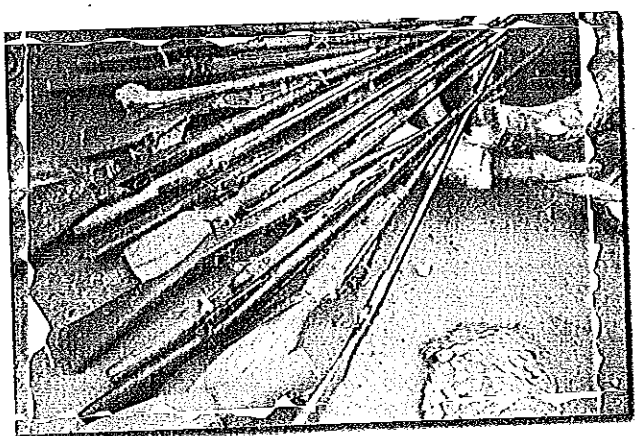
Wildlife conservation and utilization is controlled under the *Zambia Wildlife Act No.12 of 1998 (replacing the National Parks and Wildlife Act (NPWA) of 1991)*, and makes provision for controlled hunting of animals in GMAs of the country through the District, National and Special game licenses. The *National Parks and Wildlife [Licenses and Fees] Regulations of 1994* outline the license fees and

procedures prescribed. The *Zambia Wildlife Act of 1998* also regulates the illegal utilization of species hunted without a license. Wildlife species are defined as any vertebrate animal, includung mammals, birds, reptiles and amphibians. Secondary legislation to the act also specifies 25 mammal, 36 bird and four reptile species that are protected (*SI 60, 1993*), but may be hunted under "Special" license. Not all protected species are made available on quota or special licenses. Hunting weapons such as certain types of firearm, compound bows and crossbows and the use of hunting dogs, as well as hunting methods such as night torch hunting, are also restricted (*SI 63, 1993*) (Mulolani, 1995). Prescribed penalties and fines for contravening the provisions of the principal act and hunting any animal without a license are provided for under the *Legislation Prohibition of holding District Game License and National Game License* (*SI 63, 1993*).

Other legislation that affects wild meat utilization in Zambia is the *Forestry Act of 1974,* which provides for the regulation of unlicensed hunting within forest reserves and outlines penalties and fees which fall within the mandate of the Forestry Department under the Ministry of Environment and Natural Resources. Of particular importance to wildlife conservation, and to the development of the legal game meat sector in Zambia, is the *Lands Act of 1995.* This Act abolished the distinction of land tenure into reserve, trust land and state land, whilst at the same time provided for the continuation of customary tenure. By recognizing customary tenure, the Act acknowledged the importance of the traditional system and the role of chiefs in leading community participation in development activities, including natural resources management. Under the traditional customary land tenure system, land allocated by the chief of the area can be inherited and passed on, but there are no well defined property rights and, in general, resources of the land are under open access to any member of the community (Hanna and Muasinghe, 1995). Although it is argued that there are strict rules regulating resource use under traditional authority, such as in the Lozi cultural system (Simasiku and Kalyocha, 1996), a lack of property rights generally lowers the value of land and its natural resources, and results in little incentive for sustainable use and sound environmental protection (NEAP, 1996). The result in customary land areas, which constitute the majority of Zambia (Chipungu and Kunda, 1994), is generally negative and leads to deforestation, land degradation, and over-exploitation of wildlife (T Kalyocha, 1998).

III. CONSUMPTIVE WILDLIFE UTILIZATION CONTEXT

Government commitment to sustainable wildlife utilization through game meat production and the legal game ranching and farming sector is well reflected in wildlife policy and recent legislative change, and this is promising. To date, however, a limited wildlife authority capacity and remaining legal restrictions have resulted in Zambia's game ranching and farming sector being under-utilized, the licensed hunting system being over burdened, and community-based natural resource programmes such as LIRDP having to rely primarily on coercive law enforcement to contain illegal bush meat off-take (T Kalyocha, 1998). Zambia's population exhibits a high demand for wild meat, and this has had a considerable impact on the wildlife resource through illegal off-take. Legal game meat supply in contrast is limited, and has, except for a few localized community-based programme areas, contributed negligibly



Hunting rifles and wildlife products.
Rob Barnett-TRAFFIC

to providing alternative legal meat supplies.

I.) Legal Game Meat Utilization

Zambia has considerable potential for legal game meat production because large areas of the country are sparsely populated. Wildlife in such areas is believed to have the comparative advantage (Child, 1993) and, together with a high demand and price achieved for preferred game meat, the industry is in an enviable position in terms of potential for expansion. Historically, the benefits of legal game meat production have been viewed as the greatest contribution that the game estate could make to the national economy, especially for poverty alleviation in areas afflicted by trypanosomiasis (Attwell, 1992). This perception persists, with ZAWA focusing on legal game meat production and distribution to rural communities. Through community-based cropping programmes significant progress has been made, although problems in equitable distribution of meat and the economic viability of some of these schemes have recently come into question (Pope, 1994; T Kalyocha, 1998). The meat production potential from other legal game meat production sectors such as licensed hunting, problem animal control and game ranching has not received as much attention, due to a lingering perception that their contribution to social (poverty alleviation) and national objectives (increase in government revenues) is limited.

While game meat production through cropping for poverty alleviation is integral to Zambia's wildlife policy, safari hunting and photographic tourism revenues contribute vital foreign exchange revenues. The importance of tourism and safari hunting is reflected in revenue from wildlife based tourism, generating 5.4% of Zambia's total export earnings in 1993, and being responsible for nearly 8% of total formal sector employment (ZFAP, 1997). In terms of safari hunting, the ZAWA, through the Wildlife Conservation Revolving Fund (WCRF), collected USD 1.9 million in 1995 with a significant amount returned directly to community and wildlife management initiatives in rural areas. The contribution of safari hunting and tourism to areas such as the Luangwa Valley under the LIRDP community-based programme is critical with USD 320,265 generated from tourism and USD 244,353 from safari hunting during 1996, which was redistributed to rural communities. Revenues from cropping operations of hippo and Cape Buffalo in Luangwa which are by far the largest schemes in operation, achieved about USD 300,000 per annum during 1995 and 1996 (T Kalyocha, 1998).

However, if the actual value of other legal game meat production sectors such as citizen and non-resident hunting and problem animal control were also taken into account, the relative contribution of game meat supply in Luangwa would be much higher and may even outweigh that achieved through tourism or safari hunting. Although tourism and safari hunting are important, game meat production can contribute substantially to social and national objectives especially when the non-economic subsistence values of meat are taken into consideration. With the enactment of more conducive legislation (*Zambia Wildlife Act, 1998*), the legal game meat production sector is likely to play an increasing role in meeting Zambia's social and national objectives.

As seen in Table 20 the total legal game meat production sector in Zambia results in an estimated 987 mt of meat produced per year at a value of approximately USD 1,961,600. Although a proportion of the meat derived from, for example, problem animal control is not realized through cash revenues, overall it still represents a substantial potential revenue source that is at least equal to the USD 1.9 million obtained by ZAWA through the Wildlife Conservation Revolving Fund from safari hunting fees during 1995 (ZFAP, 1997; T Kalyocha, 1998). In addition, the estimate of total revenues is low because District Game license data has not been quantified, but is believed to constitute one of the most significant legal game meat production sectors in the country. Of those sectors reviewed, by far the

Table 20

Estimated average annual legal game meat production in Zambia during 1987-1997

Description:	No.	Estimated Game Meat Production per Annum (mt)	Average Price per kg (USD)	Estimated Total Value per Annum (USD)	Contribution to National Estimate (%)
Licensed Hunting:					
District License:	-	-	-	-	-
National License:	2,649 animals	138.1	2.00	276,200	14%
Safari License:	1,345 animals	137.6	2.00	275,200	14%
Special License:	-	-	-	-	-
Game Ranching: (Plains Game)	24 Ranches	39.2	2.00	78,400	4%
Game Farming: (Crocodile)	7 Farms 3,345 animals	12.4	1.00	12,400	0.7%
Cropping/ Culling Schemes:	1,567 animals	515.7	2.00	1,031,400	52.6%
DNPWS Staff Rations:	n/a	n/a	n/a	n/a	n/a
Problem Animal Control:	134 animals	144	2.00	288,000	14.7%
TOTAL:		**987 mt**		**USD 1,961,600**	**100%**

Source: TRAFFIC survey data, 1998.

largest legal game meat supply in Zambia is achieved through cropping and culling schemes (52.6%), which are mainly social but increasingly becoming commercially orientated. This is followed by the licensed hunting sector at (28%) which can be broken down into National licensed hunting (14%) and safari licensed hunting (14%). Citizen hunting through District licenses was not quantified but is believed to be responsible for the largest supply of game meat from all categories of licensed hunting. Problem animal control supply of game meat contributes significantly (14.7%), with game ranching (4%) and farming (0.7%) contributing negligible amounts.

Licensed Hunting:

Licensed hunting is regulated under the *Zambia Wildlife Act No.12 of 1998*, and the *National Parks and Wildlife (Licences and Fees) Regulations of 1994*, which makes provision for authorized hunting through the District, National, Safari and Special hunting licenses. The sale of game meat derived from hunting under these licenses is allowed for with the Act providing authority to the Director of ZAWA to issue a certificate of ownership for a game or protected animal to any person in legal possession of game meat under a hunting license. The *Zambia Wildlife Act, 1998* also makes additional provision for the regulation of trade in game meat through a statutory instrument that may be issued by the minister to control, limit or prohibit the movement of game meat including its international export. District licenses are for bonafide citizen residents of a particular district in which the hunting will occur, whereas National licenses permit non-residents of a hunting area to hunt, and are issued to Zambians and non-citizens resident in the country. Tourists must obtain a safari hunting license and hunt via registered safari hunting companies (T Kalyocha, 1998).

All categories of hunting are conducted in GMAs and open/free areas of the country, and, except for Special game licenses are issued on a quota basis. The establishment of quotas is based on the recommendations of ZAWA biologists using biological criteria. However, the absence of census data in most cases has resulted in concerns being noted that quotas for some species may actually be set at unsustainable rates (T Kalyocha, 1997). Certain areas of the country, which are included under one of the community-based natural resource programmes (LIRDP, ADMADE, WETLANDS), do have the ability to set quotas on more comprehensive census data. In addition, ADMADE has begun to initiate a system of community village scouts undertaking ground censuses for wildlife population estimates, which when stored in a GIS database have proved to be a reliable source of information for quota setting.

District and National Licensed Hunting: District licenses are issued to resident hunters and are intended to provide rural communities of GMAs with access to affordable game meat. License fees are subsidized at low prices and represent only one-tenth of the costs of non-resident hunters under the National licenses. Licenses are purchased from the districts, which facilitate the identification of bonafide citizens of the area by Wildlife Authority personnel who sell the licenses on behalf of the District Councils. A review of the allocation of quotas for district hunting in Eastern Province for the years 1989 and 1994 reveals that the numbers of animals and potential meat supply from these licenses has severely declined by an average of 36%, with greater reductions in certain species such as the Puku and hartebeest over this six year period. Hence the ability of District licenses to meet its social objective of providing cheap and affordable protein to rural communities living in GMAs is diminishing. Animals hunted in the largest quantities in the province during 1994 were the Common Duiker (25%), warthog (20%) and bushbuck (19%) (T Kalyocha,1998).

National game licenses allow for Zambian citizens and non-Zambian residents who are usually urban-based to hunt in GMAs and open/free areas. Non-Zambian residents are classified as those who satisfy the regulations provided for under the *Immigration and Deportation Act* (Sect. 33). As with the District hunting licenses, the provision of animals under quota to National licenses has declined in recent years, in addition to the actual number of licenses issued. Demand for National licenses is high. During 1996 and 1997, for examples, 83% and 75% of all applicants were rejected in three GMAs in Eastern Province. For the period under review (1994 to 1997), an average of 2,649 animals were actually hunted under the National game licenses in GMAs and open areas of the country. The most popular species hunted are lechwe (944), zebra (118), Cape Buffalo (113) and Impala (95). Annual production of dressed game meat is estimated at 138.1 mt, which due to the high demand and value associated with game meat is likely to be fully utilized through direct consumption and trade. A greater proportion of National license hunting occurs in the GMAs (87%) of the country in contrast to open areas (13%) (T Kalyocha, 1998; T Saiwana, 1998).

National licenses are issued by ZAWA in most cases, although a general decline in wildlife populations has resulted in ADMADE community-based programme area being bestowed the right for local institutions called sub-authorities to screen non-resident applicants in relation to the quota available for the area prior to ZAWA granting them authority to hunt with the issuance of a national license. Some sub-authorities in the ADMADE area have closed their areas to National license hunting (e.g Lupande GMA) due to declining wildlife levels and a generally held view that National licensed hunting results in many cases in overshooting of license allocations. In addition, sub-authorities in some cases prefer to allocate more of the area's quotas to District license hunting for the greater provision of meat to local residents. Reductions in quotas and numbers of National licenses issued together with the restriction on their hunting in some GMAs has resulted in an overall decline in meat supplied to these usually richer and urban-based hunters. Resentment is increasing in this section of Zambian society because according to law, wildlife is a natural resource vested in the President to hold on behalf of all

citizens, and does not belong to chiefdoms as proclaimed in the ADMADE programme (T Saiwana, 1998).

The decline in the number of animals allocated under District and National licenses is reflected throughout the country and can be attributed to reductions in wildlife numbers. Another reason is the more favorable allocation of greater numbers of species to the more lucrative safari hunting sector. The hunting period for District and National license hunters in areas that are also used for safari hunting is between September and December and is deliberately set at odds with the safari tourism-hunting season to reduce conflict between the two sets of hunters. This is also a deliberate strategy to provide a high quality hunting experience for foreign hunters, free of disturbance. The result for citizen hunting is that meat is only available in the last quarter of each year in safari hunting areas as opposed to other areas where the season starts much earlier in June (T Kalyocha, 1998).

All these factors have culminated in District and National licensed hunting yielding decreased quantities of game meat to smaller numbers of Zambian people and for shorter periods of time. Although always prevalent, this has led to the likely increase in the abuse of licensed hunting within the country which involves overshooting license quotas and the unlicensed sale of game meat. In the early to mid-1990s, the observed abuse of the District and National licenses together with increasing conflicts with the safari hunting sector led to its ministerial ban in 1993 and 1994 which was only reopened in 1995. In more recent years, illegality in the licensed hunting sector is still apparent. A survey conducted during 1997 on a sample of District and National licensed hunters revealed that although the sale of meat is legally provided for under the issuance of a trade permit, very few hunters obtain such a permit and hence generally sell meat illegally (T Kalyocha, 1998). Negligible chances of being apprehended have resulted in the number of trading permits issued nationally being very low (Kabumbwe, *in litt.*, to G. Kalyocha, 1997). A high urban demand means that a considerable amount of unlicensed trade in meat occurs.

The lucrative trade in game meat deriving from District and National licenses has been facilitated by the subsidized low prices of licenses with, for example, the price of a Cape Buffalo on a District license being ZMK 50,000 (USD 38.50) and on a National license being ZMK 160,000 (USD 123) (*GoZ Statutory Instrument No.53 of 1997*). With urban market prices during 1997 being approximately ZMK 10,000 per kg for Cape Buffalo meat, license fees do not represent the meat product value of animals with Cape Buffalo having a meat value of USD 628. This is more than 16 and five times the license value of District and National licenses respectively. The statutory instrument which prescribes the fees, however, does make provision for trying to regulate harvests. These include that no more than five different species be allocated per National license, and that if more than one animal is requested per species, that an additional charge equal to 50% of the indicated price of the species is applicable (T Kalyocha, 1998). However, due to a limited law enforcement capacity and negligible monitoring of licensed hunting, the positive benefits of these regulations are not in reality felt, because unscrupulous hunters overshoot licenses and fail to endorse them. Indeed, the likelihood of licenses being inspected in the field is very low. Even taking into account the costs of hunting and the increasing costs of ammunition, licensed legal hunting still represents a profitable pastime if meat is traded commercially.

Due to such incentives, commercial licensed hunting for trade is a growing phenomenon in Zambia from both District and National license hunters, although the latter's mobility and access to urban markets have resulted in greater trade motivated hunting. Generally, resident licensed hunters in Zambia consist of two categories, those that are sport motivated, and those whose primary objective is to obtain as much meat as possible for sale. A preliminary review of hunter license records (Pope, pers. comm., to R. Barnett, 1996) suggests that hunters obtain many licenses and quotas by using false names for the license, and that the same firearm registration numbers were found to appear regularly under different names to such an extent that the quantity of meat derived from animals obtained could in no way be used for domestic use only. In addition, the occurrence of hunters reporting nil returns was very high,

and believed inaccurate due to the fact that reported nil returns resulted in the quota being eligible for use again. Licenses are used as a cover in case hunters are questioned by authorities and some reports exist that commercially motivated licensed hunters may be exceeding quotas by as much as 150% (Pope, pers. comm., to R. Barnett, 1996). Historically in Zambia, exceeding license quotas has always been recognized as an area in which informal bush meat off-take overlaps with formal licensed use. The Game Department in 1972 estimated from baseline research conducted on over 100 licensed hunters in the Luangwa Valley that license quotas were exceeded by as much as 50% (Game Department, 1972).

Safari Hunting: Safari hunting in Zambia represents an important industry, resulting in much needed foreign currency in a country characterized by a huge debt re-servicing schedule (Munyenyembe, 1997). All safari hunting is undertaken with registered and established hunting companies. Through the Wildlife Conservation Revolving Fund (WCRF), ZAWA has been able to generate support for its operations by retaining a 50% share of the revenue derived from safari hunting license fees, with the remainder being directed to central government. The ADMADE programme also relies heavily on safari hunting revenues, in which the WCRF disburses 35% of the revenues retained from hunting to the ADMADE sub-authorities for socio-economic infrastructure development, 40% for wildlife management in the area, while 25% is retained by ZAWA for administration. As a result safari hunting is seen as the most important consumptive utilization sector in Zambia, and continues to be favored in terms of the numbers and species allocated and the longer hunting seasons, to the detriment of citizen and resident District and National licensed hunters (T Kalyocha, 1998; T Saiwana, 1998).

In general, safari companies enter into lease agreements with ZAWA for hunting concessions for periods of up to five years. Exclusive hunting rights between the period May to September are granted by ZAWA for safari hunting, although hunting may continue through to December but is accompanied by other District and National license categories of hunters. In addition to the longer and more favorable hunting seasons, the allocation of quotas has remained constant over the period under review (1994 to 1997). The average number of animals harvested in open areas and GMAs per year has remained stable at an average of 1,345 animals per year, as has the species composition with Cape Buffalo (12%), Impala (7%), warthog (7%) and Puku (6%) being hunted in the largest quantities. During the period under review, an average of 137.6 mt of dressed game meat was made available through trophy hunted animals, of which the Cape Buffalo was responsible for providing about one-third of all consumable meat. Unlike District and National license hunting, however, not all meat is effectively utilized, especially in remote GMAs or open areas located at considerable distances from rural communities. Contrary to hunting concession lease agreements which state that all meat should be distributed, in reality only a small proportion finds its way to rural communities and in most cases is used as camp staff rations or as bait by the hunting clients. In Luangwa Valley, it is estimated by safari operators that only about 5% of meat is actually effectively distributed to rural communities (Dodds, *et al.*, 1968; T Kalyocha, 1998).

Special License: These licenses are issued as a special prerogative of the Minister of Tourism, and are used as gestures of goodwill to visiting dignitaries and national leaders. More frequently, however, they are issued for traditional ceremonies, for research and translocation to game ranches, as well as for large-scale community-based cropping and culling schemes. These licenses are not based on quotas and the animals allocated may be provided for free, or at a price determined on a case-by-case basis. Except for culling and cropping programmes and traditional ceremonies in which ZAWA officers supervise the distribution of meat, access to data on all other uses of wildlife under special game licenses is restricted.

Culling and Cropping Schemes:

Prior to independence, culling/cropping was carried out by the Game, Fisheries and Tsetse Control Department to control rinderpest and tsetse. Early control programmes included elephant and Cape Buffalo cropping. During the period 1944 to 1969, culling resulted in the elimination of approximately 6,925 elephants and the distribution of 11,675.5 mt of dressed game meat. Even during this period, the non-economic value of meat distributed free to local communities was seen as an important objective of the wildlife institution (T Kalyocha, 1998). Culling for tsetse control ended in the late 1960s and since this time has been largely replaced by trapping and insecticide spraying.

During the 1960s and 1970s, the emergence of ecologically motivated cropping largely replaced that of disease control culling as the major supplier of game meat to rural and urban communities. Large-scale cropping schemes were initiated in the Luangwa Valley in 1966, with a yield during the first year of 204 elephant and 218 hippo. Plans to attain a target of 10 mt per week were soon achieved by the end of the first year as hunting and processing techniques improved. Disease control culling at this time was still occurring in the area and provided an additional 2,233 elephants (Eltringham, 1984). In 1968, the Kafue Flats game cropping programme was introduced because of dam construction at Kafue Gorge which would reduce the lechwe habitat; it was thought that the estimated population of 30,000 would have to be reduced by cropping. In the first year, only 78 animals were cropped although targets for the abattoir installed in the area were 50 animals a night with a target production of 1,000 animals per annum. Although the cropping scheme in Luangwa was considered to be relatively successful, problems encountered with the processing and distribution of meat on such a large scale were apparent; this was also the case in Kafue (T Kalyocha, 1998).

Currently, ZAWA continues to allocate quotas for community-based cropping, which are seen as an integral component of community-based management programmes such as LIRDP, ADMADE and the Wetlands programme. Such schemes are intended to provide affordable supplies of game meat to rural communities living with wildlife as a direct tangible benefit. In addition, some schemes have tried to become more commercialized with the aim of generating significant incomes that would contribute towards community economic development in the area. Cropping occurs on the Kafue and Bangweulu wetlands, the Chiawa and Mumba GMAs, and in some GMAs located in the Luangwa Valley. Species cropped are the Kafue Lechwe (Kafue Flats), Black Lechwe (Bangweulu Flats), Impala (Chiawa, Mumbwa and Lupande GMAs) and hippo (Luangwa Valley). During 1997, a total of 1,567 animals were allocated for community-based cropping, with hippo (750), Impala (353), Black Lechwe (150) and Kafue Lechwe (130) being allocated in the largest numbers. Potential dressed game meat production during 1997 was about 515.7 mt. Cropping schemes in most areas are relatively small-scale with the exception of hippo in the Luangwa Valley (T Kalyocha, 1998; T Saiwana, 1998).

Walker (1991) reviewed the community-based cropping schemes in the Luangwa Valley and revealed that there was an enormous disparity in the equitable distribution of game meat. Those located near cropping operations received large quantities of meat which was usually traded externally in urban areas. In addition, traditional chiefs in the area exerted control over operations and distributed meat to favored individuals or villages in the area. Although progress in achieving more equitable distribution has been made in recent years, problems still occur (Kalyocha 1996). The greatest problem pertaining to the commercialization of game meat distributed from schemes is that of low prices. Prices are subsidized because most rural inhabitants cannot afford to pay more. Due to lucrative demand existing in the urban areas of the districts, most game meat from schemes is purchased and sold in these areas for commercial profit, usually by outsiders. During the cropping of 355 hippos during 1998, it was observed that 95% of buyers came from outside the area. Local chiefs purchased the remaining five percent. The majority of all meat was sold in urban areas where prices were lucrative at USD 1.25 per

kg for dry and USD 2.50 for fresh meat. The only real supply of meat directly to the rural community was as payment for processing the hippo meat which amounted to a total of 75 mt for 200 local employees. Local communities in general only received 34% of the total meat supplied with the remaining being taken and sold outside of the area (T Kalyocha, 1998).

As emphasized in Luangwa, community-based cropping for meat production and distribution has been difficult to manage, with the intended purpose of poverty alleviation for rural people living in the wildlife area not always achieved. In all cropping areas, people from urban areas have often been the primary beneficiaries, especially from schemes conducted in Kafue and Bangweulu areas because they are closer to the large markets in Zambia's capital city, Lusaka. Other problems faced in recent years have been the rising costs of undertaking cropping schemes, particularly the price of ammunition. During 1998, the cost of culling one lechwe in terms of staff time, transport, ammunition and processing was approximately ZMK 60,000. At subsidized low sales prices, total revenues earned were negligible and barely covered operating costs. Pope (1993) attributes the general lack of economic viability of these schemes to the excessive requirements and costs of staff time, inefficient handling resulting in meat deterioration and loss, uneven supply throughout the year, and a lack of earning potential through the processing and marketing of other products such as hides. The objective of providing affordable protein to rural communities and increasing revenue for community development has have in many cases been difficult to achieve (T Kalyocha, 1998).

Warthog.
Nina Marshall-TRAFFIC

In an effort to increase the efficiency of cropping exercises, reduce costs, improve product utilization and increase cash income for rural communities, ZAWA in the last few years has begun to contract private hunting companies to undertake cropping schemes. As wildlife belongs to the state and communities have no legal ownership of wildlife, contracts are signed between the company and the Wildlife Conservation Revolving Fund on behalf of communities. The amount of meat actually consumed by resident communities from private or ZAWA cropping schemes is uncertain but believed to be low because local residents sell game meat in urban areas where they get higher prices. Additionally, many private companies now prefer to sell the majority of game meat produced in urban areas for the same reason. Hence community-based cropping is increasingly seen as more of a commercial enterprise for cash generation than as a socially necessary activity for the subsidized distribution of meat at cost price (T Kalyocha, 1998).

Problem Animal Control:

In the past, problem animal control was the responsibility of the Game, Fisheries and Tsetse Control Department, the agency charged with wild animal management since its inception in the 1940s (Chabwela, 1986; T Kalyocha, 1998). Currently, ZAWA is responsible for this important activity. Due to low human population and cultivation densities over large parts of the country, most culling is localized and is carried out in the pockets of high agricultural production (where human population densities are high) such as in the Eastern and Central Plateau areas (Chabwela, 1986).

Problem animal control (PAC) culling is regulated under the *Zambia Wildlife Act No.12 of 1998*, which permits the culling of wildlife that is a threat to human life and property. The law empowers a citizen to cull any game or protected species in defence of lives or property, but states that any such incidences should be immediately reported to the nearest ZAWA office and the carcass of the animal surrendered. A review of ZAWA records of reported incidents in 1997 revealed that very few occur in reality. For larger species such as elephant and Cape Buffalo, ZAWA officers stationed nearby undertake the culling, and it is largely these instances that are reported in official records. For a twenty year period between 1973 and 1993, a total of 1,345 problem animals were officially recorded as culled, resulting in an average of 134 animals per year of which elephant (52%) and hippo (30%) constituted the most common species. Total meat supplied during the period under review was 1,442 mt at an average annual production of 72.1 mt, although official records are believed to under-represent the actual numbers of animals culled through PAC. Carcasses from PAC are distributed to local communities as a means of compensation and appeasement for damage caused which on the national scale provides a minor but locally important legal supply of game meat (T Kalyocha, 1998).

ZAWA Staff Rations:

Prior to 1993, quotas for the culling of animals for game meat supply as staff rations were provided by ZAWA. However, the system was widely abused with quotas exceeded and limited reporting. Together with an increasing workforce, this resulted in a considerable off-take of wildlife populations even in some cases from national parks. As a result, all staff ration quotas were suspended in 1993, and replaced with the provision of dry rations such as beans and fish. The move was unpopular among staff and expensive due to the high cost of procurement and distribution of alternative rations. Problems with inadequate supplies, late deliveries of dry rations and the distance of most ZAWA stations from trading centers has resulted in reports that wildlife is still being culled informally by ZAWA officers for meat rations (T Kalyocha, 1998).

Game Ranching and Farming:

The legal utilization of wildlife for game meat production in Zambia consists of the ranching of plains ungulates and the farming of crocodiles, where skin production is the primary activity with meat regarded as a by-product (T Kalyocha, 1998). Most commercial farmland is along the railway line, and it is in these areas that most of Zambia's game ranches occur (Attwell, 1992). Participation in wildlife use by the private sector, particularly commercial farmers, was facilitated by the *Game Ranches Statutory Instrument (1983)* on keeping wildlife in captivity, which extended limited custodianship to private landholders (Munyenyembe and Mubanga, 1990). The first ranch was established in 1979 which has progressively grown to about 18 ranches in 1994, and by 1997 a total of 24 ranches were operational. Approximately ten are in the establishment phase with numerous others expressing an interest to get into the business. These game ranches range from 196 ha to 24,000 ha in size (Chipungu and Kunda, 1994; T Kalyocha, 1998). For most ranches the initial stock has been resident animals supplemented by those translocated from other ranches or from Zambia's national parks. In order to encourage game ranching, ZAWA provided a price incentive for the purchase of animals for translocation from protected areas, which between 1991 and 1993 represented a cost of only 70% of the gazetted value of animals. As a result of such incentives, in the years 1991, 1992 and 1993, a total of 961, 627 and 94 animals respectively were translocated from Zambia's protected areas (T Saiwana, 1998).

Game ranchers in Zambia have formed a Wildlife Producers Association to represent their interests, but monitoring of the industry by ZAWA is almost non-existent because ranchers rarely submit annual

utilization returns to the Director of ZAWA, although they are legally required to do so (T Kalyocha, 1998). For example, a review of all national records at ZAWA revealed that one animal was cropped in 1993, 29 in 1994, 30 in 1995 and 26 in 1996. A total of 31 species are, however, officially recorded as being utilized on game ranches in Zambia. During 1996, population estimates of these species totaled 3,762 animals of which Impala (1,339), reedbuck (514), zebra (406), Waterbuck (386) and bushbuck (344) represented the most abundant species. Cape Buffalo are only available on one ranch due to the translocation of this species being prohibited for fear of spreading FMD disease to domestic livestock (T Kalyocha, 1998). Assuming a sustainable cropping quota of 10% of the estimated populations, the game ranching sector in Zambia could potentially produce about 39.2 mt of dressed game meat per annum, although these figures are believed to be an underestimate as game ranch wildlife population numbers are likely to be under-reported. In Zambia, game ranching largely involves the ecological cropping of excess animals to keep numbers within the carrying capacity of the land, and meat is the major product. Licensed hunting by resident citizens primarily for meat supply and increasingly by safari tourists for sport is also a popular activity undertaken on some ranches (Attwell, 1992).

Attempts at crocodile farming in Zambia date back to 1966 when the first crocodile hatchlings were collected from the Luangwa River. The first farm was established at Lake Tanganyika in 1979 and the second at Lake Kariba in 1981; stocks were established through the collection of wild eggs. Currently, there are seven commercial crocodile farms in the country, and although they still rely to some extent on egg collection from the wild, they are increasingly using their own breeding stocks (Attwell, 1992; T Kalyocha, 1998). There is a levy on eggs collected from the wild, and officially a percentage of the eggs hatched artificially have to be returned to the wild. Crocodile farming is mainly geared towards the production of skins, and meat is viewed as a by-product that in most cases is used as recycled crocodile feed. Between 1987 and 1993, a total of 23,417 Nile Crocodile skins were exported from Zambia representing an average annual export of 3,345 skins. Using the estimated amount of human consumable meat derived from a crocodile culled at an age for optimum skin production developed by Davies (1998) at 3.7 kg per animal, it can be estimated that approximately 12.4 mt of crocodile meat is made available per year in Zambia from farming. However, the vast majority of meat is not believed to be utilized for human consumption, although in the last year following a drop in world prices for crocodile skin, the value of meat as a by-product is likely to have increased in significance (T Kalyocha, 1998)

The major constraint that has affected the extent of game ranching/farming in Zambia for meat production was that the *National Parks and Wildlife Act of 1991* had not been amended to exempt landholders from paying supplementary game fees for game off-take on private or leasehold land. This constraint restricted serious investment in the sector, although the new *Zambia Wildlife Act of 1998* has been adequately amended and should result in the greater development of the industry in the future. However, game meat production on game ranches and farms for human consumption and sale is also subject to strict veterinary and health regulations before it can be marketed, which has further prohibited more extensive game meat sales and will continue to do so in the foreseeable future (Munyenyembe and Mubanga, 1990; Attwell, 1992; Chipungu and Kunda, 1994; T Kalyocha, 1998).

ii.) Illegal Utilization of Bush Meat

The illegal utilization of bush meat represents by far the greatest contribution of wild meat to both urban and rural communities in Zambia (T Kalyocha, 1998). Reliance on the bush meat resource is attributed to prevalence of tsetse and trypanosomiasis and low soil fertility (leading to limited livestock and agricultural production), and a preponderance of low-income and poverty stricken inhabitants (Marks, 1989a; Marks, 1994; Wilson, 1989; Davies, *et al.*, 1997).

The utilization of bush meat occurs throughout the rural and urban areas of the country and affects a wide range of bush meat species ranging from insects, rodents and birds to Cape Buffalo and elephant (T Kalyocha, 1998). Savanna woodland is a predominant habitat type in Zambia (NEAP, 1994; Chabwela, 1986) and is the source of many non-wood forest products. This habitat stretches through the lands of many different ethnic groups, and as such a wide variety of non-wood forest products are consumed and utilized by these people (Simasiku and Kalyocha, 1996; Duncan, 1996). The use of smaller fauna such as grasshoppers, crickets, beetles, larvae and termites originating from savanna woodland has been documented since the late 1940s, with the Luvale, Ndembu, Ushi, Bemba, Bisa and Tonga peoples relying extensively on this bush meat resource (Richards, 1939; White, 1959; Kay, 1964; Marks 1984). Caterpillars are an additional important source of protein for many communities with Whitby (1972) revealing that at least 12 species are commonly utilized. During the period 1969-1972, a food consumption survey undertaken by the National Food and Nutrition Programme confirmed that these ethnic groups obtained considerable benefits from the smaller bush meat species, and derived a significant contribution to their standard of living (NFNP, 1972).

Numerous species, both small and large, are utilized as bush meat in Zambia (Whitby, 1972; T Kalyocha, 1998). Larger animals are, however, preferred due to their sizable carcass weights and a preference for their meat. A review of law enforcement data provides an indication of the parameters and dynamics that affect the utilization and trade of bush meat within Zambia. Such data suggests that bush meat related illegal off-take is extensive, and some sociological studies have attempted to quantify the number of poachers in some communities (Marks, 1979). In the Luangwa Valley, Marks (1979) found that 21 out of 511 households hunted frequently and illegally. Using the rate of 0.04 (25 out of 511) to estimate the number of illegal hunters throughout GMAs in Zambia, it was calculated that there were a total of 5,589 bush meat hunters, although it is acknowledged that this was most certainly an underestimate (FAO, 1984). Since that time, the extent of illegal off-take is believed to have at least remained stable or increased since socio-economic conditions have deteriorated since the early 1980s.

A review of law enforcement data between 1977 and 1997 revealed that the number of arrests have remained stable over the period at about 1,500 per year (ZAWA Annual Reports). However, such data should be used with caution, as law enforcement effort is likely to have changed over the period under review, with the present capacity of the ZAWA at one of its lowest levels. This suggests that in real terms poaching may actually be increasing. Also, bush meat related law enforcement has not always been legally provided for, and indeed prior to 1991, bush meat was not considered to be a government trophy on its own. The legal definition of government trophies mentioned ivory, bones, hides, and other parts or derivatives but not meat. Possession of meat was, therefore, in the strict sense of the law, only illegal if it was attached to bones or represented as a carcass (T Kalyocha, 1998). However, internal reports indicate that bush meat off-take is on the increase, and is attributed to increased access to firearms, and rising costs of living, particularly the cost of livestock meat (Lewis, *et al.*, 1990).

Law enforcement data for the period under review also indicates that illegal off-take is undertaken by people from both rural and urban areas, with the Species Protection Department of the Anti-Corruption Commission finding the hunting and trade of bush meat to be occurring at significant levels in Lusaka, Marapodi, Mabndevu, Chiasa and Chipata urban areas during 1994 (Species Watch Newsletter, 1994). The most lucrative trading markets are indeed urban-based in the Copperbelt towns and Lusaka where the highest prices are realized. Wildlife areas, especially protected areas located close to these markets, are under considerable pressure from illegal bush meat off-take. In one such area, the Kafue National Park, current research suggests that trophy motivated poaching has decreased and has been largely replaced and exceeded by meat motivated hunting (T Kalyocha, 1998; T Saiwana, 1998).

Law enforcement data also provides useful insights into the seasonality of illegal hunting. In the past, hunting was mainly subsistence motivated and seasonal in nature, with rural hunters mainly hunting when there was little work on village farms during the long dry season (Marks, 1976). This was also reflected in law enforcement data for the period, but in more recent years hunting, as indicated by arrests, occurs throughout the year to a far greater extent (T DNPWS, 1998). This is attributed to the greater degree of urban-based illegal hunting that is motivated by the lucrative profits derived from trade, and a high consumer demand throughout the year that drives a more constant supply. Hunting methods have likewise changed in recent years due to the increase in commerce surrounding the bush meat resource. An increase in the use of more sophisticated and efficient hunting methods is apparent from data on weapons seized, a fact also reflected in parallel sociological research that tracks the emergence of these hunting weapons (Lewis, 1994, Munyenyembe, 1997; T Saiwana, 1998). The number of muzzle loading firearms and more sophisticated semi-automatic weapons seized has increased over the years, and over 5,500 wires snares were seized in 1996 alone (T DNPWS, 1998).

Past research relating to the utilization of bush meat in Zambia has been directed at protected areas such as the Kafue and Bangeweulu wetlands and the Luangwa Valley, all areas where illegal bush meat off-take from wildlife populations is reported to be significant (Mwenya, 1989; Sorensen, 1993; Jeffrey, 1991). This research provides a more detailed indication of the importance of the bush meat resource, and more importantly on how the dynamics and parameters affecting this use has changed over the years from a purely subsistence and largely sustainable activity to one that is becoming increasingly trade orientated and unsustainable (Marks, 1973; 1976; 1977b; 1979b; 1989a; 1994; 1996; Ajayi, 1990; Larsen, *et al.*, 1985; Bell, *et al.*, 1992, Jachmann, 1997; Lewis and Phiri, 1996). While the Luangwa Valley is characterized as having a large wildlife resource base, it also has relatively low human population densities because of its heat, low soil fertility, and the existence of tsetse and trypanosomiasis (Dalal Clayton, 1988). However, in recent years human populations have begun to expand and this has increased the level of conflict between wildlife and human activities. Antagonism has further increased due to the conservation laws which restrict access and use of the wildlife resource in the Valley. Cropping schemes for the distribution of meat, which during the period 1962 to 1970 resulted in the supply of 1,071 mt of meat from elephant, hippo and Cape Buffalo, have achieved little to change rural communities' negative attitudes to wildlife (T Kalyocha, 1998).

During the 1970s standards of living deteriorated and poverty levels increased in the Valley, reflecting a general national decline in the performance of the economy. Consequently rural communities turned to the illegal use of wildlife resources, which between 1970 and 1989 led to a severe decline in elephant and rhino populations. For example, elephants in the South Luangwa National Park in 1970 numbered 100,000, but fell to less than 17,000 in 1989 (LIRDP, 1996) and Black Rhino were virtually exterminated. Such declines were largely due to trophy poaching, yet similar declines were evident among a wide variety of ungulate species because of bush meat poaching (T Kalyocha, 1998). The initiation of the LIRDP began the process of trying to involve the participation of communities in wildlife management through the greater devolution of wildlife benefits, which included the provision of meat and revenues from such activities as safari hunting. However, progress to date on reducing illegal hunting has been mainly directed at trophy poaching and has largely been achieved through intelligence/informer network activities (Jachmann, 1997). Hence bush meat motivated hunting has largely continued unabated and has overtaken trophy hunting by many times in terms of its overall impact on the wildlife resource (T Kalyocha, 1998).

As the socio-economic level and standards of living of communities continue to decline, illegal off-take of animals for subsistence consumption and trade have continued to play an increasing role in communities' day-to-day lives (Dalal Clayton, 1984; Kalyocha, 1996). Illegal use of the bush meat

resource is currently an important coping strategy for Luangwa Valley inhabitants, in response to increasingly deteriorating socio-economic conditions and food insecurity. A survey of living conditions conducted in the Valley revealed that inhabitants relied heavily on the bush meat resource especially during times of increased economic hardship (CSO, 1997). Changing views of bush meat initially being regarded as a purely subsistence motivated activity, to one involving commerce, have been evident in the Valley ever since the advent of colonial rule, although in recent years the extent of trade has increased dramatically. Although still prevalent today, the traditional and social dynamics associated with bush meat use are believed to have diminished in importance alongside the emergence of a greater trading dynamic (T Kalyocha, 1997).

In the past, the Bisa peoples of the Valley exhibited considerable selectivity regarding species preference and prey selection (Marks, 1973), which involved strict adherence to totems and taboos, and as well as to other cultural factors such as certain colors of animals (i.e. black) being associated with witchcraft. Therefore, in the past colored species such as zebra were not hunted (Dodds, *et al.*, 1968). Zebra and hippo were the major taboo species and to this day these species maintain the largest population numbers in the Valley, although in recent years they have been hunted in greater numbers indicating a decrease in the importance of taboos/totems and other traditional management systems (T Kalyocha, 1998). External economic factors have resulted in the Valley inhabitants entering into commercial trade of bush meat with outsiders where high prices and lucrative profits have motivated the emergence of large-scale trading (Dodds, *et al.*, 1968; Marks, 1977a; T Kalyocha, 1998). This process has been occurring since the 1970s where the increased access of outsiders by way of improved transport and roads within the Valley prompted greater trading relationships with the Valley's inhabitants and the emergence of a more cash orientated economy (Marks, 1973; Marks, 1977a). Rural hunters began to feel a need for cash profits, and bush meat was one of the few resources available that could be sold for profit. The result was an increasing use of sophisticated weapons brought in from outside, such as wire snaring and firearms, and notable decreases in Cape Buffalo populations, which were the preferred species (Marks, 1979b). The increased external demand for bush meat beyond the local needs changed the social, traditional and cultural dynamics of hunting within the Valley which previously was well regulated through traditions, beliefs and traditional authority management systems (Marks, 1973). With the advent of externally motivated trade this changed and communities began to utilize the bush meat resource unsustainably (Jachmann, 1997).

Prey selection in recent years by local community illegal hunters has also changed because of market influences. (Gibson, *et al.*, 1995; T Kalyocha, 1997). In the past, according to Marks (1973, 1977a, 1979b, 1989a), the Kunda and Bisa peoples of the Valley predominantly relied on Cape Buffalo, bushbuck and Impala for meat supply. Cape Buffalo was by far the most hunted species (39% of Bisa kills in the Valley) due to greater quantities of meat derived from each carcass (Marks, 1973; Marks 1977b; Steir, 1970). Smaller species were hunted less because muzzleloaders and expensive ammunition often did not justify the shooting of small species such as duiker, which would yield only a few kilograms of meat. With the increasing externally motivated trade of bush meat, use of sophisticated weapons (wire snares and semi-automatic weapons) has increased and is beginning to replace the use of muzzleloader guns. Unsustainable off-take from the increased use of these weapons has been documented, as well as the decline of ungulate species (Marks, 1982; 1996; Jachmann and Kalyocha, 1994; Jachmann, 1997, LIRDP 1997). Furthermore, the gender selection of the most preferred species, the Cape Buffalo, has changed with Marks (1977) finding that male Cape Buffalo were targetted in the past, even though females were preferred due to their higher fat deposits. The reason for such selection was that the use of muzzleloaders and reduced range allowed hunters to shoot Cape Buffaloes on the edge of a herd, which in most cases were males protecting females in the center of the herd. With the

advent of commercial trade and the greater use of semi-automatic weapons and rifles, the range of firearms increased allowing hunters to target the preferred females, resulting in the increased unsustainability of illegal bush meat hunting (Gibson, *et al.*, 1995; Kalyocha, 1996).

Species previously regarded as taboo, such as the hippo and zebra, are now utilized in comparable numbers with the more traditionally utilized species (T Kalyocha, 1998). This is confirmed by seizure data for bush meat offenses that shows an increase in hippo and zebra seizures for the period 1990 to 1997 (LIRDP, 1997). Such changes in species selection are believed to be trade motivated and as other ungulate numbers declined, the greater abundance of zebra and hippo and hence easier catch per effort rates for these larger species has resulted in trade and subsistence motivated hunters being less restricted by traditional management systems. This changing trend is also confirmed by the fact that hippo cropping schemes in recent years in the Valley have been characterized by a general acceptance by most communities of consuming hippo meat, where in the past they would have most likely abstained (T Kalyocha, 1998).

Overall, in recent years there has been an increase in trade motivated commercial bush meat poaching by the Valley residents, which is reflected in law enforcement data for the area. During 1996, the greatest number of bush meat related encounters were recorded during patrols (Kalyocha, 1996). Trophy poaching has been reduced (Gibson, *et al.*, 1995; Jachmann, 1997) but has been replaced by trade motivated bush meat hunting (Kalyocha, 1996). Increased law enforcement has not affected the level of bush meat off-take. In a study of the bush meat off-take rates from five illegal hunters during the period 1988 to 1993, Gibson *et al.* (1995) found that that quantities hunted and utilized had increased over the period under review with an average of 1.2 mt hunted per year between 1988 and 1990, and an increase to 1.9 mt between the years 1990 to 1993. Further research in 1995 confirmed the extensive levels of unsustainable wildlife off-take. Annually it was estimated that 750 residents in the Valley snared more than 2,000 Impalas and 400 animals of other species, mainly Puku, warthog, Waterbuck and Cape Buffalo. With an average value of USD 9.00 per carcass (1995 prices) for Impala alone, the estimated contribution through trade to each household was USD 130 per year, which represents almost 26% of average household incomes in the area. This is a considerable enticement for undertaking illegal bush meat hunting through wire snaring for trade (Lewis and Phiri, 1996). This level of bush meat motivated off-take is believed to be indicative of many areas within the Valley, and is reflected in LIRDP law enforcement data. The vast majority of illegal bush meat hunting emanates from both within and outside of the Valley, with certain areas such as Chipata, Petauke and Lundazi having the highest arrest rates due to these areas being located close to the main lucrative bush meat markets which occur in district urban centers and along the main Chipata to Lusaka highway (Lewis and Phiri, 1990; Jachmann, 1997).

The Luangwa Valley, although having one of the richest wildlife resource bases within the country, is likely to be indicative of many other areas in that illegal hunting is increasingly motivated by trade, is widespread, and is currently the key factor influencing wildlife population levels (Kalyocha, 1996; Lewis and Phiri, 1996, T Kalyocha, 1998). An increasing trade dynamic and importance associated with the resource has resulted in the emergence of many unsustainable hunting dynamics such as a decrease in the importance of taboo and totem restriction on species selection and the increased use of more sophisticated and efficient hunting weapons (Gibson, *et al.*, 1995; T Kalyocha, 1998). Law enforcement throughout the country is generally still directed at trophy poaching. Additionally, the levels of acquittals for convicted poachers are low resulting in law enforcement acting as a limited deterrent. For example, during the period 1983 to 1997, of an average of 1,500 arrests made nationally within Zambia, only 963 (64%) were actually convicted in a court of law and even in these cases fines and prison sentences are reported to be low, due to a general perception by the judiciary that all bush meat related offences are purely subsistence motivated (T DNPWS, 1998; T Kalyocha, 1998).

Table 21

Dynamics of bush meat utilization and trade in selected urban and rural survey areas of Zambia during 1997

Survey Area:	Rural Area Luangwa Valley			Urban Area
	Alluvial Zone	Intermediate Zone	Plateau Zone	Lusaka City
Species Utilized:	18 species, 78% large, 22% small			21 species, 76% large, 24% small
Proportion of Users:	Majority			Majority
Quantities Utilized:	Hhld/yr. 163 kg Capita/yr. 27 kg	Hhld/yr. 442 kg Capita/yr. 73 kg	Hhld/yr. 56 kg Capita/yr. 9 kg	-
Bush Meat Most Important Meat:	Yes	Yes	Yes	Yes
Demand: Cheaper Prefer Taste Available Habit	8.3% 70% 10% 11.7%			Prefer Taste
Price of Bush Meat (BM) verses Domestic Meat (DM):	BM USD 1.32 DM USD 1.27 DM 3.9% cheaper	BM USD 1.48 DM USD 1.5 BM 1.2% cheaper	BM USD 3.00 DM USD 1.9 DM 57.9% cheaper	BM USD 2.45 DM USD 1.9 DM 28.9% cheaper
Supply: Trade: Subsistence:	70% 30%			80% 20%
Main Customers:	Lower income	Lower income	High income	High income
Conservation Implications:	1) high urban and rural demand; 2) demand based on taste; 3) lucrative prices and profits; 4) substantially trade motivated; 5) declining wildlife populations in some areas; 6) increased use of more efficient hunting techniques; 7) reduction in traditional hunting seasons; 8) current use of traditionally taboo species.			

Note: Small bush meat species categorized as those having dressed carcass weight of under 5 kg; Hhld. = Household; DM = Domestic Meat; BM = Bush Meat.
Source: TRAFFIC survey data, 1998.

Limited law enforcement, high demand and reliance on bush meat by many people throughout the urban and rural areas of Zambia have resulted in significant levels of use. This has been exacerbated by the generally low-income and high poverty levels experienced by most rural and urban communities and the increasing levels of unemployment. The importance, extent, as well as the variety of areas, people and species that the utilization and trade of bush meat affects is reflected in research conducted during 1997 in the urban area of Lusaka, and in three rural survey areas in the Luangwa Valley. A summary of the parameters and dynamics of the trade and utilization of bush meat in these urban and rural survey areas is provided in Table 21.

Importance of Bush Meat Utilization:

Research conducted during 1997 by TRAFFIC confirmed that the utilization and trade of bush meat continues to represent a substantial industry, and is likely to be indicative of many urban and rural areas throughout the country. The importance of bush meat and its high demand in survey areas is mainly due to the current status of the economy that, although improving, is still characterized by high unemployment levels, low-incomes and a high degree of poverty. Reliance on natural resources in general and on bush meat in particular is increasingly becoming an important coping strategy in dealing with these prevailing conditions.

The three rural survey areas of the Luangwa Valley represented different habitat, ethnicity, socio-economic levels and wildlife resources. They consisted of the "Alluvial" zone which was a rural, isolated and poor area but with a good wildlife resource base located near to the SNLP protected area, the "Plateau" zone with high human population densities, greater wealth, but a reduced wildlife resource base and an area with urban characteristics, and the "Intermediate" zone located between the Alluvial and Plateau zone which is located in the Lupande GMA, which has a good wildlife resource base in addition to greater incomes from agriculture than the Alluvial zone but still less than the Plateau zone. One unifying factor, however, between these rural survey areas, was that a large majority of inhabitants were involved with the utilization of bush meat (T Kalyocha, 1998).

In the three survey areas, the majority of inhabitants utilize bush meat through hunting, trade and consumption. Quantities utilized are large in all areas due to the relative abundance of the wildlife resource in the Luangwa Valley. Quantities of bush meat derived from hunting were more substantial in the Alluvial and Intermediate survey areas where wildlife is locally more available, than in the Plateau survey area. Due to a large trade motivation, hunters primarily target the larger species, and during 1997 the estimated number of 575 hunters in the Alluvial zone hunted about 2,245 mt (Cape Buffalo), 569 mt (warthog), and 453.4 mt (Impala) representing a total annual off-take of 3,267 mt, accounting for over 35,000 animals. Such high quantities are motivated by the emergence of a trading dynamic, and are reflected in all three survey areas, although quantities utilized in the higher human density area of the Plateau are considerably less (T Kalyocha, 1998).

Consumption of bush meat is an integral activity for the majority of the survey area inhabitants and quantities used are substantial. In the Alluvial zone area quantities of 163 kg dressed meat are consumed per household (27 kg per capita) during the year, which rises significantly to 442 kg per household (73 kg per capita) per year in the Intermediate zone survey area. In the Plateau area bush meat consumption rates are the lowest at 56 kg per household per annum (9 kg per capita) and are mainly due to the higher costs of bush meat in this area and less local availability. Such quantities consumed by the inhabitants of the rural survey areas are substantial and could represent one of the highest in Zambia, due to the Luangwa Valley being renowned for its extensive wildlife resource base. Quantities per capita consumed in the Alluvial zone and Intermediate zone survey areas at 27 kg and 73 kg per capita are in excess of the FAO recommended meat consumption rates of 22 kg per capita per annum, and confirm the vital role that bush meat plays in providing meat protein to communities and in maintaining their nutritional and food security status. Such large quantities consumed are comparable to other studies (Marks, 1989) for the Bisa people of the Valley during 1966-67 where it was found that 91.5 kg of bush meat was consumed per capita per year (T Kalyocha, 1998).

All hunting of larger species in the survey areas of the Valley is undertaken by males (100%) confirming Marks' (1979a) findings that hunting is a male dominated activity. Gathering of the smaller species such as insects and birds was undertaken by a larger majority of females (69%), suggesting that male hunters do not regard this form of bush meat collection as an activity that they should partake in. Although the utilization of bush meat was undertaken primarily by certain ethnic groups in each of the rural survey areas such as the Kunda in the Alluvial zone and the Chewa in the Intermediate zone, in all areas and especially the Plateau zone a considerable number of ethnic groups (including the Nsenga, Tumbuka, and Ngoni) were actively involved in the hunting, trading and consumption of bush meat. Hence benefits obtained from the bush meat resource are not seen to be the sole preserve of certain tribes, but are enjoyed by all to differing degrees. Bush meat user respondents represented a range of ethnic groups and socio-economic levels, indicating how widely appreciated the bush meat resource is among the different peoples of the area, and that it is not restricted to the rural poor. This is also reflected in the main occupations and livelihoods of bush meat users which were: farmers (30%); formally employed (8%); fishermen (7%); informally employed such as through handicraft and beer

production (9%); and unemployed (3%). The diverse range of livelihoods and the low proportion of unemployed indicates that a wide variety of people with varying socio-economic backgrounds utilize bush meat in the survey areas.

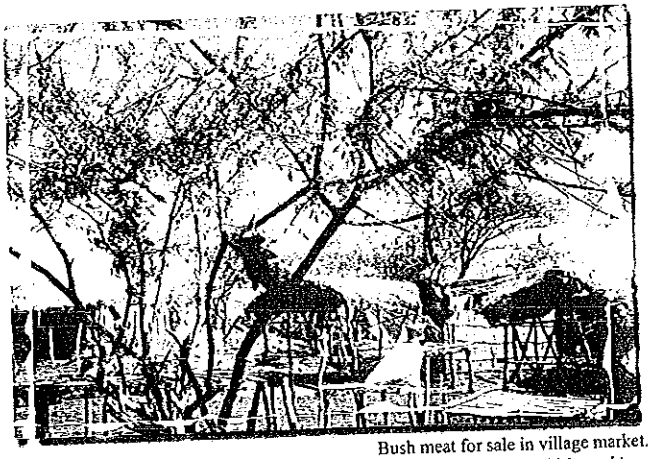
Within the urban survey area of Lusaka a similar high demand and usage was found. Bush meat obtained mainly through purchase was observed in 24 compounds and informal markets throughout the city, where its higher costs suggest that economic considerations are less significant and may be overridden by a preference for bush meat. Estimates of the extent of bush meat traded in these urban areas are high, and reflect the importance of the trade as an urban industry and the role that it plays in driving increased supply from rural areas. In Lusaka, approximately 33,762 Impala and 3,000 Cape Buffalo were estimated to be traded each year, and 29,792 Impala and 2,613 Cape Buffalo in the Copperbelt urban areas (Davies, *et al.*, 1997; T DNPWS, 1998). Such large quantities are however believed to be an underestimate, but do confirm that trade is extensive and affects many people through generation of cash income. Consumption of bush meat is undertaken by many urban residents and forms an integral part of life as it is consumed on average three times per month (T Saiwana, 1998).

Bush Meat Demand:

The overriding factor affecting the demand for bush meat in Zambia in both rural and urban areas is that it is preferred for its taste and quality over domestic meats. In the rural survey areas of the Luangwa Valley, the vast majority (70%) of hunters, traders, and consumers reported a preference for bush meat due to its good taste and tenderness, with a lesser amount (18.3%) indicating its use because of cheapness and the unavailability of domestic meats in the rural areas. Reasons such as traditional habit were also important for 11.7% of all respondents. Such demand dynamics are reflected in the urban survey areas where meat is viewed as a superior tasting product. Due to this and a high market demand, bush meat is generally more expensive than domestic meat especially in urban areas, although in some rural areas it is comparable or slightly lower in cost. Hence the economic savings in consuming bush meat do not usually constitute the major reason for consumption except in those rural areas where domestic meat is largely unavailable because of tsetse fly, and is therefore generally more expensive. With increasing human populations and a decreasing standard of living, bush meat demand has increased in recent years as shown in the rural survey areas where 58% of respondents indicated a marked increase (T Kalyocha, 1998; T DNPWS, 1998).

Bush Meat Species Utilized:

The species most traded and utilized in the largest quantities in both the rural and urban areas are the larger species indicating that the supply of bush meat is still relatively available for these species. Clearly, the high demand experienced within the country has not as yet resulted in a decline of the more favored species, and traders and hunters have not yet had to resort to a wider variety of species (T Kalyocha, 1998; T Saiwana, 1998).



Bush meat for sale in village market.
IUCN Mozambique

In the rural survey areas of the Luangwa Valley, a total of 18 species were utilized during 1997 of which the majority were defined as larger ungulate species (77.8%). The species hunted in the largest quantities were Impala (23%), Cape Buffalo (16.6%), warthog (13.5%), Puku (7.7%), zebra (7.4%) and kudu (4.6%). Additional species in order of importance were Eland, Waterbuck, bushbuck, hippo, wildebeest, and hartebeest. Throughout the rural survey areas, the same trend in the species composition of animals hunted, traded and consumed is generally evident suggesting that there is a high level of heterogeneity in species utilized. There is a general commonality in the popularity of species with the Impala, Cape Buffalo and warthog being the most frequently traded and consumed, and this is similar to the findings of Marks (1973, 1976, 1977b) and Steir (1970). Although the most utilized species are similar throughout the survey areas, the number of species available in the higher human density Plateau (14 species) and Intermediate survey areas (10 species) is significantly less, and the number of species that can be categorized as small is higher, than that found in the richer wildlife area of the Alluvial survey area. As such, local bush meat availability in the higher human density areas is less and more focused on species that have been able to adapt to the modified and cultivated habitats. Impala, warthog and Cape Buffalo species which are less available in these survey areas are still, however, supplied in the largest quantities which reflects the dynamic of a substantial inter-district trade occurring from wildlife-rich to wildlife-poor districts (T Kalyocha, 1998).

Although the species utilized are primarily the larger ones, a trend in identifying new sources of bush meat that previously were restricted by taboo or totem beliefs is becoming evident. Hippo and zebra were previously reported not to be hunted for these reasons, but current research showed zebra to be the fifth most utilized species and hippo ranked tenth. Presently and in marked difference to the past, zebra and hippo are hunted, traded and consumed by the rural communities in the survey areas without any problem. This is due to the commercialization of bush meat use and increased demand which has resulted in traditionally non-edible species being utilized. Furthermore, even animals that are under considerable protection in the area such as the elephant, formerly hunted primarily for its ivory, are coming under considerable pressure for their meat with all survey areas recording the illegal trade in the meat of this species. Although the dynamic of identifying new sources of bush meat from a larger variety of smaller species has not yet emerged, it is clear that reductions in overall availability have resulted in an increase in the number of larger species currently utilized (T Kalyocha, 1998).

In the urban survey areas of Lusaka, larger bush meat species are mainly sold in dry form in bundles of usually two kilograms. Most meat is sold dry due to the long distance from the rural supply areas to the urban markets. Although dry meat sells at prices lower than fresh meat, lack of refrigeration necessitates the need to trade primarily in dry bush meat. Of the 21 species traded in the urban areas, the vast majority were larger ungulate species (76%) with only a few smaller species such as dried caterpillars and rodents identified as being sold in formal markets (T Saiwana, 1998). Preferences as with rural areas for bush meat are mainly focused on the larger species such as Cape Buffalo, warthog and Impala, although a slightly greater number of species are available than seen in rural survey areas due to high demand and profits, enticing the supply of bush meat from all over the country.

Bush Meat Trade:

The vast majority of trade that occurs within the rural Luangwa Valley and urban Lusaka survey area is illegal. Traders almost never have the trading permits issued by ZAWA as legislated for and, in the rural areas, only 8% of hunters have legal game hunting District or National licenses, as opposed to 92% who hunted without licenses and illegally. Even those few hunters in the Luangwa Valley survey areas who did have licenses indicated a general tendency to overshoot allocated quotas. Hence, nearly all use of wild meat in the urban and rural survey areas can be classified as illegal (T Kalyocha, 1998; T

Saiwana, 1998). In the rural survey areas of the Luangwa Valley, trade for cash profit is the main motivation for hunting (50% of hunters), followed by trade through exchange and barter (20%) with only 30% of hunters motivated for subsistence consumption (T Kalyocha, 1998). In Lusaka, the vast majority of meat is purchased through trade (80%) although some hunting by urban residents does occur (20%) and usually involves the illegal use of National hunting licenses (T Saiwana, 1998).

In the Luangwa rural areas, trade is mainly undertaken within the districts, although there were cases when a more externally motivated trade was conducted with trucks, buses and other vehicles on the Chipata to Lusaka highway. In general, however, the survey failed to capture this trade with all traders identified as operating within the rural and urban areas of the districts. All bush meat traders were based in the survey areas, with none originating from outside of the district suggesting that although externally motivated trading was reported to occur, a localized and self sufficient trading dynamic has also emerged. The majority of traders were male (66%) with a lesser but still significant amount of trade undertaken by women (34%). Men generally trade in the larger ungulate species that derive directly from their own hunting, and likewise women traders sell the smaller species such as insects and birds that they themselves have gathered.

Traders primarily obtain the bush meat they trade directly through hunting and gathering (63%), although the existence of trader middlemen is high within the survey areas with 31% of traders purchasing their bush meat supplies from hunters for eventual resale. Cash exchange is the main method used by these traders in purchasing their bush meat supplies from hunters, with barter occurring to a limited extent (6%), indicating that bush meat in the area is a high-value product with hunters preferring payment in cash. The emergence of bush meat as a valued product and the associated increase in the trading dynamic is also reflected in bush meat buyers and consumers bartering (21%) to a limited extent to obtain bush meat. In addition, obtaining bush meat for free through gifts from extended relatives and friends which used to be an important traditional support mechanism is of less importance in the survey areas, reinforcing the view that many hunters are no longer willing to give bush meat away for free when it is such a high-value product (T Kalyocha, 1998).

The trading mechanisms employed can be generally defined as being undertaken very secretively and in an underground manner. The majority of meat in rural areas is sold fresh to trusted customers at night, and in some cases during the day through door to door sales, although this method is associated with greater chance of apprehension (T Kalyocha, 1998). Other risky methods of sale also occur and account for a good proportion of all meat traded. These include the sale of bush meat in more urbanized areas where other consumable products such as dry fish are used to cover any bush meat sales. Potential customers are reviewed from a security perspective, and when satisfied, the bush meat trader will either make a sign as if chewing meat or whisper the word "*dinghi*" which is the slang name for bush meat. This type of trade mechanism is also employed on the Chipata to Lusaka highway where bush meat is sold to consumers passing by where they are attracted to stop by traders showing signs of eating or chewing meat. The fear of being caught by law enforcement officers is in all cases the overriding factor influencing the mode and methods of selling bush meat. In some cases, those with licenses will use the legal cover to sell illegally obtained bush meat, and will tend to sell openly to the public in more urbanized areas of the Valley that include in restaurants, markets and from the back of vehicles (T Kalyocha, 1998).

In the urban survey area of Lusaka, trade in the larger ungulate species is also undertaken in a secretive manner with most being undertaken from traders' houses to trusted customers in the many shanty compounds that are prevalent in the urban areas. Smaller species such as birds, rodents and especially insects during the rainy season are sold more openly in the markets of the urban areas due to a general feeling among traders and law enforcement personnel that such trade is legal (T Saiwana, 1998).

The prices of bush meat throughout the country are relatively high, but are affected significantly by the areas of trade and especially whether the market is urban or rural. In the rural survey areas of the Luangwa Valley, prices differentiated between the three survey areas according to the relative abundance of the resource in the local area and according to the socio-economic status of residents. In the Alluvial survey area where the bush meat resource is more available, the price for dry bush meat per kilogram regardless of species was ZMK 2,125. Prices in the more densely human populated Intermediate and Plateau survey areas which were characterized by a smaller bush meat resource base and higher household wealth were higher at ZMK 2,375 and ZMK 4,875 per kg of dried bush meat, respectively. The Plateau survey area with the highest human population densities, smallest bush meat resource base and highest household income had the most expensive bush meat prices. The cost of bush meat in comparison to alternative meat sources in the three survey areas varied. In the Alluvial zone the price of bush meat was slightly more expensive (4.1%) on a kilogram basis to the average cost of chicken, fish, beef, pork and goat (ZMK 2,040 per kg). The same trend was evident in the Intermediate survey area with the price of bush meat similar to alternative meats (ZMK 2,440 per kg) but slightly cheaper (2.7%). In the Plateau survey area, bush meat was considerably more expensive than alternative meats (ZMK 3,040 per kg) by as much as 60.4%.

As such, higher income levels and reduced availability of wildlife in the Plateau area result in bush meat being purchased at prices much higher than alternative meats, and reflect the demand dynamic found in more urbanized areas where bush meat is regarded as a superior but more expensive product to other meats. In the more rural and remote Alluvial survey area in Luangwa, bush meat costs are similar to the average costs of alternative meats but are less expensive than the more costly meats such as beef (ZMK 4,000 per kg). Hence in some cases cheapness of bush meat may be a motivating factor, but in general there are cheaper available protein alternatives such as fish (ZMK 2,000 per kg). As a result rural hunters could be motivated to trade in hunted supplies of bush meat and generate cash income that could then be used to purchase cheaper sources of protein such as fish. In general, demand is likely to result in more bush meat being traded from rural supply areas than is consumed for subsistence (T Kalyocha, 1998).

Larger bush meat species obtain higher prices than smaller species in both the rural and urban survey areas (T Kalyocha, 1998; T Saiwana, 1998). However, the overall value of bush meat in urbanized Lusaka is generally higher, and entices supplies of bush meat from rural areas all over Zambia. Sales of dry meat prevail, with fresh meat traded in much smaller quantities. The price for dry meat regardless of species is ZMK 3,923 per kg, with fresh meat obtaining nearly double the price at ZMK 7,345 per kg. Prices for the larger species are higher. For example, dry Cape Buffalo meat is ZMK 5,000 per kg in contrast to Common Duiker at ZMK 1,500; this is believed to reflect the greater popularity of larger species, and the fact that there is a greater supply of smaller species such as Common Duiker from the more local areas surrounding Lusaka (T Saiwana, 1998).

The trade in bush meat represents a lucrative business with many people obtaining their sole income or additional incomes through the sale of bush meat in rural and urban areas. In the rural survey areas of the Luangwa Valley, traders obtained profit margins in the region of 25%, which considering the quantities of bush meat traded results in significant incomes that can be far greater than that achieved through more formal employment opportunities (T Kalyocha, 1998).

Conservation Implication of the Bush Meat Utilization and Trade:

The extensive level of trade motivated bush meat hunting that has emerged in recent years in Zambia has significant implications for conservation. Substantial quantities of wildlife are believed to be

hunted to supply both rural and urban markets. The lucrative nature of the trade is based upon the high price structure of many urban markets. This has motivated many hunters to try and obtain large quantities of bush meat throughout the year (T Kalyocha, 1998; T Saiwana, 1998).

In the past when hunting was mainly for subsistence, traditional hunting seasons were observed. In recent years, this has changed. In the rural survey areas of the Luangwa Valley, a significant proportion of bush meat from all utilized species is hunted, traded and consumed throughout the year (41%). This contrasts sharply to those utilizing during the traditional dry period hunting seasons (59%). Although this is still the most intensive hunting season, it is nowhere near the levels reported by Marks (1973) in the early 1970s. The result has been the hunting of animals during breeding seasons, and the erosion of wildlife population recovery periods. The likelihood of unsustainable off-take rates has increased, as has the inability of populations to withstand current levels of bush meat use and to sustain viable population levels. Hunters in the Luangwa rural survey areas also revealed that a considerable amount of hunting occurs in protected areas with 26% obtaining bush meat from national parks. Hence bush meat utilization is likely to be having a considerable impact on the status of wildlife populations both outside protected areas and within the GMAs and national parks of the Luangwa Valley (T Kalyocha, 1998).

The increased trade and utilization of bush meat in the rural survey areas has resulted in a decline in wildlife populations, with the majority of hunters indicating a decrease in wildlife populations (68%) which was especially apparent in the high human density Plateau survey area. This is reflected in a reduction in the efficiency of hunters catch per effort. In 1977, the catch per effort of hunters was reported by Marks (1977a) to be one large animal for every ten hours of hunting effort. During the current study in 1997, it was found that even in the more wildlife-rich Alluvial survey area approximately 22 hours of hunting effort were required to catch one large animal and involved travelling distances of up to 15 km. Catch per effort rates have decreased even more in the Plateau survey area where distances travelled by hunters in search of large prey is much greater at up to 60 km and involves a time commitment of up to 60 hours. This indicates that wildlife availability has been affected, leading to the hunting of species such as hippo and zebra that in the past were not utilized (T Kalyocha, 1998). Increased bush meat trade has also resulted in the greater use of more efficient and unsustainable hunting weapons in the Luangwa Valley, with muzzleloader firearms (25%) and wire snares (24%) now constituting the main hunting weapons in contrast to only 9% of hunters who still use more traditional weapons such as bow and arrows and traditional traps. Increased use of such weapons, and of semi-automatic rifles more generally throughout the Valley has resulted in greater unsustainable hunting of less targeted species, and killing more animals than required (Kalyocha, 1996; Gibson, *et al.* 1995). Also noteworthy is the targeting of female animals with rifles (Marks, 1979a; Lewis and Phiri, 1996; T Kalyocha, 1998).

An increasing demand for bush meat in both the rural and urban areas has resulted in an increase in the prices of bush meat in recent years, suggesting that demand is out-performing supply for the resource. In the rural survey areas of the Luangwa, 63% of respondents indicated substantial increases in the price of bush meat above the standard cost of living. Such increases in cost of bush meat are not likely to make any significant impact on reducing demand which is based primarily on a preference for the taste of bush meat and not generally on economic considerations. Hence demand is likely to continue increasing due to the popularity of bush meat as a superior product. Increasing prices will in addition motivate hunters and traders to continue supply from a declining resource, even as catch per effort indices reduce. The use of more efficient and, in the case of wire snares, wasteful hunting techniques, and the erosion of hunting seasons, can only lead to a further decline in the bush meat resource base. This will have considerable development and conservation implications (T Kalyocha, 1998; T Saiwana, 1998).

IV. SUMMARY/CONCLUSION

Wild meat utilization in Zambia performs a critical role in maintaining both rural and urban standards of living in a country that is currently going through major macro-economic policy changes. Although progress in re-structuring the economy is evident, the country is still characterized by high unemployment, low-income and widespread poverty. In response, a major coping strategy has evolved which relies extensively on the natural resource base. Low agricultural and livestock production capacity over large areas of the country have exacerbated this situation in many rural areas, with wild meat being the only viable and available source of protein and opportunity for cash generation.

Government policy has always recognized the important role that wildlife plays in the provision of meat to the inhabitants of the country, and currently the game meat industry provides a potential 987 mt of game meat per annum at a value of USD 1,961,600. This represents a significant contribution towards achieving the national objectives of increasing government revenues and alleviating poverty and food insecurity. The importance of such quantities and revenues potentially produced is, however, mainly manifested in the community cropping and culling schemes undertaken by community-based programmes such as LIRDP, ADMADE and the Wetlands initiatives. Although legal supply of game meat from such sources plays a critical role in providing protein, it is generally restricted to certain areas of the country, and problems with equitable distribution and the increasing commercialization of such schemes have reduced its overall impact. Other legal game meat production sectors such as game ranching/farming, are likewise operating at levels below their potential. In addition, citizen and non-resident hunting licenses have been reduced in both number and species allocated with the result that fewer inhabitants have access to affordable game meat supplies.

Although legal game meat supply through licensed hunting and community cropping schemes provides considerable quantities of game meat, it has not made any considerable impact on reducing illegal bush meat off-take which still represents by far the greatest supply of wild meat within the country. The effect on wildlife populations is believed to be substantial, and is motivated in part through the need of communities for cheap protein sources, but mainly through a general perception that bush meat is a superior product. Increasing prices of bush meat above the cost of alternative domestic meats is not likely to have considerable impact on reducing off-take. The resulting conservation and development implications of such a quality-motivated demand are considerable, and are likely to result in bush meat motivated illegal hunting continuing to have a major impact on wildlife populations within the country.

V. RECOMMENDATIONS

- A greater awareness of the importance that bush meat utilization and trade plays in maintaining the standards of living of many rural and urban communities in Zambia through subsistence consumption and benefits to food security levels, and by way of trade and the generation of cash income, should be promoted to increase the level of support by government and non-governmental sectors to achieve the sustainable use of the wildlife resource.

  Progress made by community-based natural resource programmes such as LIRDP, ADMADE and the Wetlands programme in the GMAs of Zambia should be fully supported and further initiatives developed to expand the effective coverage of such programmes. However, it is recognized that progress to date in reducing illegal off-take from wildlife areas has been mainly achieved through coercive law enforcement activities, for example ZAWA scouts in LIRDP areas or village community scouts in ADMADE areas. Although progress has been made especially in ADMADE areas in

devolving greater benefits to rural communities from the wildlife resource by encouraging greater community participation in sustainable wildlife management, it has generally been on a limited basis. Reductions in District license allocations and the resulting decline in access to legal supplies of game meat has not helped matters. Community-based cropping and culling schemes have also been under-performing in terms of meeting their social objectives of increasing game meat supplies at affordable prices to local rural communities. A review of such schemes, which represent one of the most tangible mechanisms for increasing wildlife benefits to rural communities, is needed as a matter of priority to develop guidelines that will reduce the level of external commercialization currently taking place and increase the amount of meat consumed by rural communities, hence contributing to food security and nutritional status.

- An assessment of the licensed hunting industry within Zambia should be undertaken as a matter of priority with the aim of developing guidelines that will ensure a more equitable distribution of the issuance of licenses and specifically the number of animals allocated to District and National licenses. Although it is recognized that the safari hunting sector of the industry results in considerable revenues to ZAWA and central treasury, a greater awareness of the role that District hunting plays in the provision of affordable supplies of game meat is needed. Total values of such utilized meat are substantial and, although not accruing to ZAWA, are nonetheless one of the most direct and tangible benefits that rural communities currently receive from wildlife. District hunting could be a promising mechanism for meeting current stated objectives of devolving greater benefits of the wildlife resource to rural communities.

  A greater level of monitoring is required by ZAWA to ensure that current misuse and abuse of the citizen and non-resident license sector is discontinued. Specifically, the requirement for hunting license returns should be fully enforced before new licenses are issued, and the occurrence of nil returns and re-issue of licenses should be disbanded. Greater monitoring of the hunting license sector should result in a higher level of regulation, and records should be reviewed and analyzed on a regular basis to ensure that individual hunters are not obtaining excessive license allocations. The commercialization of the licensed hunting sector is of serious concern and action to reduce the level of illegal bush meat trade and overshooting of license quotas should be implemented as a matter of priority.

  Initiatives undertaken by ADMADE where National licenses are issued at the district level should be viewed positively in contributing to a reduction in the level of illegal overshooting and abuse currently believed to occur extensively within this category of license. Increased regulation and authority of district councils through wildlife personnel in issuing National licenses in favor of District license allocations should be regarded as a positive step in providing greater supplies of meat to rural communities living with the burdens of wildlife in rural areas.

  The socially justifiable objective of National and District licenses in providing affordable supplies of game meat to Zambian residents should be maintained, and emphasis on rural community access continued through a differentiated license fee structure for citizen District licenses and non-resident National licenses. However in light of current illegal bush meat prices observed in urban areas as well as rural GMA areas it is apparent that the value of species allocated under licenses is extremely low. Although license fees should remain at affordable prices, it is recommended that fees should be reviewed to be more applicable to the current meat values of species allocated. This in addition will reduce the commercialization of this hunting sector especially with regard to National licenses where licensed hunting is mainly undertaken for cash profits in many cases.

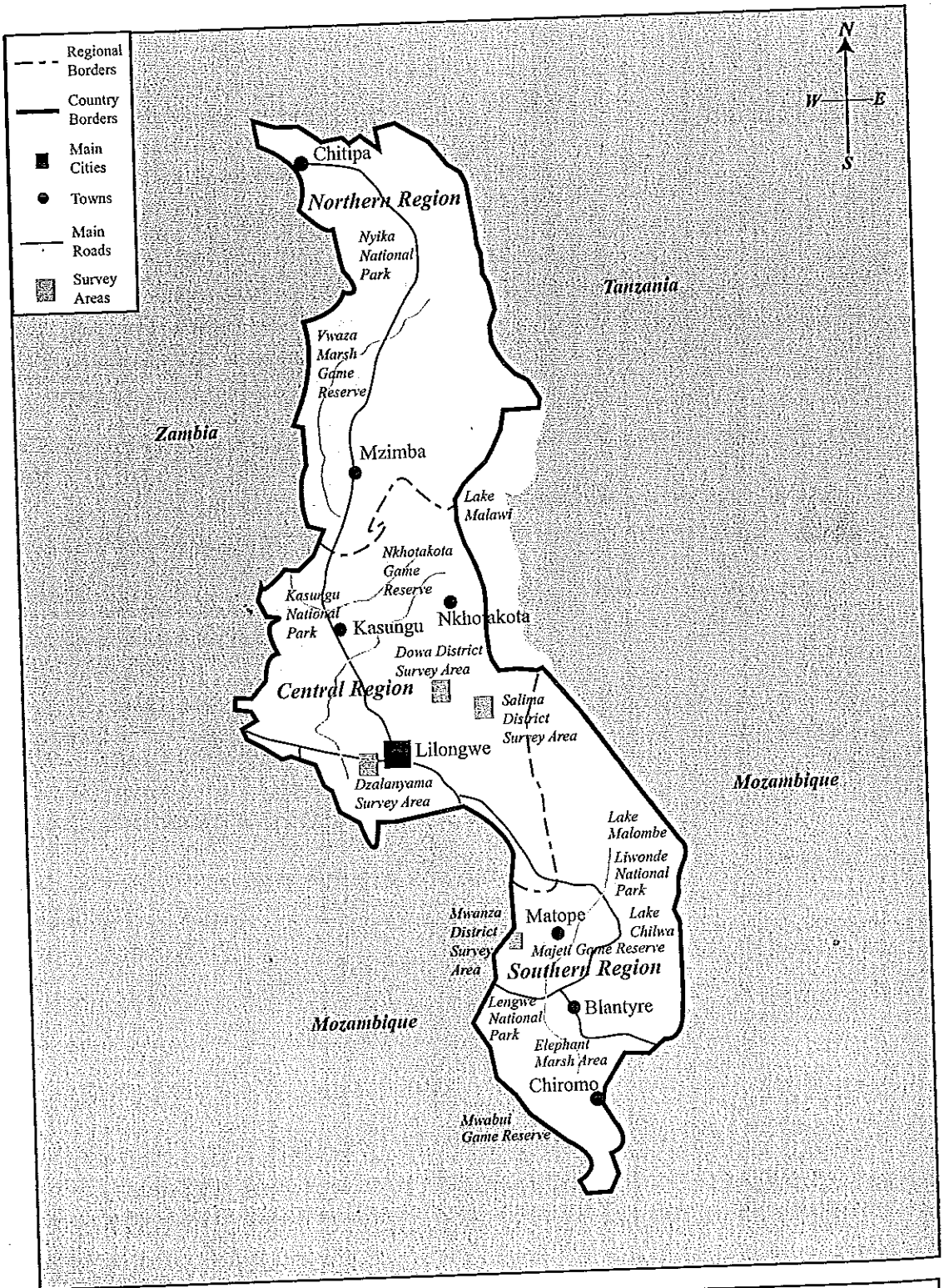
- The review of current practices for problem animal control and the resulting supply of meat should be undertaken, with the aim of assessing ways to obtain more revenues for wildlife management through the sale of meat derived from problem controlled animals. The willingness of rural and urban communities throughout the country to purchase high priced supplies of illegal bush meat should be seen as an indication of the ability for PAC supplied meat to be sold instead of distributed freely as is currently the practice. Prices should be affordable and under that currently achieved by illegal supplies of bush meat. Revenues obtained should be directed to the WCRF for access by ZAWA and used for increasing the level of monitoring and regulation of PAC supplied game meat which currently is limited.

- A greater level of importance attributed to the game ranching and farming sector within Zambia is needed, especially in light of the significant potential that this sector has for development within the country. Game ranching and farming should be viewed as one important mechanism for increasing legal supplies of game meat that may reduce illegal demand. In addition, high demand and lucrative prices within the country provide considerable potential for the industry to generate substantial revenues and contribute meaningfully to national GDP. Currently non-existent monitoring of the industry suggests limited importance associated to its activities. A greater emphasis on monitoring and evaluation is required by ZAWA that should be facilitated by establishing a close working partnership with the Zambian Wildlife Producer's Association. A review of current veterinary and health restrictions imposed on the ranching and farming sector with specific attention paid to regulations for marketing of game meat should be undertaken to assess ways to reduce present restrictions on effective game meat marketing by ranches and farms.

- Increased donor support and funding is required for developing a greater capacity within ZAWA to implement effective bush meat related law enforcement. Currently, capacity and law enforcement levels are limited and result in a negligible impact on the extent of bush meat utilization and trade occurring throughout the country. Initiatives undertaken by ADMADE in involving local community village scouts in law enforcement activities within GMAs should be encouraged and replicated in other areas. The effective deterrent of law enforcement through the provision of fines and prison sentences within the judicial system should be reviewed, as presently fines imposed for bush meat related offences are low and act as a limited deterrent. In line with this review, initiatives should be undertaken to communicate a greater level of awareness among the judicial system on the effect that bush meat off-take is having on wildlife populations, and the increasing emergence of commercial trade that is resulting in unsustainable off-take methods and rates. The current perception of all bush meat related offences being viewed as subsistence motivated should be rectified and courts made fully aware of the seriousness of commercially related bush meat hunting and trade.

Guinea Fowl on sale in city market.
Rob Barnett-TRAFFIC

MALAWI



Survey Areas	Salima, Dowa, Mwanza District Survey Areas	Dzalanyama P.A. Buffer Zone Survey Area	Bush Meat Markets of Central Region
Survey Sample Size	2,200 Households	557 Households	44 Markets

CHAPTER SIX
MALAWI

I. BACKGROUND

Area: 119,140 km^2, of which 94,276 km^2 is land. ***Population:*** Estimated at 11 million with an annual growth rate of about 3.5%. ***Density:*** 117 per km^2.

Malawi is situated south of the equator and shares borders with Mozambique, Tanzania and Zambia. The country is divided into three administrative regions, the Northern region which harbors 11% of the population, the Central region (39%), and the densely populated Southern region (50%). Eighty-nine percent of Malawi's human population lives in rural areas. The north is typified by mountainous terrain, and the central and southern parts of the country are characterized by highly modified miombo woodland and intense cultivation (Simons and Chirambo, 1991). Lake Malawi is the country's most significant natural feature and stretches along almost the entire eastern side of the country (Carter, 1988). Fishing represents an important economic activity and source of protein for people living around the lake (SADCC/GTZ, 1989).

Per capita income is estimated at USD 170 and Malawi ranks as the fifth poorest country in the world (World Bank, 1998). Malawi's economy is based on agriculture which generates over 40% of the GDP and 90% of the country's export earnings, and employs approximately 85% of the population (World Bank, 1995; MoALD, 1995). Agricultural productivity in recent years has been constrained by persistent drought, as well as unfavorable incentives (*e.g.*, inflexible credit policies, poor marketing systems and infrastructure) which has resulted in nearly 60% of small holder households experiencing food insecurity even in normal years. Food insecurity is exacerbated by close to half (47%) of the population being dependants. This is believed to be a major contributing factor to the widespread chronic malnutrition (48.6% of under fives are stunted) and high mortality rates prevalent in Malawi (World Bank, 1995; Pearce, *et al.*, 1996). Insufficient food production has led to starvation and malnutrition in many parts of the country (Anon., 1994), and an increase in human populations and reduction in available arable land has resulted in a rapid decline of the wildlife habitat and intense land degradation (Munthali and Mughogo, 1992; Earl and Moseley, 1996). Under this socio-economic context, dependence on wildlife resources is particularly significant for rural communities (T Munthali, 1998). Hunting for wild meat, fishing, and gathering of seasonal delicacies such as caterpillars, termites and mushrooms is practiced throughout the country (T Phiri, 1998; T Mwapatira, 1998).

Protected areas in Malawi include national parks and game reserves comprising 11.5% of the total land area, and forest reserves covering 22% of the land area (Khonga, 1991; Attwell, 1992). Land degradation is proceeding at a rapid rate, and it is estimated that there is a 3.5% reduction in total forest cover each year (T Munthali, 1998). In some areas, burial sites of no more than one hectare comprise the only remaining vegetation (Munthali, 1993). The Mango *Mangifera indica* is frequently the only tree species visible in such highly modified landscapes. Rising human populations and increasing demand for agricultural land has resulted in most wildlife being restricted to protected areas (Deodatus and Sefu, 1992). Buffer zones around these protected areas are largely non-existent, and human-animal conflict is a serious concern (Sherry, 1989; Mkanda, 1991). Tourism revenue generally goes into the treasury and benefits of eco-tourism to local people are few; this situation has resulted in resentment, as well as illegal harvest of wildlife and encroachment into protected areas (T Munthali, 1998). Outside of protected areas only a few large animal species such as crocodile and hippo occur in their aquatic environments and smaller land-based species predominate. These include rodents, insects, birds and to a lesser extent duikers and bushbucks because they have been able to adapt to current conditions (Simons and Chirambo, 1991).

II. POLICY AND LEGISLATION

Wildlife policy in Malawi is administered by the Department of National Parks and Wildlife (DNPW), which now falls under the Ministry of Tourism. Malawi's wildlife policy is a component of its overall land use policy (FAO, 1990; MNR, 1994), and apportions considerable emphasis on sustainable utilization of the wildlife resource. The Government of Malawi recognizes three broad classes of wildlife management, which are conservation, utilization and control (Clark, 1983). Poverty alleviation is an important objective of the Government and protected areas are regarded as serving the dual purposes of consumptive and non-consumptive use (DNPW, 1998). Acceptable consumptive uses include culling or cropping of excess animals, licensed hunting, and collection of mini-fauna resources such as caterpillars. In addition, the DNPW is mandated to facilitate income generation and financial sustainability through consumptive use of wildlife to the nation as well as local communities, and promoting game ranching/farming among small holders and the commercial sector (MNR, 1994).

The wildlife policy recognizes two categories of wildlife: populations managed by the state which occur in national parks, and reserves, and problem animals outside of protected areas; and those populations outside state control, such as those in game ranches and farms (Clarke, 1983). Ownership of wildlife is vested in the state on behalf of and for the benefit of the people. There are five recognized approaches in which the public may legally benefit directly in the form of meat from wildlife. These are licensed hunting, culling, game ranching, game farming and problem animal control. The government recognizes wildlife utilization as a legitimate form of land use in situations where it does not conflict with other forms such as preservation or agriculture (Khonga, 1991; Tamang, 1992).

Malawi's principal law pertaining to wildlife utilization is the *National Parks and Wildlife Act, 1992*, which regulates the harvest, possession, sale and trade in wildlife. The Act also contains a list of protected animal and plant species. The Act specifically states that it supports sustainable utilization of wildlife for the benefit of the people (Cap.1.3.). One exception to this Act is the regulation of licensed crocodile hunting, which is carried out by the Department of Fisheries under the *Fisheries Act, 1973* rather than by the DNPW (Rodgers and Jamusana, 1989). Certain provisions of the *Forest Act, 1997* also impact wildlife utilization by regulating removal of forest produce and prohibiting hunting in forest reserves without a license (Mphande, 1987; Rodgers and Jamusana, 1989).

III. CONSUMPTIVE WILDLIFE UTILIZATION CONTEXT

Malawi is characterized by having one of the smallest wildlife resource bases and the highest human population densities in the countries of this study (Mkanda, 1991). Legal game meat production in the national sense is negligible, and illegal utilization of bush meat is largely restricted to smaller species outside of protected areas, with larger species only hunted in protected areas (national parks, wildlife reserves and forest reserves). Illegal bush meat utilization represents by far the biggest supply of wild meat in Malawi. Bush meat off-take is currently the major impact on wildlife populations within protected areas, and in communal lands the utilization of smaller species (rodents, birds and insects) represents an important source of additional protein. This off-take is also important in that it provides an opportunity to generate additional income through trade, in a country with limited potential for formal wage employment.

i.) Legal Game Meat Utilization

Although government policy is firmly committed to promoting the sustainable utilization of wildlife for the benefit of Malawi's people, a limited wildlife resource base, high human populations and cultivation densities outside of protected areas, severely restrict progress and the development of the wildlife utilization sector. Hence legal game meat production is likewise restricted and does not make a significant contribution to the national economy or the socio-economic status of the people.

Table 22

Estimated annual legal game meat production in Malawi during 1986-1996

Description	No. Per Annum	Estimated Game Meat Production Per Annum (mt)	Average Price per kg. (USD)	Estimated Total Value Per Annum (USD)	Contribution to National Estimate (%)
Problem Animal Control	552 animals	138.8 mt	USD 0.66	USD 92,533	72.3%
Licensed Resident Hunting	333 licenses	12.5 mt	USD 1.80	USD 22,819	17.8%
Game Ranching (Plains Game) Game Farming (Crocodile)	2 ranches 2 farms	3 mt 0.9 mt	USD 3.00 USD 4.00	USD 9,000 USD 3,646	9.9%
Protected Area Sustainable Harvesting	Kasungu PA Vwaza WR	1,850 kg caterpillars 2,640 liters termites	negligable	negligable	negligable
TOTAL		**157 mt**		**USD 127,998**	**100%**

Source: TRAFFIC survey data, 1998.

As seen in Table 22, the most significant source of legal game meat in Malawi is problem animal control (72.3%), with less significant sources being derived from licensed hunting (17.8%), and game ranching and farming schemes (9.9%) which number only four and comprise two crocodile farms and two plains game ranches. Sustainable harvesting of insects occurs in two protected areas as part of community-based natural resource management programmes, and although important to the rural communities in question, on the national scale results in negligible quantities and economic values of mini-fauna game meat supply.

Problem Animal Control:

The lack of protected area buffer zones and high human and cultivation densities bordering protected areas and aquatic habitats has led to considerable conflict between farming communities and crop raiding species (Rodgers and Jamusana, 1989; Mkanda, 1988; Deodatus and Sefu, 1992). The result has been the problem animal control culling of many species ranging from hippo and elephant to the smaller species such as birds and rodents that represent the largest legal supply of game meat to communities within Malawi (Baliddawa, 1995; Baliddawa, *et al.*, 1996; T Munthali, 1998).

Problem animal control is regulated under the *National Parks and Wildlife Act, 1992*. Wildlife may be killed in defense of property or life (Sect. 74 and 75). The preferred situation is, however, that the DNPW be informed if a wild animal is about to damage crops or domestic livestock, whereupon a DNPW hunter scout from the Problem Animal Control Unit (PACU) would cull the animal (Khonga, 1991; Deodatus and Sefu, 1992). The PACU's personnel are located in all agricultural areas of the country (T Munthali, 1998). For species regarded as "vermin" such as Bush Pig, Vervet Monkey and baboon, control (i.e. killing) may be carried out by local villagers without consultation with DNPW,

provided that these animals are actually posing a threat to property or life. In actuality there is no list of vermin species stipulated in the *National Parks and Wildlife Act, 1992* (Mphande, 1984). The categorization of species as vermin or as protected species, which require the services of the DNPW to be disposed of, is not clear. Meat derived from problem animal control (small animals and vermin) may be consumed by communities. When large animals are culled by DNPW hunter scouts the meat is sold. Due to the absence of cold storage facilities, the vast majority of meat is sold to local communities at a cheap price when compared to domestic meat prices, and the proceeds from the sale are kept by the Department (Simons and Chirambo, 1991).

Although almost all species of vertebrate wildlife in Malawi damage crops at one time or another, the main species responsible for crop damage are ducks and weavers amongst the birds, and baboons, Vervet Monkeys, hippo and Bush Pigs amongst the mammals (Rodgers and Jamusana, 1989). The damage caused by such wild animals to local communities' crops is substantial (Mkanda, 1992). For instance, Deodatus and Sefu (1992) estimated that about MWK 46 million (USD 2,555,555) worth of crops are destroyed by wild animals in Malawi each year. This represents an estimated 8% loss in agricultural produce. To the individual farmer an 8% crop loss can create a critical situation for those with less than 0.7 ha of land, as they produce less than is sufficient for subsistence. This loss aggravates poverty among the rural communities, whose low-income does not allow them to offset serious crop depredation. These crop losses also exacerbate the malnutrition problem, which is prevalent in most rural areas of Malawi (Anon, 1994), where about 50% of the families run out of food stocks by November each year (Anon, 1991).

Due to low food security among the majority of Malawi's agriculturists, the demand for additional protein from wild meat and the need to protect small holder crops from substantial losses incurred by animal pests, there is a substantial off-take of pest species for human consumption (T Munthali, 1998). These species are not only targeted because they raid crops, but also for their value as meat. An example of the relationship between the negative aspects of crop raiding and resulting harvest losses, and the advantages of increased access to wild meat is shown in the Lake Chilwa area of Malawi. In the area, birds (especially ducks, cormorants, geese and queleas) cause considerable damage to rice crops that were estimated to represent approximately 10-15% of potential yields. Although representing a significant loss to farmers' subsistence income, provision of meat for subsistence consumption and the creation of additional cash incomes through the trade of crop raiding bird species does to some extent compensate for crop yield losses. In fact, Wilson and Zegeren (1996) estimated during 1995 that 10,000 ducks, 25,000 gallinules, 65,000 moorhens and 50,000 crakes were caught, representing a possible value of between USD 33,333 and USD 66,666. They concluded that the income generated by communities as well as the subsistence consumption values (estimated at 10% of sales), more than made up for monetary losses resulting from decreased crop yields (Wilson and Zegeren, 1996). The inter-relationship between the animals' pest status and their value as a source of meat provides an interesting dynamic to problem animal control in Malawi.

The categorization of just about all species occurring in unprotected areas as "vermin", means that they can be hunted for crop protection legally. This has in reality resulted in the legalization of most wildlife utilization in these areas. Smaller species in particular are legally utilized at a substantial rate to protect crops and to obtain the considerable benefits through trade and consumption as seen in Lake Chilwa area (Baliddawa, *et al.*, 1996; T Mwapatira, 1998). In addition, an existing high demand for game meat (Ajayi, 1992) and the sale of large quantities of cheap meat from the larger species such as hippo which require the assistance of DNPW hunter scouts to cull, have resulted in problem animal control culling being very popular among local communities (Baliddawa, 1995). The benefits of such culls have in many cases led to the occurrence of false reporting. The broadly defined categorization

of "vermin" species, and the likelihood of false reporting have resulted in large numbers of animals being culled and significant quantities of meat being supplied within Malawi (T Munthali, 1998).

The monitoring of problem animal control (PAC) is generally focused on the larger species, and consequently officially recorded quantities do not include what is thought to be the largest supply of meat derived from smaller species such as duiker, birds, rodents and even insects (T Munthali, 1998). Nevertheless, the larger species alone are responsible for substantial meat supply, with about 800 mt being supplied through the "pest control" of 187 elephants and 475 hippo between 1981-1985 (Mkanda, 1988; SADCC/GTZ, 1989). For the period 1986 to 1996, figures of numbers of animals killed in problem animal control campaigns have been reviewed. Overall, the three animals killed in the largest quantities were monkey (2,024), hippo (1,809) and baboon (1,116). A rather extensive variety of species have however in the past been killed for control purposes, including elephant, python, guinea fowl and civet. The number of animal species shot in northern Malawi is more diverse than in the other two regions of the country. This disparity can be attributed to the availability of suitable wildlife habitats in some parts of the Northern region, due to relatively sparse human population in the region. Vervet Monkeys and baboons are by far the most problematic animals in northern Malawi and as such they have been killed in large numbers. In the Central and Southern regions of Malawi, besides the primates, hippos have been a major problem, and have been killed in substantial numbers over the past decade (T Munthali, 1998).

By far the most important sources of game meat have been the elephant, hippo and Cape Buffalo. Due to their large size, these animals supply huge quantities of meat (Mkanda, 1992; Baliddawa, 1995). However, in recent years the number of elephant and Cape Buffalo killed by the PAC hunter scouts has declined. This can almost entirely be attributed to the decline in population of these animals, due to unabated illegal off-take, and habitat destruction for agricultural development and settlement purposes. In most cases, the Cape Buffaloes that raid crops are those that occur outside protected areas, and as such they are vulnerable to illicit hunting (T Munthali, 1998).

Game meat resulting from PAC is about 138,844 kg per annum on average, and this has been made available in Malawi over the past ten years. However, taking into account the fact that about 76% of this game meat is supplied by the hippo, of which about 90% are killed in Chikwawa, Mangochi, Nsanje, Nkhotakota and Salima Districts, the per capita consumption of hippo meat in these districts amounts to about 0.16 kg. The actual meat consumed by some may be much higher than this because not all people in these districts eat hippo meat due to traditional and religious taboos. The number of hippos killed and the meat accruing from them have increased over the period under review, and PAC is believed to constitute a major impact on the remaining viability of hippo populations (T Munthali, 1998).

The hippos in Malawi are in a very precarious situation because as the arable land continues to dwindle due to human population growth, people encroach into the hippo's habitat along the riverine and lakeshore swamps to grow rice, sugar cane and maize for subsistence and cash (Simons and Chirambo, 1991; Baliddawa, *et al.*, 1996). Most unfortunately for the hippo, the areas in which they occur in large numbers are also areas where the human population density exceeds 200 persons per km^2. These areas include the Ndindi and Elephant Marsh in the Lower Shire Valley, Liwonde National Park in the Upper Shire, and river deltas and swamps mainly in the southern and central parts of Lake Malawi (Simons and Chirambo, 1991). The majority of families in these areas have land holdings less than 0.5 ha in size (National Statistical Office, 1993). With such shortage of land, incidents of people encroaching into hippo habitat, for purposes of cultivation and grazing livestock are common (Mkanda, 1992). This has inevitably increased the conflict between hippos and people. Indeed, there have been incidents when people have been killed by hippos (Simons and Chirambo, 1991; Irving, 1998). In the last decade, calls for DNPW hunters scouts to shoot hippos have increased by 300% and an average of 202 hippos are culled per year with 63 on average also being injured (Irving, 1998). Consequently, the number of hippos killed to save crops and human life, and the meat accruing from them, will continue to increase (T Munthali, 1998).

The crocodile is also in a similar insecure situation, as it threatens humans and livestock. In areas such as the Lower Shire Valley in southern Malawi, many people and livestock lose their lives to crocodiles (Mphande, 1987). Fugitive elephants have also been killed in fairly large numbers, both in central and southern Malawi. This is primarily because most elephant habitats are surrounded by human settlements, and villages and gardens have obstructed the traditional migration routes of these animals. Besides the Cape Buffalo, large ungulates have not been in serious conflict with human interests, mainly because most of them now only occur in protected wildlife areas, and due to hunting pressure outside these areas, these animals seem to have learnt not to range beyond their sanctuaries (T Munthali, 1998).

Earnings from the meat resulting from animals killed by the PAC hunter scouts are at three levels: the DNPW, middlemen and retailers. For the DNPW, the hunter scouts are responsible for killing, eviscerating and selling the game meat. Despite the meat being sold to middlemen and to local communities at very cheap prices of MWK 10 (USD 0.66 per kg), during the period under review, the DNPW could potentially have earned on average about MWK 1, 049,309 (USD 160,542) per annum from 138.8 mt of game meat supplied. However, the hunter scouts often claim that large quantities of meat get wasted due to lack of cold room facilities in rural areas. Hence, in the majority of cases, less than 10% of the potential revenue has been earned by the DNPW from the sales of game meat realized during the problem animal control campaigns. Such meager amounts, even if they were to be re-invested into the PAC operations, would not offset the cost of purchasing rifles, ammunition, uniforms, and payment of allowances and salaries of the hunter scouts. In Malawi Kwacha terms, the potential revenue from game meat resulting from problem animal control has been increasing over the period under review, but in real terms, there has been a negative trend due to the devaluation of Malawi's currency (T Munthali, 1998).

Research conducted during 1997 in the Salima and Nkhotakota areas of Malawi's Central region revealed that in the majority of cases, hunter scouts disposed of the animals they killed by either selling to local communities, or to traders who bought the meat in bulk. The animals that are not favored for consumption, such as monkey and baboon, were given away free of charge to local communities. Species that are not eaten, such as hyena and crocodile, were taken and destroyed by the hunter scouts. Crocodile tails, which are a popular delicacy, particularly in the hotels, have never been sold by the DNPW, probably because of logistical problems, as these animals are killed in remote areas, where the required hygiene and meat preservation facilities are non-existent. A considerable number of the killed animals became rotten and were wasted due to lack of cold rooms or appropriate meat preservation facilities in rural areas. The most notable was in Salima, where four hippos were reported to have putrefied and gone to waste (T Munthali, 1998).

Estimated quantities and economic values of meat derived from PAC in Malawi represent a considerable underestimate due to smaller crop raiding "vermin" species generally not being reported and included in official records. In addition, larger species such as hippo may well be culled in larger quantities than officially recorded by DNPW hunter scouts, due to the possibility that scouts cull more animals than necessary for personal profit (T Munthali, 1998).

Research in Nkotokota and Salima provides an indication of the parameters and dynamics affecting communities' own "vermin" problem animal control activities. For the period 1994 to 1996, of the total game meat resulting from local community intervention, the Bush Pig accounted for 71%, Vervet Monkey 11% and baboon 9% of the total meat supplied in Nkhotakota District. In Salima, the Bush Pig accounted for 63%, bushbuck 20% and Vervet Monkey 10% of the total game meat supplied. The game meat from other species was negligible. The subsistence consumption and potential revenue earning benefits derived from PAC and resulting supply of meat were found to be significant to those undertaking the hunting, with the average price of game meat being MWK 16 per kg (USD 1.06). The Bush Pig has potentially been the most important revenue earner for local communities, particularly in

Salima District, where a large number had been killed during the period under review. The other notable sources of revenue had been bushbuck, Vervet Monkey, quelea and Cane Rat. In Nkhotakota, mice are also an important source of food and revenue (T Munthali, 1998).

Problem animal control is a major issue in Malawi and it affects the large majority of subsistence agriculturists. Conflict is only likely to rise as human populations increase and protected areas become "islands" surrounded by human settlement and croplands. Game meat supply from problem animals currently represents the only form of compensation for crop losses, but due to a high demand and the emergence of trade, animals culled directly by communities in some cases are believed to more than adequately compensate for crop losses. Culling of larger species by DNPW hunter scouts also provides direct tangible benefits of wildlife to communities, although the potential for supply is under-utilized due to wastage, and in some cases is believed to be misused due to false reporting and overshooting by DNPW hunter scouts.

Licensed Hunting:

Licensed hunting in Malawi is permitted outside of protected areas to meet demand for sport hunting and meat (Khonga, 1991). Permits issued include the Wild Bird License, National Game License, District Game License, Hunting License, Special License and Visitor's License as per the *National Parks and Wildlife Act, 1992*. Bird and game licenses are only available to Malawi residents. Visitor's licenses are issued to non-residents to hunt birds and game, and are issued at the discretion of the Minister on a case-by-case basis. Special licenses are issued to hunt a protected species, and in every case are considered only for scientific research. Lastly, the Hunting license is provided for safari hunting within protected areas, although currently it is not in use (licensed hunting only occurs outside of protected areas) (Government of Malawi, 1992). In the past, the use of traditional hunting weapons was prohibited under the Game Rules (Cap 66:03), but as Mphande (1984) maintained, prohibiting the use of traditional hunting weapons conflicted with traditional wildlife utilization in Malawi, as such methods of hunting were felt to be sustainable and therefore accepted. Under the *National Parks and Wildlife Act, 1992*, this was repealed and traditional hunting methods are currently allowed outside of protected areas (T Munthali, 1998).

Issuance of hunting licenses is based on quotas, and each license specifies the species and number of animals that can be killed, and in the case of birds, the season during which different species can be hunted. Each of these licenses is valid for a period of one year, but can be renewed in the subsequent years. Each license also specifies the number of the animals by species that can be killed in a year. For instance, both the National and District Game Licenses (which the majority of local communities can afford), allow license holders to shoot: one male bushbuck, five Common Duikers, and two warthogs. The Wild Bird License allows the holders to shoot wild geese, ducks, pigeons, doves, francolins, guinea fowls, and other selected species. The disposal of meat harvested under hunting licenses is restricted for protected species, but for non-protected species may be carried out at the discretion of the license holder. This meat therefore may be consumed or traded (T Munthali, 1998).

The contribution of licensed hunting to legal meat production is poorly monitored and regulated, with hunting returns rarely submitted. Data on the number of mammals and birds killed by licensed hunters were unavailable, implying a limited level of importance associated to licensed hunting by Department of National Parks and Wildlife. During the period under review, about 333 hunting licenses were issued annually, and assuming that all license quotas issued are fully utilized, an average of about 12,469 kg of game meat was supplied from licensed hunting. At a family level, this amount of game meat (about 37.4 kg/license holder) may be substantial, especially in situations where alternative sources of protein are limited. In terms of revenue, if all the game meat was sold for cash, each license holder

could have earned about MWK 556 (USD 69) per annum during the period under review. This represents a substantial amount equivalent to 40.6% of the country's per capita income of USD 170 (T Munthali, 1998). However, these quantities and values of game meat derived from licensed hunting are believed to be overestimates as it is likely that not all licensed quotas are fully utilized.

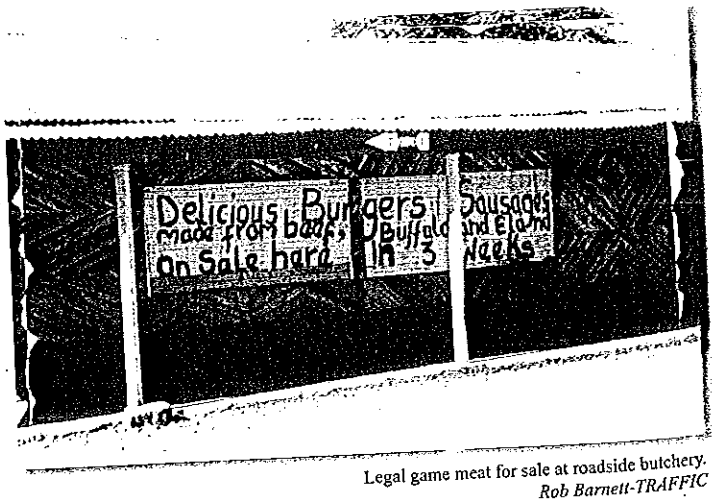
In the past, the number of people obtaining game licenses steadily declined, with a net decrease of 0.6% in 1986. Likewise, the holders of game licenses found it increasingly difficult to fulfill the quota of the license and consequently to harvest the full potential crop of meat. SADCC/GTZ (1989) reported that from 1981 to 1986, only 41% and 24% of the potential off-take of meat for the Common Duiker and warthog respectively were harvested under the District Game Licenses. Mkanda (1988) reported 25% of licensed hunters indicated that they had not fulfilled their hunting quota, and 26.2% felt that this was due to the scarcity of the target animals. The reason for the decline in the hunters' realization of quotas was believed to be linked to the overall decline in wildlife numbers outside of protected areas, due to loss of habitat to cultivation, high cost and/or unavailability of ammunition, and the illegal off-take of wildlife for bush meat use (SADCC/GTZ, 1989). The only species that has experienced an increase in achieved hunting quotas is the bushbuck. This is believed to be due to the species more adaptable nature to the changing habitat outside of protected areas, and resulting ability to maintain population numbers.

In more recent years this may have changed, as the number of people obtaining licenses has shown some increase during the period 1990 to 1996, particularly in the Northern and Southern regions of Malawi, and indicates possibly that a greater success rate and proportion of license quotas are being achieved. Among the species on a hunting license quota, the warthog does not occur outside protected areas, and it is for this reason that it has been scrapped off the quota list, under the revised *National Parks and Wildlife Act of 1992*. However, other species on the quota, such as Common Duiker and bushbuck still occur in relic shrub habitats, even in the heavily farmed areas of the country. This may partly be the reason for the continued and increased interest in licensed hunting in Malawi (T Munthali, 1998).

With the small number of licenses issued, it is evident that licensed hunting is not a significant source of game meat in Malawi. However, based on the limited resource available, massive deforestation, and expansion of agriculture outside the government protected areas, it is unlikely that this form of wildlife utilization can be sustained in Malawi. The escalating number of people obtaining hunting licenses will create great pressure on the relic populations of bushbuck and Common Duiker outside the protected areas. This seems quite eminent, because so far, the DNPW does not monitor the activities of licensed hunters, and there is no mechanism to prevent hunters from exceeding their quotas.

Game Ranching and Farming:

Game ranching is a relatively new endeavor in the country (SADCC/GTZ, 1989) and is underdeveloped (T Munthali, 1998). This situation differs from other southern African countries, in particular South Africa, Zimbabwe and Namibia, where game ranching and farming has become an important production system



Legal game meat for sale at roadside butchery.
Rob Barnett-TRAFFIC

that generates large sums of income (T Munthali, 1998). Currently, there are only two game ranches and two game farms operating in Malawi.

These include the SUCOMA (Sugar Corporation of Malawi) Ranch in Chikwawa District, which harbors Nyala, Impala, bushbuck, Sable and Giraffe. This ranch is fully developed, and some game meat from cropping Nyala is occasionally sold for human consumption. The Gulugufe Nyala Ranch in Mangochi District on the other hand is still in its infancy and as such, cropping game meat has not yet officially started. DWASCO (Dwanga Sugar Corporation Estate) Crocodile Farm in Nkhotakota District has since 1993 sold crocodile tails for human consumption, whereas COMACROC Crocodile Farm in Mangochi District does not sell any meat for human consumption as all of the meat from crocodiles killed for their skins is fed to the live crocodiles (T Munthali, 1998).

Of these four operations, only the SUCOMA game ranch and DWASCO crocodile farm, both owned by international sugar companies, supply game meat for human consumption (T Munthali, 1998). The main objective of SUCOMA Game Ranch in Chikwawa District is to regenerate degraded areas suitable for ranching and produce game meat (Attwell, 1992). Although well established, this ranch is not yet economically independent or viable, and maintains its status only through the financial backing it receives from SUCOMA. The ranch covers an area of 180 ha, and received its initial stock of 40 Nyala from Lengwe National Park in 1983 with the authority of the DNPW. In 1992, the ranch supported 260 Nyala from the original stock, plus 19 sable, 26 duikers and 30 bushbuck. During the period 1986 to 1996, SUCOMA culled 250 Nyala, and supplied about 30,000 kg of meat. This meat was sold at MWK 45 per kg, earning about MWK 1,350,000 (USD 75,000, 1997 exchange rate). The annual value of three mt of game meat produced and sold for the period is estimated to be approximately MWK 135,000 per year. At present most of SUCOMA's game meat is sold to its senior staff (T Munthali, 1998), but in the past some has been sold to local communities and to hotels. Present trends in the supply of Nyala meat by SUCOMA ranch could not be depicted because culling is an irregular activity. However, Attwell (1992) reported that the ranch had plans to increase its Nyala herd to 500, and due to the population of Nyala presently thriving, it is likely that more meat will continue to be supplied through culling operations (T Munthali, 1998).

Both the DWASCO and COMOCROC crocodile farms collect crocodile eggs from protected areas with the consent of the DNPW, as well as maintain their own breeding ponds. DNPW requires that 5% of the hatchlings be returned to the wild (Mphande, 1987; Attwell, 1992). One of the major constraints associated with crocodile farming is access to a suitable cheap supply of feed. Therefore, both farms are situated close to Lake Malawi to ensure a constant and reliable supply of cheap fish feed. Both of these farms are primarily concerned with the production of skins for overseas export, and any meat produced is viewed as a welcomed by-product (T Munthali, 1998).

For the period 1993 to 1996, DWASCO sold 3,647 kg of crocodile tails for human consumption. These tails were sold at MWK 60 per kg, earning MWK 21,8820. An approximate annual value of 1.2 mt meat sold for this period is MWK 54,705 per annum. Buyers are primarily international hotels, hence local communities have no access to the meat supplied by the farm. The supply of crocodile tail meat is dependent on the market for crocodile skins. In 1992, the major exporter of crocodile skins was DWASCO, who at that time envisioned an expansion to their production and planned to collect 1,350 eggs annually from the wild to rear live crocodiles for sale to other ranches in Malawi and the region. However, the expected growth in crocodile farming did not materialize and indeed the overall demand for skins has dwindled over the past five years, which has negatively affected the supply of crocodile tails for meat in Malawi. DWASCO currently has a CITES quota of 1,500 skins that is expected to remain stable for the near future (T Munthali, 1998).

Game farming in Malawi essentially involves the intensive management of the Nile Crocodile on farms, although other species such as guinea fowl are beginning to be farmed through community-based conservation and development farming initiatives being undertaken by a UNDP project and the Wildlife Conservation Society of Malawi (WCSM pers. comm. 1997). At present, crocodile farming is not practiced by local communities essentially because the enterprise requires substantial capital investment that is generally not available to local communities. However, potential for community involvement in game farming is extensive due to the high demand of suitable species such as Common Duiker, Cane Rat, hyrax, francolin, and guinea fowl that exists in most areas of Malawi (Ajayi, 1994). Ajayi (1994) determined that guinea fowl, Common Duiker, and francolin all had a 100% market demand and other species such as Cane Rat 60-80% and hyrax 60%.

However, limitations affecting commercial and community-orientated ranching and farming of wildlife have prohibited meaningful progress in the sector (T Munthali, 1998). A fundamental restricting factor has been the required veterinary meat inspection procedures. These procedures are based on conventional domestic meat inspection guidelines that require: inspection of cropped animals by a government veterinary officer; detailed ante-mortem and post-mortem inspection procedures; abattoirs for large operations to be hygienically suitable and licensed by the Minister of Agriculture; rigid control of movement of game meat or its products from the Shire Valley in particular (where FMD is endemic); and strict bureaucratic certification procedures for any meat originating from a FMD area (SADCC/ GTZ, 1989; Attwell, 1992).

Such restrictions imposed on the game ranching and farming sector in Malawi mean that its supply of game meat is negligible. However, game farming in particular of suitable, high fecundity and non-territorial species such as Cane Rat and hyrax does represent an important potential sector for rural communities in producing needed additional protein, especially in light of reduced fisheries productivity from Lake Malawi (Munthali 1997; CODA & Partners 1993; T Munthali, 1998).

Game Meat Utilization from Protected Areas:

The culling of wildlife in Malawi for habitat management has only been undertaken in the Lengwe National Park. The species that have been culled are the Nyala and the warthog (Mphande and Jamusana, 1985). The Nyala has been culled six times since 1981 and the warthog four times since 1984, with the last culls occurring in 1988 (SADCC/GTZ, 1989; Mkanda, 1991; T Munthali, 1998)

The culling was undertaken primarily for ecological reasons, with a secondary objective of improving public relations with local communities on the benefits of conserving the Lengwe National Park. As a result, game meat derived from the culling operations in 1981, 1983 and 1984 were sold to local residents at a reduced price. A survey conducted by Munthali and Banda (1985) on the attitudes of local communities to culling indicated that 83% of the 111 respondents favored culling as a cheap source of meat. However, despite the promotion of cheap game meat the people around the Lengwe National Park rigidly maintained their bush meat poaching activities, and consequently the provision of cheap meat from culling activities had not satiated the demand for bush meat that was being satisfied from illicit off-take from the park (Mkanda, *et al.*, 1989). The underlying reasons for the failure of the culling exercise to deter people from bush meat poaching seem to be linked to the chronic protein deficiency in the area, and to the absence of community involvement in the planning and running of the culling scheme (SADCC/GTZ, 1989).

During the culling schemes in Lengwe National Park, a number of veterinary procedures were imposed on the culling operations. Among these were that strict ante-mortem and post-mortem inspection procedures be carried out. In the early stages, in 1981, the veterinary inspector insisted on accompanying

the marksmen in the shooting operations in order to carry out ante-mortem inspections in the field. This was, however, soon found to be impractical. In addition, and since FMD is endemic in the area, stiff controls on the movement of meat outside the Shire Valley were imposed. Luckily, the internal demand for the cropped meat was high within the valley, hence no problems were encountered in selling the meat (Mkanda, 1991; Attwell, 1992).

Reductions in larger species both within and outside protected areas has generally negated the present need for ecological culling throughout the country, although an increasing conflict between hippo and humans in the lower Shire Valley may in the future lead to culling as a management option. The sustainable harvesting from protected areas of smaller species such as insects does, however, occur in an effort to confer greater benefits to local rural communities surrounding protected areas (DNPW, 1998). The DNPW since 1985 has allowed local communities living around some of Malawi's parks and reserves to harvest caterpillars and termites (Khonga, 1991; MNR, 1994; T Munthali, 1998). The sustainable off-take of these species is seen as one way of involving local communities in the benefits of maintaining and conserving Malawi's protected areas (Hess, *et al.*, 1996). Although quantities by weight are small the nutritional contribution to food security is high, with insects generally having a 60-70% protein content on a dry matter basis (Dreyer and Wehmeyer, 1982; Holden, 1991).

Free collection of emperor moth caterpillars, family *Saturniidae*, occured in Kasungu National Park, where two caterpillar species occur: *Gonimbrasia belina* and *Gynanisa maia*. These caterpillars feed on miombo species. Between September and December 1990, a total of 173 families (i.e 10% of the households around the park) freely collected caterpillars from the park (Munthali and Mughogo, 1992). Overall, about 1,850 kg (wet weight) of caterpillars were harvested for both home consumption and sale in the local markets, where they were sold at a price higher than first grade beef, or any other form of meat sold in the same markets (Grenfell, 1993; Roberts, 1998). Caterpillar utilization in Kasungu NP took place on an experimental basis, and was not subject to veterinary restrictions, although if it became more sophisticated and included packaging and selling of the product in urban supermarkets, the Malawi Bureau of Standards would have imposed quality standards as required by their Act (Cap 51:02) (DNPW, 1998).

Initiated in 1993, the Vwaza Marsh Wildlife Reserve (VMWR) Resource Utilization Project has also initiated and monitored the sustainable off-take of termites and caterpillars from within the reserve. Within VMWR, termite mounds occur in savannas as well as forested areas. Except for extremely hydric sites, such as Vwaza Marsh, they are common throughout the reserve. Annual harvesting of the winged termites by local communities occurs during January to March, when shallow rectangular pits measuring one meter or more wide and twice as long are excavated in the sides of active mounds after the worker termites have been observed building escape openings. From each trap it is possible to capture on average 1-2 liters of termites. Termites are valued by the local communities as a delicacy and protein source, and can be found for sale in local market places were they sell for MWK 3-4 per cupful (1996 prices). An estimate of the potential harvest of termites in VMWR could be as high as 2,640 liters per year (Hess, *et al.*, 1996).

In addition, residents of the VMWR area legally harvest and consume two caterpillar species. Of these two species, the *minor* caterpillar, is utilized to a limited extent due to its occurrence in the upper canopy of the *Brachystegia* forest, which makes it harder to harvest. Moreover, this caterpillar is not the preferred species for human consumption. In contrast, the ground dwelling *nthowa* caterpillar is preferred by local residents for consumption, and is found in an area defined by the range of *dipoto* plant (*Ipomoea* sp.), the primary food source of the caterpillar, and consequently can be easily harvested. The period of optimum caterpillar harvest begins shortly after the start of the rainy season, and continues for about two to three weeks (Hess, *et al.*, 1996).

Insects are also collected from forest reserves (Holden, 1991). According to the forestry ground staff at Chimaliro Forest Reserve, the very existence of the forest reserve was threatened at one time because caterpillar collectors felled the trees instead of climbing them in the rush to collect caterpillars. There is clear evidence in the Reserve that in the past *Julbernardia paniculata* trees were felled by *Matondo* caterpillar collectors; at present sustainable harvesting techniques are enforced. Termites and ants including *Mpalata, Uzuma, Manyene* and *Majalamakutu* are also collected from the Chilmaliro Forest Reserve and eaten as a relish (Lowore, *et al.*, 1995).

It is evident that insect harvesting from protected areas in Malawi is one of the few benefits that communities obtain from living with wildlife, and current harvesting programmes such as in Vwaza March Wildlife Reserve contribute increasingly to reducing antagonism between communities and wildlife.

ii.) Illegal Utilization Of Bush Meat

To this day, the use of bush meat remains an integral part of many Malawians daily lives, and the concept of bush meat as a source of food is far more understood than the idea of conserving wild animals for purely aesthetic and sentimental reasons (Blower and Brooks, 1963). The continuing demand for bush meat is likely to be attributed to food insecurity, with the Ministry of Economic Planning and Development (1997) noting a recent 20% increase in the price of maize (the staple diet of Malawians) (T Sangalakula, 1998). The daily minimum wage is low at MWK 10.65, and with maize prices rising, food security is threatened. In addition, fisheries production, which provides nearly 75% of Malawi's protein requirements, is in a state of decline (Munthali, 1997; CODA and Partners, 1993), with general fish catches down by 94% since 1987 (Irving, 1998). The livestock sector is also unable to cope with the demand for meat as production within the country is limited (Pearce, *et al.*, 1996), and aggravated by owners keeping livestock as a symbol of wealth (T Munthali, 1998). Hence, opportunities for obtaining cheap supplies of meat protein through bush meat are becoming increasingly popular (Wijnhoven, 1992; T Sangalakula, 1998). As a result of such demand, illegal hunting is common and is generally carried out with snares, bow and arrows, and locally made muzzle loader guns, although the use of sophisticated weapons such as AK47s has also increased in recent years (T Munthali, 1998).

Due to the overwhelming loss of wildlife species from outside of protected areas in Malawi, Attwell (1992) suggests that relative to the total human population, few people can still benefit from unlicensed informal utilization of larger wildlife species and those that do, live in close proximity to parks and reserves. Bell (1984) further maintains that for this segment of Malawi's population, traditional informal wildlife utilization must contribute significantly to nutrition and people's standard of living. Illegal wildlife off-take from protected areas in Malawi is the major conservation issue facing the future viability of the protected area network. National parks and wildlife reserves in Malawi account for about 11.5% of the total land area, and this has created serious conflicts between the government and the rural communities, who view protected wildlife areas as potential land for settlement and agricultural development (Mkanda, 1991; T Munthali, 1998).

The government on the other hand narrowly considers the contribution of wildlife to development in terms of direct revenues to its treasuries and generation of foreign exchange from nature-based tourism. However, employment of rural people in the recreational use of wildlife is limited and the benefits are rarely returned to the people who live adjacent to national parks and wildlife reserves, although some progress has been made through sustainable insect harvesting in Vwaza Marsh Wildife Reserve and Kasungu National Park (Grenfell, 1993). Eco-tourism does not particularly play a major role in the Malawi economy, because of low animal population density and limited tourist infrastructure (World

Bank, 1995). Consequently, rural people view the government's approach to the management of wildlife, and its outdated legislation, as an "*ecological apartheid*", that ignores their socio-economic dependence on wildlife. Hence, they manifest their antagonism through illicit use of protected wildlife, and encroachment into the wildlife habitats, and this has led to the demise of many large mammals in protected areas (T Munthali, 1998).

Demand for all bush meat species supplied from protected areas is high (Attwell, 1992). Bell *et al.* (1993) and Munthali and Mughogo (1992) indicated that the use of wildlife from within Kasungu National Park had been traditional and still is a major factor in the domestic economy of the communities in the area. Over 93% of people surveyed indicated a need to harvest caterpillars and termites from the reserve, with 35% suggesting a subsistence consumption, and 75% a commercial trade motivation for use (Mkanda and Munthali, 1994). Phiri *et al.* (1995) reported that 13% of respondents from areas bordering the Nkhotakota Wildlife Reserve in Malawi voiced a need to obtain bush meat from the reserve, and 30% of these indicated that they would want to generate income from the sale of meat. This is also reflected for communities living around the VMWR where 17% of the people reported a need for bush meat supplied from the reserve (Sinks and Masika, 1994), and in Nyika National Park where the need for wild meat (13.4%) is second only to wood and fuel resources (JOFCA, 1996).

Lowore *et al.* (1995) reports that meat from wild animals is an important source of protein derived from the Chimaliro Forest Reserve for rural communities with commonly hunted species being bushbucks, hares and birds. In Nkhotakota Wildlife Reserve illegal entry is also a common activity to obtain bush meat. Animals targeted from the Reserve were predominantly bushbuck (58%) and birds (19.8%) with 39% of users stating that they hunted themselves, and 46% that they purchase hence indicating a significant informal market (Phiri, *et al.*, 1995).

In VMWR, between1982-1985, illegal activities reported by patrols increased by 94% for serious offenses and 9% for minor offenses. Minor offenses consisted almost entirely of illegal activities associated with bush meat use, and as McShane (1985) suggests these form an integral part of the subsistence rural economy. Serious offenses were associated with commercialized trophy and bush meat hunting mainly using firearms (Bell, 1984). A similar trend was identified in Nyika National Park between 1990 and 1994 with the number of armed groups encountered increasing significantly. This pattern of increased occurrence of armed groups and a reduction in meat drying racks, snares and poachers camps discovered in the protected areas suggests a change from traditional hunting methods towards a greater use of firearms and "hit and run" hunting strategies by more commercialized bush meat and trophy motivated hunters. This "hit and run" tactic results in hunters remaining in the park for shorter periods thus lessening chances of apprehension (Gibb, 1995).

Although larger wildlife species are only generally available to a relatively small segment of Malawians living around protected areas and reserves, past research (Ajayi, 1994; Hess, *et al.*, 1996; Lowore, *et al.*, 1995; Holden, 1991; Platt, 1982; Heldens, 1992; Wijnhoven, 1992; and Wilson and Zegeren, 1996) suggests that the importance of bush meat derived from smaller animals such as insects, rodents and birds could still play an important role in the livelihood and food security of a substantial number of Malawians living on customary land. Although the use of these smaller species is regarded by most as a legal activity, in the strict sense of the law it is illegal to consume or trade these species without appropriate licenses. This is due to the ambiguous definition of the term "wildlife" in the *National Parks and Wildlife Act, 1992*, in which all species ranging from insects to elephants are defined as wildlife and protected as such. Rodents, birds and insects play an important role in the livelihoods of local communities in Malawi, especially in the higher cultivation and human density Southern and Central regions where they constitute the bulk of the remaining bush meat resource (Matembe, pers. comm., to R. Barnett, 1996).

In the Lake Chilwa area of Malawi, Wilson and Zegeren (1996) indicated that a substantial trade and consumption of crop raiding bird species occurred, and Ajayi (1994) suggested that where Cane Rats and hyrax are abundant (Cane Rat in Nkhatabay, Mangochi and Thyolo and hyrax in Mangochi), the meat of these rodents constitutes the bulk of animal protein consumed by local communities. In Ntcheu District, 4.2% of households utilized 360 grams of flying ants during their season; traded supply is substantial with 29% of termites being purchased (Wijnhoven, 1992). In the same district Heldens (1992) reports that birds (especially partridge) also constitute an important source of protein and cash income through trade. These smaller species have been able to survive in the modified environment of customary land brought about by intensive agriculture and expanding human populations. In some cases, such wildlife populations have expanded considerably due to increased availability of mono-crop food sources (T Sangalukala, 1998). These wildlife species are generally regarded as crop raiding pests, and combined with low food security levels amongst the majority of local communities, are believed to be targeted to reduce crop losses, and to provide additional protein through subsistence consumption or a cash income through trade (T Munthali, 1998).

The utilization of bush meat in Malawi therefore stems from larger species from protected areas, whose illegal offtake constitutes one of the greatest impacts on protected area wildlife populations, and from smaller widely distributed species such as insects, rodents and birds which play an important role in maintaining nutritional, food security and economic status of many rural communities throughout Malawi (T Munthali, 1998).

Zebra.
Nina Marshall-TRAFFIC

Although the utilization of bush meat within and outside of protected areas is prevalent, law enforcement acts as a limited deterrent and performs only a small regulating role. Outside of protected areas, this is mainly due to DNPW personnel regarding the utilization of remaining species such as birds, insects and rodents as a legitimate activity. Within protected areas, limited staff capacity, low morale and a reduction in real terms of law enforcement budgets over the past few years has resulted in a limited effective law enforcement effort within all protected areas (Mkanda, 1991). Official records of bush meat being taken illegally from Malawi's protected area network are correspondingly low, with only 128.9 mt representing an economic value of USDD 226,144, being officially recorded between 1986 and 1996 (T Munthali, 1998). Limited effective monitoring and reporting of law enforcement effort and seizures also contribute to the limited nature of official records. Law enforcement effort is directed primarily at trophy-related poaching. DNPW personnel largely consider bush meat off-take as a subsistence-motivated activity.

In addition, the offence of bush meat possession, which is one of the most frequent charges laid, does not exist under section 7 of the *National Parks and Wildlife Act,* and subsequently confusion leads to mis-reporting. Although increased penalties for commercial and repeat offenders have been included in the *National Parks and Wildlife Act* in 1992 through Government Notice No. 57 of 1994, penalties for first offenders have remained the same or decreased, and a limited number of arrested poachers from protected areas are actually convicted in court and sentenced according to prescribed penalties (Government of Malawi, 1971, 1992, 1994). For example, between 1991 and 1994, only 47 (45%) of the 103 poachers arrested in Nyika National Park were convicted in a court of law. In only three cases

were fines in excess of MWK 150 (USD 8.30) and default prison sentences more than six months. On average, the 47 accused poachers were charged with 3.23 offences, which should have resulted in minimum fines of MWK 323 (USD 20) and prison terms of 19-20 months. Hence, law enforcement acts as a limited deterrent even for the small proportion that are convicted in court and, in most cases, fines are likely to be less than the meat value of animals poached (Critchlow, 1995)

A wide variety of wild animals have been illegally killed from Malawi's protected area network during the period under review (1986-1996), with elephant (687) coming under considerable pressure mainly from trophy-motivated hunting, as shown in the Majete Wildlife Reserve, where between 1989 and 1992, an entire elephant population of about 380 was wiped out. Overall the elephant population within Malawi has declined by 50% from 4,500 in 1979 to 2,249 in 1995 (T Munthali, 1998). Although trophy hunting is of major conservation concern for species such as the elephant, bush meat motivated hunting is believed to have a greater impact on a far wider range of plains game species within protected areas with the Nyala (154) and Waterbuck (87) being illegally hunted in the largest quantities for their meat. This has led to considerable declines in these as well as other key ungulate populations with Nyala populations declining from 2,300 in 1987 to 1,200 in 1995, and Waterbuck populations declining from 1,900 in 1988 to 500 in 1995 (T Munthali, 1998).

For the period under review, the number of law enforcement field patrols within protected areas has increased. Despite this increase in effort, poaching, as depicted by the number of arrests in all three regions of Malawi, has also shown some increase over the same period, and some wildlife populations have been negatively affected (T Munthali, 1998). Negative trends in the law enforcement catch per effort indices in Malawi's wildlife protected areas have been evident, with Majete and Mwabvi Wildlife Reserves having the greatest decline. This poor law enforcement performance can be attributed mainly to inadequate funding and low staff morale. For the period 1992 to 1996, trends in the funds allocated to the Department of National Parks and Wildlife have increased slightly, but much of these funds have been used in paying salaries. Dublin *et al.* (1995) also noted that excluding salaries, the budget allocated to DNPW between 1988 and 1993 had in real terms declined by nearly 50%. With such receding funds, field patrollers have in many cases operated with inadequate equipment, which in turn has reduced staff morale and contributed to low catch per effort indices (T Munthali, 1998).

A limited law enforcement deterrent and a continuing perception by rural communities that non-consumptive uses of wildlife through tourism contribute little to their everyday lives, has meant that consumptive bush meat uses remain a prevalent activity by many communities throughout the country. The limited nature of community-based natural resource management programmes occurring within the country has done little to change the attitude of protected areas being viewed only as non-utilized farming areas, and wildlife as a free-resource food item. The importance of bush meat utilization to the conservation status of many wild animal species in protected areas, and as an important resource to the livelihood status of many communities is reflected in current research conducted during 1997 in the Salima, Dowa and Mwanza Districts of Malawi, the more urban market areas of Central Malawi, and by communities surrounding the Dzalanyama Protected Area. A summary of the key parameters and dynamics of the trade and utilization of bush meat in these areas is provided in Table 23.

Bush Meat Species Utilized:

Malawi is relatively unique in that most wildlife has disappeared in rural communal areas. Most of the larger bush meat species are confined to the country's five protected areas and surrounding buffer zones (T Munthali, 1998). Rural communities in Malawi have consequently been forced to target these larger species from protected areas. For communities in Dzalanyama, the protected area is responsible for

Table 23

Dynamics of bush meat utilization in selected survey areas of Malawi during 1997

Survey Areas	Salima, Dowa, Mwanza Districts (n 2,200)	Dzalanyama Protected Area Buffer Zone, Central Region (n 557)	Formal/Informal Markets of Central Region (n 44)
Species Utilized	47 species, 40% large, 60% small	42 species, 33% large, 67% small	35 species, 100% small
Proportion Of Users	100%	100%	-
Quantities Utilized (kg)	350 grms termites per day in season	0.4 kg smaller species per Hhld. per month; 25 kg larger species per Hhld. per month	-
Bush Meat Most Important Meat Protein Source	19.7%	-	-
Demand: Cheaper Prefer taste Available Habit Other	 19.2% 39% 0% 25.9% 15.9%	 12.8% 27.7% 0% 31.3% 28.2%	 -
Price of Plains Game Bush Meat verses Domestic Meat per kg.	Bush Meat USD 0.93 Domestic Meat USD 1.66 Bush Meat 77% cheaper		
Supply: % Traded % Subsistence	 70.6% 29.4%	 77% 23%	 100% 0%
Main Customers	Low income subsistence farmers (96%)	Low Income	Low, medium, high income
Conservation Implications	1) larger species targeted from protected areas; 2) greater use of firearms in protected areas; 3) limited conservation implications on mini-fauna mainly utilized in communal areas due to seasonality and high fecundity of these species; 4) PAC culling impacting status and future viability of hippo populations; 5) licensed hunting believed to be unsustainable in the long term.		

Note: Small game meat species characterized as those having dressed carcass weight of under 5 kg; Hhld.=Household; n = sample size

Source: TRAFFIC survey data, 1998.

supplying the majority of larger species. Species such as Common Duiker and Bush Pig are supplied predominantly from the protected area, as reported by 81% and 56% of respondents respectively during 1997. However, the majority of smaller species are still available from the communal areas and buffer zones surrounding the protected area, with species such as the hare, helmeted guinea fowl and rodents being mainly hunted in these areas by 84%, 50% and 83% of respondents respectively. As such, the Ngonis community obtains many small species from the buffer zone, but has to rely on the protected area itself for larger species. Even in an area located close to a protected wildlife area, only 14 species of the total 42 utilized consisted of larger antelope species such as bushbuck which were primarily supplied from Dzalanyama protected area. The majority were smaller birds and rodents at 28 species mainly supplied from communal areas and protected area buffer zones (T Phiri, 1998).

For the vast majority of rural communities who do not live within easy access of the protected areas in the country, the supply, trade and consumption of these larger species is even more limited (T Sangalukala, 1998; T Mwapatira, 1998). Rural communities have, however, adapted to the reduced availability by utilizing a much larger range of bush meat species such as birds, rodents and insects.

The majority of these smaller species are available from farmlands and specifically fallow fields, with over 95% of insects, birds and rodents supplied from these areas in the Dowa, Salima and Mwanza Districts (T Mwapatira, 1998). In addition, many of these mini-fauna populations are likely to have increased due to the availability of mono-crop food sources. Thus rural communities still obtain considerable benefits, but from a variety of less renowned bush meat species. This is reflected in the Dowa, Salima and Mwanza Districts where a preference for mini-fauna (59% {insects (31%), rodents (23%) and birds (6%)}) is more profound than a preference for all larger bush meat species (41%). However, availability is a key factor in determining inhabitants' preference. In Dowa and Salima Districts 70% and 80% respectively of respondents reported the consumption of larger animals such as duikers to be a very rare and usually only once a year (T Mwapatira, 1998).

Bush Meat Demand:

In the Salima and Dowa Districts of the Central region, and the Mwanza District of the Southern region, bush meat is in demand by all inhabitants (100%) to some degree because of a preference for taste (39%) and out of habit (25.9%) (T Mwapatira, 1998). Such traditional factors associated with bush meat consumption are seen to be important in Malawi, but bush meat is also cheaper than domestic meat (19.2%), and is another important consideration. In these areas, income levels of inhabitants were found to be an important determinant for consumption of bush meat, with 96% of consumers being low-income subsistence farmers and only 4% regular wage/salary earners. Average subsistence incomes varied, but an average of MWK 3,666 (USD 203) per annum indicates the importance of subsistence consumption or the purchasing of cheap supplies of bush meat to keep household expenditure low. Due to the reliance on smaller bush meat species, the quantities of bush meat consumed per capita are relatively small with, for example, 350 grams of termites consumed by 90% of respondents per day during the season. However, the contribution to food security is still important due to their use as relish and the high protein content of these species. Bush meat supply through subsistence or trade constitutes a considerable benefit to these households, with 19.7% regarding it as more important than alternative domestic meats (T Mwapatira, 1998).

This demand dynamic is also reflected by the majority of rural communities surrounding the Dzalanyama Protected Area where bush meat is utilized because of a preference for taste (27.7%), out of traditional habit (31.3%) and because it is cheaper (12.8%). The Ngonis subsistence farmer community living in the area obtains considerable benefits from bush meat which forms an integral part of daily life, with 17% of respondents consuming bush meat every week, 20% every month and the remaining 63% a few times a year. Due to the occurrence of some households mainly relying on smaller species such as insects and rodents, and others having hunters who obtained larger species such as Common Duiker from the Dzalanyama Protected Area, it is estimated that households consumed approximately 0.4 kg (smaller species) to 25 kg (larger species) per month which in both cases represents an important contribution to food security (T Phiri, 1998).

In terms of a more formalized trade of the smaller mini-fauna species such as insects, rodents and birds occurring along roadsides and in district and village markets within the Central region, the Chewa peoples seem to purchase in the largest quantities compared to any other ethnic group. Mini-fauna purchased from markets throughout the region are consumed mainly as a snack, and in some cases as a relish with *nsima* (maize meal) accompanied by vegetables. Buyers come from many different professions, and even those that earn quite substantial amounts of money purchase both rodents and birds. This implies that poverty per se may not be the only factor influencing demand, and reflects the fact that preference for taste is a major dynamic within Malawi. Out of 17 consumers, eight reported

monthly earnings in excess of MWK 1,000. Economic factors are however still important with some of the lower income users indicating a greater reliance of bush meat during times of economic hardship. (T Sangalakula, 1998).

Although there is a reliance in most rural and urban areas on the smaller species which on a kilogram to kilogram weight are more expensive than domestic meat, prices for antelope species are cheaper at about MWK 16.9 (USD 0.93) per kg, or 77.5% cheaper than alternative domestic meat at about MWK 30 (USD 1.66) per kg (T Phiri, 1998; T Mwapatira, 1998).

Bush Meat Trade and Subsistence Use:

Trade of bush meat in the Central region of Malawi provides additional income to many inhabitants, although in areas bordering the Dzalanyama Protected Area, bush meat is obtained primarily through subsistence hunting (77%), and to a lesser but still significant extent through purchasing (20%). Only 3% obtain bush meat for free through relatives and friends or through exchange or bartering for other produce such as maize, and this suggests that, in contrast to the past, the cash value of bush meat is more appreciated and represents an increasing source of income to hunters. Trade within the area is externally motivated to some extent by visiting trader middlemen (48%), although hunters selling directly to houses remains the most common means of marketing (52.2%). Additional trade occurs at limited levels in market places for the smaller species such as insects and birds, and in beer selling places for larger animals (T Phiri, 1998).

In Dowa, Salima and Mwanza Districts, over 89% of hunters and gatherers of the smaller bush meat species trade a proportion of their catch (T Mwapatira, 1998). During the season, many rural inhabitants sell surplus supplies in villages, towns, and roadsides of the districts. In general, traders are also hunters and gatherers with only a small proportion of trader middlemen operating due to the erratic and seasonal nature of supply and reduced potential for regular annual income. The majority of traders regard bush meat sales as an additional source of income at certain times of the year, with none reporting relying on the trade as their sole source of income throughout the year (T Mwapatira, 1998). However, most traders in these rural districts are subsistence farmers with low average annual incomes of about MWK 500 (USD 27.70). Thus any income obtained through selling rodents, insects or birds, constitutes an important source of additional income. For the trade in insects, termites *Inswa-Macrotermes* are the most important species traded, resulting in the largest proportion of bush meat sold during 1997 (T Mwapatira, 1998).

A high demand for mini-fauna bush meat has resulted in a more formalized and substantial trade occurring within main market centers, rural market centers, village market centers, and along roadsides and at bus stations in the Central region of Malawi. Primarily Chewa and Ngoni ethnic groups conduct this trade probably because they were hunter/gatherer peoples. Furthermore, the cultures of these people do not prohibit or consider it taboo to consume these wildlife species (T Sangalakula, 1998; T Mwapatira, 1998). During 1997 in a survey area of about 35,592 km^2, the trade in rodents, insects and birds was found to be prevalent in markets and roadsides of the Central region. A total of 19 bird species (mainly quelea and weavers) and 16 rodents species were commonly traded. Birds are generally available for trade throughout the year, but especially during the dry season. For rodents, there are two major peaks when they are abundant, the early wet season and the mid dry season. However, for trading, rodents are mainly caught between the mid dry season months of May and October, as rodents quickly spoil due to the damp weather conditions at other harvesting times of the year (T Sangalukala, 1998).

Income obtained from the seasonal trade are significant with rodents being purchased by traders from suppliers for between MWK 0.30 to MWK 0.50 per carcass (Five rodents at MWK 2.00 {USD 0.10}) and selling them to consumers at between MWK 0.50 and MWK 1.50 per carcass. Likewise bird

species such as queleas and weavers are purchased by traders for just over MWK 2.00 for five birds on a slit stick known locally as *mpani*, and sold to consumers at prices of up to MWK 5.00 (USD 0.27) per *mpani* (1997 prices). Overall profits are enticing, especially in a country characterized by limited potential for formal wage employment. Traders earn a substantial amount of money from rodents and birds when they are in season, and in most cases increase their profit margins by trapping and gathering supplies themselves. During the 1997 season, 15 traders reported earning an average income of MWK 1,368 (USD 91) per month, which is a substantial amount representing almost six times the official minimum monthly wage rate of MWK 224 (MEPD, 1997). Although the supply of rodents was especially high during 1997, traders do obtain lucrative returns from mini-fauna trade, and offset the disadvantages of it being a seasonal activity by diversifying their income base both when the bush meat trade is in season and when it is off-season. Such additional and in many cases complimentary livelihoods include farming, casual labor and selling fresh produce at markets (T Sangalukala, 1998).

Within Malawi, declines in larger wildlife species outside of protected areas are the norm, but an increasing demand from a growing population has resulted in most species being traded. Trade, however, is more predominant in areas where the resource is limited, as reflected by communities in the Dowa, Salima and Mwanza Districts trading 70.6%, in contrast to communities bordering Dzalanyama Protected Area where only 23% of supply is purchased. Larger species supplied from protected areas are sold at relatively high prices (although still lower than domestic meat), and in communal lands smaller mini-fauna species are sold by the kilogram at prices which are far higher than top grade beef, reflecting the high demand for these high protein species.

Conservation Implications of Bush Meat Utilization and Trade:

The supply of bush meat in the survey areas of Malawi has declined considerably since the 1970s in line with the decrease in larger bush meat species in communal lands. Traders in Salima, Dowa and Mwanza (67%) reported a drastic decrease in supply over the past few years. Bush meat consumers and hunters reflected this reduction in traded supply with 94.2% indicating a marked decrease in subsistence supply of bush meat and only 5.8% indicating an increase. Increasing human populations, bush meat demand, and a seasonally erratic and overall reduced supply have led to high price increases above the rate of inflation. In the Central region, prices have increased considerably since 1993, with for example the kilogram price of larger antelope species rising from MWK 5.00 per kg to as much as MWK 80.00 during the wet season in 1997. Prices of a bird or rodent rose from MWK 0.20-0.50 to MWK 1.00-3.50, and Cane Rats previously valued at MWK 5.00 rose to MWK 80.00 in 1997 (T Mwapatira, 1998).

Although the overall decline in bush meat supply has mainly been attributed to a decline of larger species, increasing human populations has also resulted in mini-fauna species meeting a larger proportion of demand. The reduced supply of all species locally, especially larger bush meat species, has resulted in some cross border trade. In Mwanza District for example, 70% of larger bush meat species were supplied from the Mgunda forest in Mozambique during 1997, indicating that a prevalent demand from inhabitants for larger species (41% of all demand) is motivating traders to continue supply for increased profits. Increases in bush meat prices are ensuring that trader's profit margins remain lucrative, and this contributes to the continued supply and decline of the larger species in Malawi and neighboring countries (T Mwapatira, 1998).

The consumption and trade of smaller bush meat species is highly seasonal which results in conservation and community development implications. Due to most bush meat traders and consumers being subsistence agriculturists, utilization of bush meat during the wet season is limited because people need to work on their farms. Ecological factors are also important in influencing seasonal availability of bush meat species utilized, in that bird species are primarily supplied during the dry season, rodents from May

to October, and insects during the wet season. In general, of the common bush meat species utilized, 75% are available and supplied during the dry season, 24.4% during the wet season and only 0.6% throughout the year. Insect species are mainly trapped during the wet season when they emerge in large quantities after the first rains arrive. Bird and rodent species are supplied during the dry season when fallow fields are burnt, enabling better catch rates for these species. The highly seasonal nature of bush meat supply results in off-season periods enabling population recovery for bush meat species, but also implies that traders and consumers benefit from bush meat utilization through income generation and food security status only during certain periods of the year (T Mwapatira; T Sangalakula; T Phiri, 1998).

However, a prevalent demand for bush meat throughout the year results in price increases during off-season times of the year, especially during the wet season. During this period, many households report a reduced supply of alternative protein thus resulting in a greater demand for bush meat (T Mwapatira, 1998). Increased prices may motivate traders to ensure longer supply seasons which result in shorter off-season recovery periods for bush meat species. Hunting catch per effort has decreased with hunters having to spend far greater periods of time in order to catch limited bush meat quantities. Due to the increased effort required, hunters do not distinguish between the sex of animal caught, as frequency of encounter is so low they cannot afford to let any animals escape. With such a large variety of species being utilized by inhabitants in Central region of Malawi, it is not surprising that there are few traditional management strategies that prohibit the use of certain species. The main species not utilized seem to be primates (72.6%) due to their resemblance to human beings, and hyena (15.5%) because of its association with witchcraft and evil spirits (T Mwapatira, 1998).

Hyenas are by and large restricted to protected areas, and therefore exploitation (for witch craft) is thought to be low. In contrast, primates are still largely available in communal areas and are responsible for being one of the most renowned crop raiding species (T Munthali, 1998). However, due to greater supply through crop protection, primates were recorded as being sold and utilized during 1997, indicating that taboos do not totally restrict use. To overcome any taboo restrictions, hunters and traders usually smoke and dry the meat of primates so that it is less recognizable and more appealing to consumers. Totem species seem to obtain a higher level of protection in that for example 97.7% of the Yao do not consume rodents, and the Mbewa and Ngondo peoples do not consume their namesake species of rodents and Bush Pigs respectively (T Mwapatira, 1998; Phiri, 1998).

IV. SUMMARY/CONCLUSION

In Malawi, legal game meat production is limited representing only about 157 mt per annum at a value of USD 127,998 with problem animal control being the major source of game meat. Present off-take is, however, believed to be unsustainable because the manner in which animals are harvested is not based on quota setting, or any biological criteria. The hippo, elephant and Cape Buffalo, which are the major game meat species supplied from problem animal control, are in a critical state, as DNPW hunter scouts continue to cull them in the interests of people. Encroachment into these animals' habitats is increasing due to the dire shortage of land. Therefore, in the short term, the supply of meat from the problem animal control campaigns may increase, but once the affected animals have been killed to critical levels, the amount of game meat supplied through this source will also diminish. Licensed hunting, although providing limited amounts of legal game meat, is also not a viable source within Malawi. This is because outside protected areas, factors such as open access to the wildlife resource, lack of control mechanisms, and the destruction of wildlife habitat due to human population growth and expansion of agricultural development, will inevitably lead to further reductions in the species currently on hunting license quotas.

The illegal utilization of bush meat by rural communities in Malawi is by far the largest supply of wild meat within the country, and is characterized by a reliance on a wide variety of smaller bush meat species due to the unavailability of larger species in communal areas. Utilization is motivated primarily by a preference for taste and traditional factors, although cheapness of price is still considered important. The supply of bush meat is seasonally erratic but during these times contributes an important source of high protein and additional income through trade. Rising prices are likely to result in increased pressure on the larger species, although the highly seasonal nature of smaller species supply indicates less cause for concern. Bush meat is an important and highly sought after resource in Malawi that contributes significantly to the food security status of many communities. However, severe environmental issues facing Malawi such as habitat encroachment, have resulted in larger species being relatively unavailable, and the trend is to rely on smaller mini-fauna. Certain species of rodents, birds and insects have successfully adapted to the cultivated and modified environment and as such are likely to represent a viable future resource for community development.

V. RECOMMENDATIONS

- To offset the cost of engaging in problem animal control, the DNPW should privatize this function, and charge hunting and trophy fees for the animals killed. The meat arising from the animals killed by the private entrepreneurs should be required to be sold to local communities. In so doing, the Department could also avoid costs of preserving the meat and trophies, but make money, which could support community-based natural resource management programmes. This together with the direct tangible benefits of meat supply should be advantageous to the DNPW in promoting natural resource management in Malawi.

  Furthermore, the hunter scouts could be mobilized and re-deployed to protected wildlife areas, where they would boost the numbers of field law enforcers. This for Malawi is particularly crucial, as illegal off-take of wildlife has become rampant. Similarly, the ammunition purchased for PAC could be used for law enforcement purposes. However, the private sector that should be responsible for dealing with problem animals would be closely monitored to ensure that animals are not killed for the sake of providing meat and trophies.

  A continuing trend of increasing problem animal control culling of hippo may critically reduce the species' gene pool, and hence result in critical conservation implications for this species. This seems likely because, besides the hippo population in Liwonde National Park, most other major hippo populations occur outside Government protected areas, where they are vulnerable to illicit use. Therefore to safeguard the hippo, there is need for a management plan for this species, which should introduce innovative measures of protecting crops from the marauding animals. More importantly however, local communities should be educated about the value of hippo, both as a component of the country's biodiversity and as an agent of energy transfer from land (through grazing) to water that positively contributes to fisheries production.

  Hunter scouts should be trained in simple methods of preserving meat to avoid current losses. Such courses have been undertaken in the past, but there is need for close supervision to ensure that each hunter scout is following the appropriate preservation procedures.

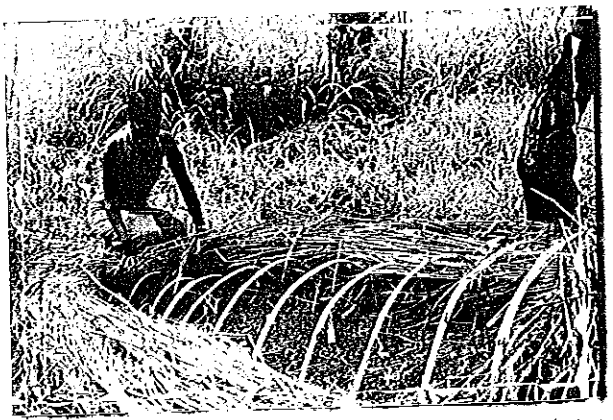
  Ranching, which is currently underdeveloped, needs to be promoted in Malawi. However, for the local communities to benefit, captive breeding and stall-feeding of some species that easily adapt to agricultural farming systems, such as duiker, Cane Rat, and guinea fowl, should be encouraged, in order to increase game meat production for subsistence and cash. The experiences in Ghana,

where Cane Rats have been raised for quality meat in boxes in human dwellings, should be emulated in Malawi. This type of game farming is greatly required for Malawi because even the fisheries, which provide nearly 75% of the animal protein consumed by people, are in a state of decline due to over fishing and siltation from poor land use practices. The livestock industry is also unable to cope with the demand for meat, and this is being aggravated by the fact that most livestock owners keep livestock as a symbol of wealth.

- A greater level of monitoring and regulation of the licensed resident hunting sector in Malawi is required as a matter of urgency. Submission of license returns should be enforced, and issuance of new licenses restricted to those hunters abiding by monitoring requirements. A greater level of monitoring is required to ensure that hunters do not overshoot specified quotas.

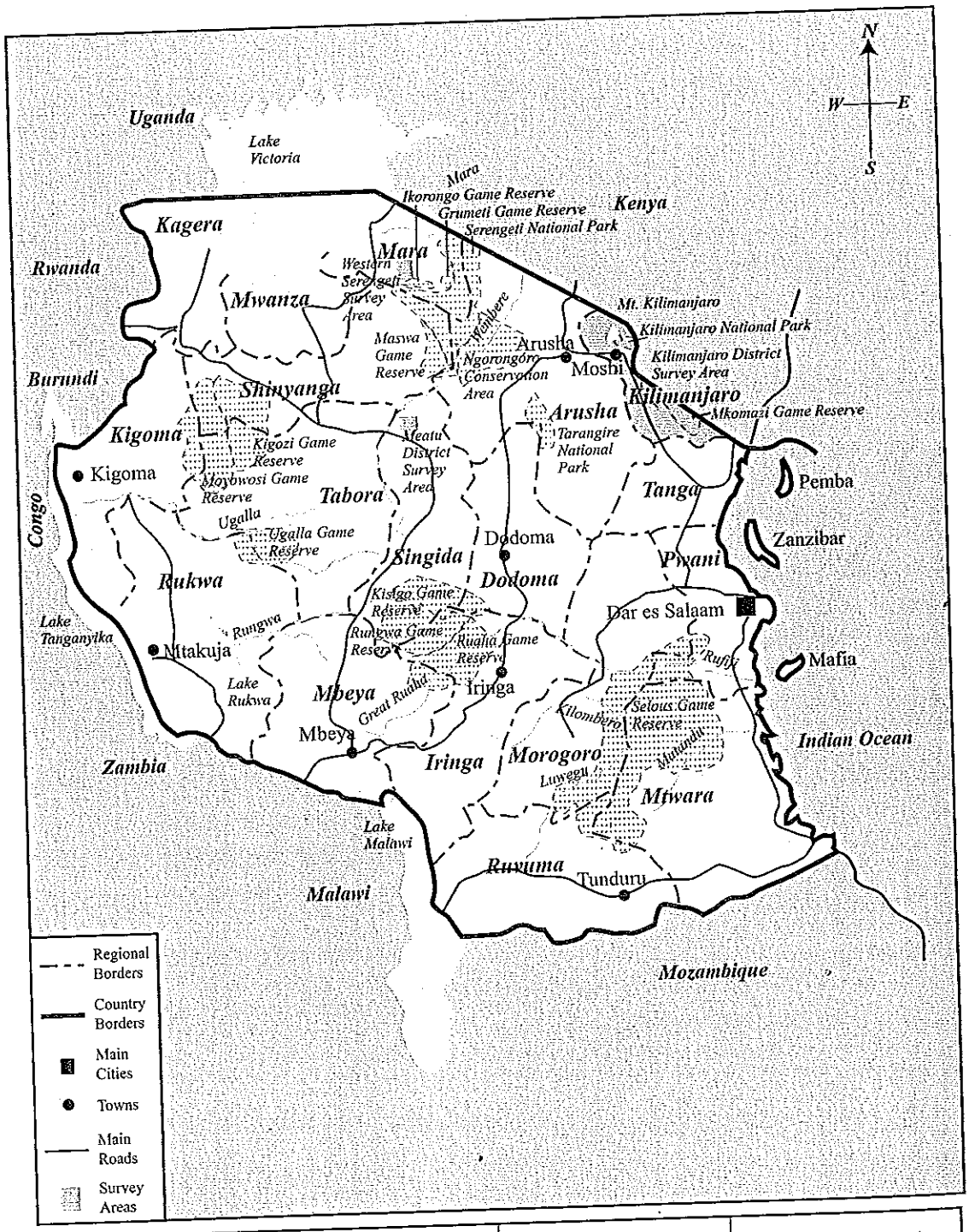
- Presently, Malawi does not have a viable Community-based Natural Resources Management (CBNRM) Programme and, as most large mammals in protected areas are declining due to illegal off take, it will be difficult even to implement the revenue sharing programmes between the government and local communities which have been initiated in Nyika National Park and Vwaza Marsh Wildlife Reserve. The biggest challenge for the Department of National Parks and Wildlife in Malawi is to deter illicit off-take of wildlife and to develop viable and sustainable CBNRM programmes that will truly win local communities as genuine partners in conserving biodiversity. This can partly be accomplished by improving the generation of revenue from protected wildlife areas, and lobbying to use portions of the revenues to strengthen the law enforcement capacity. Any wildlife-based investment promoted for local communities, should be preceded by the community's needs assessment and socio-economic evaluation. This would help in promoting activities that are acceptable, viable and sustainable.

  Greater awareness by DNPW personnel on the conservation implications of bush meat motivated illegal off-take from Malawi's protected areas is needed to yield a higher level of bush meat related law enforcement seizures. This should be facilitated by initiating revision of Section 7 of the *National Parks and Wildlife Act* to clearly outline the legal position of bush meat possession being regarded as an illegal activity. In addition, fines and sentences for bush meat offences should be increased to reflect as a minimum the value of the resource, to act as an effective deterrent.



Uncovering termite trap.
Louisa Sangalakula-TRAFFIC

TANZANIA



Survey Areas	Meatu District bordering Maswa Game Reserve	Kilimanjaro District	Western Serengeti bordering Serengeti National Park
Survey Sample Size	21 villages 52 Hunters	5 Districts 983 Households	3 Villages 707 respondents

CHAPTER SEVEN
TANZANIA

I. BACKGROUND

Area: 945,000 km^2. ***Population:*** Estimated at 31.3 million with an annual growth rate of about 3.8%. ***Density:*** 33.3 per km^2.

Tanzania is situated south of the equator and borders Kenya and Uganda to the north, Democratic Republic of Congo, Burundi and Rwanda to the west, Malawi, Zambia and Mozambique to the south, and the Indian Ocean on its entire eastern frontier, forming an 800 km stretch of coastline (Eltringham, 1984). Except for the coastal belt, most of mainland Tanzania is part of the Central African Plateau rising from 1,000 to 1,500 m above sea level. It is characterized by gently sloping plains and plateau broken by scattered hills and low-lying wetlands (URT, 1976). The main upland areas occur in a northern belt that includes the Kilimanjaro, Meru, Pare and Usambara mountains, a southern and central belt that includes the Ngurus and Ulungurus southern highlands, and a northern running belt, which extends from the Ngorongoro crater (Pratt and Gwyne, 1977; Leader-Williams, *et al.*, 1995).

Most Tanzanians are African of Bantu origin. There are, however, sizable groups of Indian, Pakistani and Arab ancestry in most urban areas, especially in Dar es Salaam, Tanga and Zanzibar. There are more than 120 ethnic groups in the country, but none exceeds 10% of the population, and an absence of any one dominant ethnic group has been one of the society's unifying factors (Bagachwa, *et al.*, 1995). About 15% of the population on mainland Tanzania lives in urban areas, making it one of the least urbanized countries in Africa. However, in certain areas such as Dar es Salaam the population was recorded to increase by 60% between 1978 and 1988, and in Zanzibar 33% of the population live in urban areas. At present, urban growth is estimated to be increasing at a rate of 7-10%, suggesting that rural to urban migration is becoming an increasing concern (WWF and ERB, 1995).

The Tanzanian population is still predominantly rural (85%), with the economy primarily based on agriculture which represents 86% of employment and 60% of GDP. However, only one-fifth of the country has a secure annual rainfall of more than 750 mm, enabling reliable agriculture. Together with generally infertile soils over much of the Plateau, this has resulted in high population densities (up to 200 per km^2) in favorable agricultural areas such as those around Mt. Kilimanjaro. Much of the country is sparsely populated rangeland and woodland with only about 5% cultivated (Bagachwa, *et al.*, 1995). Reliance on subsistence agriculture and a lack of major commercial industries has resulted in Tanzania being classified as one of the poorest countries in Africa with a per capita annual income of USD 200 (World Bank, 1998). Nearly 12 million rural Tanzanians or 60% of the population live below the poverty line, and about 10% of the total population lives in absolute poverty (Jazairy, *et al.*, 1992; Tinios, *et al.*, 1993).

Although the rate of inflation has declined from an average of 30% per annum in 1980 to 25.7% in 1994, it still remains high in absolute terms. As a consequence, real wages and salaries have fallen dramatically over time. The real value of the average civil service wage in 1986 was less than 18% of that in 1975 and could cover only about one quarter of the required expenses of a typical household (Mulolani, 1995). This situation has resulted in increased pressure on the wildlife resource for subsistence food consumption and trade for commercial gain (TRAFFIC survey data, 1998).

Rural communities have access to a large wildlife resource base. Tanzania has some of the richest biodiversity in sub-Saharan Africa. The country possesses a diversity of species, both in terms of richness and endemism, and a wide range of habitats and ecosystems (Melamari, 1989; Stuart and

Adams, 1991). Tanzania has been very successful in implementing its policy for gazetting protected areas; these now include 12 national parks (NP), 23 game reserves (GR), one conservation area (CA), and 44 game controlled areas (GCA) that cover about 240,000 km^2 of the country's total land surface. In addition, there are 540 forest reserves (FR) (Wily, 1995; Leader-Williams, *et al.*, 1995). Altogether, these protected areas comprise 25% of Tanzania's land area with 10% of this area made up of NPs and GRs where permanent human settlement is not permitted (Leader-Williams, *et al.*, 1995).

This network of protected areas demonstrates that wildlife conservation is a major form of land use. Tanzania still maintains large densities of wildlife within and outside of protected areas (Melamari, 1989; Sommerlatte, *et al.*, 1989; Leader-Williams, *et al.*, 1995). Outside of protected areas, wildlife persists because of low human population density, and the fact that most rural people live in agriculturally productive areas (Eltringham, 1980; T Malima, 1998). Therefore, land clearing and habitat destruction, although important in some areas (Mwalyosi, 1993), are not thought to constitute as high an impact on wildlife populations as does exploitation for bush meat (SADCC/GTZ, 1989; T Forestor, 1998; T FCF, 1998).

II. POLICY AND LEGISLATION

In Tanzania, all wildlife comes under the jurisdiction of the Ministry of Natural Resources and Tourism. The Wildlife Division is responsible for the management of wildlife and problem animals occurring outside of protected areas, but also plays a supervisory and monitoring role of five parastatal wildlife institutions (MTNRE, 1995). These parastatals are organized according to individual management roles that include Tanzania National Parks (TANAPA), Serengeti Wildlife Research Institute (SWRI), Ngorongoro Conservation Area Authority (NCAA), College of African Wildlife Management (CAWM) and Tanzania Wildlife Corporation (TAWICO) (Eltringham, 1980; ITC and IUCN, 1989; T Malima, 1998). The Wildlife Division is responsible for issuing wildlife cropping and hunting quotas in GCAs, problem animal control (PAC), and regulating game ranching and farming. TAWICO is mandated to undertake commercial utilization of wildlife in Tanzania through safari hunting and game cropping (Ndolanga, 1992; Ngwenya, undated; TAWICO, 1995).

Policy as specified in Tanzania's five year development plan (1989-1993) mentions the "provision of game meat" as one solution to food shortages in the country (Mapunda, 1992). In addition, the *Policy for Wildlife Conservation and Utilization, 1996,* has identified key areas pertaining to legal game meat supply that should be promoted. At the same time, existing wildlife legislation is restrictive in its treatment of utilization issues. Wildlife ownership in Tanzania is vested in the Government (Melamari, 1989). The principal legislation pertaining to wildlife utilization is the *Wildlife Conservation Act No.12 of 1974.* Various supplementary acts exist as well, such as *Amendment No.21 of 1978* which established the "Wildlife Protection Unit" whose function is to protect wildlife against unlawful hunting (GTZ, 1996). The Act specifies hunting seasons, restricts the types and methods of hunting, and outlines license requirements (MTNRE, 1995). Of note is the prohibition of the use of traditional hunting weapons, although wildlife policy does indicate that special consideration would be given to specified tribal groups through appropriate modification of existing legislation. Through the Act and its amendments, hunting of all animal species is regulated (Department of Wildlife, 1995). Other relevant legislation includes the *Forest Ordinance, Cap. 389 of 1957,* which prohibits entry into a forest reserve and the harvesting of wildlife to all but authorized persons (Leader-Williams, *et al.*, 1995; T Malima, 1998).

Current legislation is regarded as not entirely supportive of utilization objectives, specifically because land tenure and wildlife ownership conditions are not conducive to investment. Yet the *Policy for Wildlife Conservation and Utilization, 1996,* recognizes wildlife as an important source of food and as

an integral part of the subsistence economy, making up an estimated 20-25% of total meat consumption in many rural areas of the country. At the same time, unsustainable harvest of bush meat has resulted in severe wildlife declines in many rural areas (Mapunda, 1992; GTZ, 1996; MTNRE, 1996). Strategies to address this issue include the establishment of Wildlife Management Areas (WMA) with the objective that rural communities take responsibility for the wildlife resource and obtain direct benefits through legal and sustainable wildlife utilization schemes. In addition, efforts are outlined to ensure that game meat is not under-valued and therefore illegally and unsustainably utilized (PAWM, 1994; GTZ, 1996).

The Government acknowledges that in the past, large-scale game meat cropping schemes involving high off-take and sophisticated meat processing and distribution systems were economically unsuccessful, and that small-scale cropping exercises undertaken by rural communities are more feasible, and would increase protein and income available to these people (T Malima, 1998). The Government is also encouraging the establishment of more game ranches and farms through an assessment of land tenure issues, and with the aim of ensuring that ranchers/farmers become eligible for the same benefits and incentives that the agriculture and livestock industries currently receive from Government (Melamari, 1989; MTNRE, 1994).

Tanzania's wildlife policy sets the foundation for wildlife utilization and specifically game meat production to play an important role in the future wildlife management and community development aspirations of the country. However, at present these aspirations remain largely hypothetical, and present legislation still reflects a largely restrictive environment for the legal production and use of game meat (TRAFFIC survey data, 1998).

III. CONSUMPTIVE WILDLIFE UTILIZATION CONTEXT

In the late 1980s, a study conducted by IUCN and ITC (1989) suggested that the gross value of wildlife to the Tanzania economy represented USD 128.5 million in 1989, of which USD 95.5 million was attributed to consumptive wildlife utilization and USD 33 million to non-consumptive tourism. Although based on crude estimates, illegal wildlife hunting for bush meat was estimated to be the single largest contribution representing USD 50 million. Formal legal wildlife utilization represented USD 35.5 million, of which the game meat supply mechanisms of cropping, problem animal control and licensed hunting constituted a minimal overall contribution of only 10.9% even when including revenues generated through license fees (ITC and IUCN, 1989). The same trend in the relative contribution of different sources of wildlife meat supply is still evident within Tanzania today, with by far the largest supply of all wildlife meat being obtained through illegal trade and subsistence utilization of bush meat (TRAFFIC survey data, 1998).

i.) Legal Game Meat Utilization:

Although land tenure issues and current legislation can be regarded as prohibitive in terms of promoting the more commercial sectors of the industry such as game farming and ranching, resident and safari hunting, problem animal control and cropping schemes do contribute significant supplies of game meat to many rural peoples throughout a large part of Tanzania (TRAFFIC survey data, 1998). Resident/ safari hunting and cropping are mainly conducted in GCAs and open areas, with problem animal control an important management option in many agricultural areas of the country. Ecological cropping from national parks and game reserves has not been undertaken in Tanzania since the culling of 600 elephants in Mkomazi Game Reserve in the late 1960s (Parker and Archer, 1970, Ecosystems, 1980).

Table 24

Estimated annual legal game meat production in Tanzania

Description:	No. Animals per Annum	Estimated Game Meat Production Per Annum (mt)	Average Price per kg (USD)	Estimated Total Value Per Annum (USD)	Contribution to National Estimate (%)
Resident Hunting (1989-96) Safari Hunting (1988-92)	4,476 5,694	345.9 307.8	0.83 0.83	287,097 255,474	25.2% 22.4%
Problem Animal Control (1988-96)	1,295	210.9	0.83	175,047	15.3%
Game Ranching/Farming	negligible	negligible	negligible	negligible	negligible
Cropping: Commercial Cropping (1982-96) Community Based Cropping (1994-96) Ecological National Parks Cropping	 2,086 825 None	 283.4 133.6 None	 1.16 0.71 None	 328,744 94,856 None	 28.8% 8.3% None
Total:		**1,282 mt**		**1,141,218**	**100%**

Source: TRAFFIC survey data, 1998

Currently, and as seen in Table 24, the greatest legal supplies and economic value of game meat in Tanzania derive from the licensed hunting industry (47.6%), which can be broken down into resident hunting (25.2%) and safari hunting (22.4%). Licensed hunting represents a substantial supply of game meat nationally, although a considerable amount of wastage is thought to occur within the safari hunting industry. Commercial (28.8%) and community-based cropping schemes (8.3%) provide smaller quantities and values of game meat (37.1%) within the country, although in contrast to safari hunting the vast majority of meat is utilized and distributed effectively. Problem animal control provides a lesser but still important supply and value of game meat (15.3%), with the game ranching and farming sector providing almost nothing.

Licensed Hunting:

Resident Hunting: Licensed resident hunting in Tanzania is conducted during the formal hunting season occurring between July and December, with animal quotas being issued to every region by the Wildlife Division (Ecosystems, 1980; GTZ, 1996). Resident hunting is available to three categories of hunters that include Tanzania citizens, Tanzania non-citizen residents, and designated organizations such as Ujamaa villages (Kappara, 1993). A range of 22 animals and a number of bird species are available to resident hunters in Tanzania (Government of Tanzania, 1989; PAWM, 1994). Game meat derived from resident hunting is intended for subsistence use and off-take cannot be used commercially (ITC and IUCN, 1989). In theory, all resident hunters should be accompanied by Wildlife Division district scouts, although this rarely happens. Additionally, since the ban on hunting was lifted in 1978, there has been limited effective control through monitoring and regulation by the Wildlife Division (WD) due to limitations of staff and financial capacity (T Malima, 1998).

Resident hunting fees are very low, especially for Tanzanian citizens with the cost of a Cape Buffalo license being TSH 6,000 (USD 10) for citizens and TSH 27,020 (USD 45) for non-citizen residents. With an open market value of illegal bush meat in rural areas at about TSH 518 (USD 0.83 per kg, 1997 prices), dressed meat from one Cape Buffalo represents an economic value of TSH 132,194 or approximately 22 times more than the cost of a license for a citizen hunter. Such fees cover no more than the administrative cost of issuing the license, and being last reviewed in 1989 have since not even kept up with rates of inflation at about 25% per year. A continuing under-valuation of resident hunted

wildlife is likely to have stimulated the commercialization of hunting, motivated in part through enticing trade profits from meat. This together with a limited level of regulation by District WD officers has led to the misuse of resident licensed hunting within Tanzania, with indications that actual off-take is far higher than allowed for on the license quota (T Malima, 1998).

Government subsidization of resident hunting through provision of cheap licenses, that have no resemblance to its "product value" either through meat or sport hunting, was originally intended to allow a greater supply of game meat to protein deficient rural communities (Kappara, 1993; MTNRE, 1995; GTZ, 1996). However, close to a decade ago, ITC and IUCN (1989) suggested that rural communities benefited negligibly from resident hunting. This was confirmed by PAWM (1994) in 1992 when it was found that over 92% of all resident licenses were issued to citizens from urban centers. As traditional methods of hunting are not permitted under present legislation, and firearms are prohibitively expensive, licensed resident hunting is beyond the means of most rural communities in Tanzania (Melamari, 1989). This effectively has restricted subsidized resident hunting to more affluent urban resident and non-citizen residents, who increasingly look at licensed hunting as a lucrative commercial activity, albeit illegal (T Malima, 1998).

For the period 1989 to 1996, a total of 35,810 animals were officially recorded as being resident hunted, resulting in 4,476 animals per year and an annual meat harvest of 345.9 mt representing a value of USD 287,097. The most popular species shot on average each year are Impala (1,049), Topi (528), Cape Buffalo (370) and Thompson's Gazelle (358). Annual quantities of game meat derived from resident hunting represent a considerable underestimate due to the critical lack of monitoring of both the issuance and returns of resident licenses throughout the country, with data unavailable for many regions (T Malima, 1998). Lack of monitoring, under-reporting, and overuse of licenses catalyzed by the increasing commercialization of the sector has resulted in actual off-take being many times that officially recorded, with ITC and IUCN (1989) estimating as many as 30,000 animals actually taken each year.

Currently, licensed resident hunting is largely unregulated, misused, and contributes very little to the national economy or the food security status of rural communities it set out to support. Although providing access to game meat supplies for increased food security status to protein deficient rural communities is socially justifiable and necessary, in practice licensed resident hunting has not achieved this objective (T Malima, 1998).

Safari Hunting: Safari hunting for non-resident tourists also results in a significant supply of game meat in Tanzania that is generally used as camp staff rations, baiting predators, and a proportion is distributed to local communities in safari hunting areas (Winter, 1991; Cullman, *in litt.*, to R. Barnett, 1998; FCF, *in litt.*, to R. Barnett, 1998). Since its reopening in 1978, the industry has grown rapidly from just the TAWICO parastatal mandated to undertake tourism hunting, to nine companies in 1984, and 31 in 1993 (ITC and IUCN, 1989; Ndolanga, 1992, PAWM, 1993). The total number of hunting safaris has increased accordingly from just over 200 in 1988 to around 500 in 1993 (PAWM, 1993). During this period of development, and especially in more recent years, the industry through a variety of fees (game fees, conservation fees, permit fees, trophy handling fees) has contributed significantly to the economy of Tanzania. In 1990, the industry was estimated to be worth USD 10 million which by 1992 had increased to nearly USD 14 million (PAWM, 1993) from game fees alone, and USD 30 million in total (Edwards and Allen, 1992; Leader-Williams, *et al.*, 1995). At this time the industry was envisioned to have the potential to increase fivefold within ten to 20 years (Winter, 1991), and by 1997 was estimated to be in the region of USD 40 million (Jones, 1997).

Prior to the 1990s, safari operators and central government coffers were largely the only recipients of the revenues accrued through the expansion of the industry, with rural communities obtaining little

other than a limited possibility of employment (Somerlatte, *et al.*, 1989; Wildlife Division, 1993). Since this time, safari operators have given more thought to the people living in or near to their hunting areas (Jackson, 1995; Jones, 1997). The incentive for this change of attitude has been the realization by some operators for a need to invest in the future of what is a lucrative business reported to be worth between USD 20,000 and USD 50,000 per tourist hunter (Edwards and Allen, 1992; TRAFFIC survey data, 1998). Drastic declines in trophy wildlife in key hunting areas such as Maswa-Makau GCA in the 1980s (Hurt and Etling, 1991;Wallas, *in litt.*, to R. Barnett, 1998), caused by rampant bush meat off-take using wasteful hunting techniques such as long line snaring, resulted in a clear perception by some of the leading safari operators that unless the rural communities were persuaded to stop their activities, little would be left to market to overseas clients within a few years (Winter, 1991; Edwards and Allen, 1992; Leader-Williams, *et al.*, 1995).

Their approach has been to try and convince communities that animals may be able to offer more then just a free meal. To achieve this, operators have tried to provide a greater proportion of the financial value of animals derived from safari hunting to communities with the aim that they will be motivated to protect the assets that generate this income (Jones, 1997; T FCF, 1998). Government policy has changed from issuing hunting area concessions on an annual basis to much longer periods of up to five years (Wildlife Division, 1993; Ndolanga, 1995), and this has provided safari operators with the incentive to invest in the future of the hunting area (Winter, 1991; Severre, 1995). This has catalyzed the establishment of community conservation and development projects initiated and sponsored by leading safari operators such as the Cullman and Hurt Community Wildlife Project and the Friedkin Conservation Fund (Cullman and Hurt, 1997; Jones, 1997). Wildlife benefits have mainly been provided through the payment by hunting clients of conservation fees (15-20%), in addition to standard hunting costs, and these have funded community infrastructure improvements and the establishment of village law enforcement patrols and reward schemes in which cash payments are given for recovered snares, firearms and the arrest of poachers (Wallas, *in litt.*, to R. Barnett, 1998; FCF, 1997).

The distribution of legal supplies of game meat has also contributed significantly to the transference of benefits from safari hunting to rural communities (Pasanisi, 1995; T Malima, 1998). In the Maswa-Makau GCA, this has involved the cropping of wildebeest and zebra quotas for meat distribution to the community (Wallas, *in litt.*, to R. Barnett, 1998). However, such safari operator initiated community projects are few. Generally, within Tanzania, meat from trophy hunted animals is likely to constitute the only and most tangible benefit of safari hunting to rural communities. Not all trophy hunted species, however, provide meat for human consumption, with only about 51 mammal species out of the 73 available being considered to provide utilizable meat (Winter, 1991, Leader-Williams, *et al.*, 1995; TRAFFIC survey data, 1998). Annual quantities produced throughout the country are still substantial, and if distributed equitably among rural communities would represent an important benefit from safari hunting. For the period 1988 to 1992, on average 5,694 animals (including predators) were safari hunted in Tanzania annually. Of the principal mammal species that provide meat, it is estimated that 307.8 mt of meat per annum was made available through safari hunting at an open market economic value of USD 255,474 during the period under review (Leader-Williams, *et al.*, 1995; TRAFFIC survey data, 1998).

Unfortunately, not all game meat derived from safari hunting is distributed, due to logistical and financial constraints (Winter, 1991; GTZ, 1996). Hunting is fairly evenly distributed between game reserves that are not occupied by humans, and GCA and Open Areas (OA) where wildlife and humans co-habit (PAWM, 1993). Distribution of game meat from trophy hunted animals in GCAs and OAs is therefore facilitated by the greater likelihood that rural communities would be closer at hand than would be the case in game reserves. In addition, supply is seasonal and available only during the July to December hunting season (Winter, 1991; Edwards and Allen, 1992). The main reasons for limited meat distribution

are the absence of any cash incentive to do so and the fact that hunting camps do not have facilities, such as cold storage equipment, for handling meat (GTZ, 1996). Although the few safari operators who are running community-based initiatives try to ensure as much meat distribution as possible, the majority of operators with no long-term future in a hunting area are less proactive (Winter, 1991; Edwards and Allen, 1992).

Currently, in many GCAs and OAs under intense pressure from illegal bush meat off-take, game meat distribution performs a greater role in promoting the safari hunting industry and the benefits it can provide if viable wildlife populations are maintained. In contrast, rural communities bordering some of the most productive game reserves in terms of safari hunting such as the Selous, Rungwa/Kizigio and Moyowosi/Kigosi, receive negligible quantities of game meat from the industry (ITC and IUCN, 1989; GTZ, 1996; T Malima, 1998). Although currently of importance, the greater distribution of trophy hunted game meat in all areas provides an immediate potential for the safari sector to meet its own objectives as well as government policy (MTNRE, 1995) in achieving greater community wildlife management participation.

Culling and Cropping Schemes:

Because large populations of plains game occurs outside of protected areas, Tanzania has had a long history of undertaking large-scale cropping schemes for meat production (Field, 1979; Field, 1974; Eltringham, 1984). As far back as the early 1960s, the viability of undertaking such schemes for both commercial and social objectives was assessed in four areas of Tanzania (Bindernagel, 1975). An experimental research cropping scheme undertaken in the Grumeti/Ikorongo region of the Serengeti between 1964 and 1967 evaluated the veterinary and processing viability of large-scale cropping, and found it to be perfectly feasible due to the availability of high animal densities, and suggested that effective marketing of game meat would be facilitated by high human populations being located close to the cropping area (Sachs and Glees, 1967). Although feasible in theory, in practice problems encountered in both the processing and marketing of game meat from other cropping schemes throughout the country resulted largely in their failure (Field, 1974).

Between 1968 and 1973 in Loliondo District, a total of 2,780 animals, including 2,184 zebra, were cropped (Ecosystems, 1980). The objective was to crop 10% of the animals counted in aerial surveys (Gogan, 1972; Bindernagel, 1975). Difficulties in cropping, transporting game meat and resistance from cattle dealers in the markets of Moshi and Arusha resulted in the contractors pulling out in the first year. Thereafter, the scheme resorted to relying on zebra skin sales from an annual crop of only 2% (364 zebra per year) of the estimated population (Field, 1979; Eltringham, 1984). In 1968, the cropping of 265 Thompson's Gazelle on the National Development Corporation's ranch between Mt. Kilimanjaro and Mt. Meru (Robinette and Archer, 1971), and a cropping scheme in the Lake Rukwa flood plains in southern Tanzania between 1962 and 1971 was abandoned due to difficulties in cropping sufficient numbers of animals (Reinwald and Hemingway, 1968; Ecosystems, 1980). An experimental crop of 189 animals in the Yaida Valley in northern Tanzania also faced similar problems in obtaining sufficient quantities, as well as in the distribution and marketing of meat to the local Hadza (or Watindiga) nomadic hunter/gatherer peoples (Field, 1974; Bindernagel, 1975; Ecosystems, 1980).

Such experiences indicated that large-scale cropping exercises, involving high off-takes and sophisticated meat processing and distribution schemes, were both impractical and uneconomic. On the other hand, small-scale cropping schemes when undertaken in close cooperation with local communities are now believed to provide greater potential for effective game meat distribution (ITC and IUCN, 1989; MTNRE, 1995). Currently within Tanzania, legal cropping schemes represent an

important supply of game meat to rural and urban communities and can be clearly categorized firstly as community-based cropping schemes, and secondly as cropping undertaken on a commercial basis by TAWICO. Although government policy firmly supports socially motivated community-based cropping initiatives over more large-scale commercially orientated schemes, in relation to quantities of meat produced, commercial large-scale cropping still results in over twice the amount of meat distributed (T Foya, 1998; T Malima, 1998).

Community-Based Cropping Schemes: In Tanzania, community-based activities are seen as an integral component to any long term conservation and development strategy (Melamari, 1989; MTNRE, 1996; Ndolanga, 1995). With a large wildlife base available to many communities living in GCAs or buffer zones surrounding protected areas, game meat supply confers direct benefits to inhabitants and in many cases represents the only form of compensation for living with wildlife (Ndunguru, 1993; SCP, 1995). For the period 1994 to 1996, a total of 2,476 animals of ten species were cropped by all community-based cropping schemes, of which wildebeest (1,665) and Cape Buffalo (653) were culled in the largest quantities. The smaller dressed carcass weight of many species, such as Impala (44) and reedbuck (23), were found to be less economically viable for meat cropping enterprises. A total of 400.7 mt of meat was supplied directly to communities representing 133.6 mt per annum at an economic value of USD 77,488 (TRAFFIC survey data, 1998).

Currently within Tanzania, community-based game meat supply cropping schemes are undertaken around the Serengeti and Ruaha National Parks, Selous Game Reserve and in the Maswa-Makau Game Controlled Area. For the period 1994 to 1996, 222 animals were cropped and distributed by the Serengeti Regional Conservation Strategy (SRCS) around the Serengeti National Park, and in Maswa-Makau Game Controlled Area 300 wildebeest and 120 zebra were cropped by the Cullman and Hurt Community Wildlife Project (Wallas, *in litt.*, to R. Barnett, 1998). The Selous Conservation Programme (SCP) operates the largest formal supply of game meat in five districts (Songea, Morogoro, Tunduru, Liwale, Rufiji) surrounding the Selous Game Reserve (Seige, 1996). The first villages were enrolled in the scheme in 1989 and presently number 41 villages in the community wildlife management programme which affects more than 70,000 people in an area of about 3,000 to 4000 km^2 (GTZ, 1996).

In an area such as the Selous, which is characterized by the prevalence of the tsetse fly and trypanosomiasis (Kabigumila, 1991), wildlife meat is in high demand because alternative domestic meat is unavailable. Hence formal supplies of game meat provided through Wildlife Division quotas are extremely welcomed (Cumming, 1990b; Ndunguru, 1993; Baldus, *et al.*, 1994). Currently, the Selous Conservation Programme (SCP) which was created in 1988 retains 50% of revenues earned from safari hunting (from game fees, conservation fees) and the majority generated from tourism within the reserve (Seige, 1996). The entire project hinges on villages being granted title deeds so that they can be classified as authorized associations and "rent" their Wildlife Management Areas (WMA) to the most lucrative use of tourism or safari hunting (Krischke, 1994, GTZ, 1996). WMAs will consequently allow communities to retain a significant portion of the revenue realized from wildlife in the area, thus meeting government policy objectives of involving rural communities in taking joint responsibility for the management of wildlife and sharing in the direct benefits of its utilization (Lyamuya, *et al.*, 1994; MTNRE, 1995). As a first step in achieving this objective, SCP has initiated village land use plans for all of the 41 villages with the aim of obtaining title deeds necessary for villages to become authorized associations (Kaggi, 1997).

Presently, rural communities obtain little direct benefit from commercial safari hunting apart from some limited meat distribution from trophy hunted animals and in some cases a voluntary contribution from safari operators (Ndunguru, 1994; Seige, 1996). Voluntary safari operators' contributions to

communities are usually limited with, for example, only one out of three operators providing a contribution of USD 2,700 in Songea District. This represents less then one percent of total income generated from safari hunting during 1994. In addition, tourism within the buffer zones of the Selous Game Reserve is limited and hence few benefits accrue directly to communities (GTZ, 1996).

As such and in the current perspective, game meat distribution from allocated community quotas is by far the most tangible benefit from wildlife that communities receive (T Malima, 1998). Sustainable hunting quotas (usually nine large animals per village) are provided on an annual basis and cropping is undertaken by Wildlife Division personnel, although dressing, transporting and the sale of meat is undertaken by the villagers themselves (Krichke, 1994). Sale prices vary and are determined by Village Wildlife Management Committees (VWMC); in 1997 one kg of meat was valued at approximately TSH 428 (USD 0.71) and prices are usually set just below those of illegal bush meat (Baldus, 1989; TRAFFIC survey data, 1998). Usually the meat is dried in the field and then carried back to the village by porters. In rare cases when meat is hunted near to a village, it is distributed as preferred fresh meat which is sold at a price approximately TSH 100 cheaper than dried meat (T Malima, 1998). In all cases, the skin and offal is efficiently utilized with wastage being minimal and the skin being consumed as an edible part of the carcass (Ndunguru, 1994). On average, the VWMC generates about USD 78 per animal and has to pay approximately 21 kg of the meat as a salary to porters (GTZ, 1996). Money raised through the sale of game meat is usually spent on items necessary to service the hunting of the village quota. This includes the building of armories so that villagers can purchase and store their own weapons which will enable them to undertake cropping themselves in the future without the assistance of Wildlife Division personnel (T Malima, 1998).

In addition, VWMCs allocate revenues from meat sales to salaries, equipment, and rations for village anti-poaching teams. Apart from salaries to village scouts, the community does not benefit in monetary terms, but in the provision of preferred and cheap meat which at TSH 428 per kg is under half the cost of less available beef (TSH 800-1200 per kg) (Baldus, 1989; Seige, 1996; GTZ, 1996; TRAFFIC survey data, 1998). Communities also benefit from meat sales through village development activities such as the building of schools, irrigation schemes, brick machines and maize mills under a self help programme in which SCP donates 50% of the funds required for the project with the remaining being provided from meat sales revenue by the community (Baldus, *et al.*, 1994; Kaggi, 1997; Krischke, 1994). Although quotas are limited, the amount of cheap game meat supplied to villagers and the revenues raised through its sale do play a major role in demonstrating the potential benefits of the sustainable utilization of wildlife. They also help finance a greater level of illegal bush meat off-take regulation through village scout law enforcement patrols (T Malima, 1998). This has resulted in a decrease in illegal off-take and a reported stabilization of wildlife populations (Cumming, 1990; Baldus, *et al.*, 1994), which can largely be attributed to the financial and social benefits obtained through game meat.

Household sale of Suni duiker.
IUCN Mozambique

During 1994 and 1995, incomes derived from wildlife in selected villages of Morogoro, Tunduru and Songea Districts consisted of TSH 3,896,701 (80%) derived from game meat sales and only TSH 975,000 (20%) from safari operators' voluntary contributions (GTZ, 1996). Game meat provided

the most direct and tangible returns from wildlife, although during drought and famine years, as experienced during 1996/97, prices of game meat are reduced and sales realize smaller revenues that only just cover processing and distribution expenditures (T Malima, 1998). However, total quantities and revenues generated are usually substantial. For the period 1994 to 1996, a total of 1,624 animals were culled by the majority of the 41 villages in the programme of which Cape Buffalo (413) and wildebeest (1,159) were utilized in the greatest quantities. Smaller species that include such animals as reedbuck, warthog and Bush Pig are seldom taken due to some communities regarding their consumption as taboo, and their size and potential meat production not warranting the time and expense of shooting them. Additionally, firearms available are usually of a large caliber unsuitable for such small species (T Malima, 1998).

To date, however, the entire available quota has never been fully utilized due mainly to the late arrival of quota allocations, leaving little time during the available hunting season to hunt the full quota. During 1996/97, only 45% of available quotas were utilized by villages in the five SCP districts (SCP/GTZ, *in litt.*, to R. Barnett, 1997). Other problems include meat only being available for part of the year during the official hunting season (July to December) when animals are officially allowed to be cropped, leaving the village without meat for the rest of the year. In addition, the source of money used to purchase game meat is generally through the sale of crops at harvest time, resulting in long periods of the year when villagers do not have enough money to purchase meat and therefore cropping is suspended during these times (T Malima, 1998). Regardless, game meat obtained through sustainable hunting quotas remains the most tangible benefit that communities currently receive from wildlife and has resulted in increased regulation of illegal bush meat off-take in the Selous buffer zone and other areas such as western Serengeti where community-based cropping schemes occur.

Commercial Large-Scale Cropping: TAWICO undertakes cropping which results in game meat for local sale in dried and fresh form, processed trophies either for local sale or export, and live animal capture mainly for export (Ndolanga, 1992). Presently, TAWICO undertakes cropping of wildebeest and zebra in the Fort Ikoma, Ikorongo/Grumeti, Loliondo, Mto wa Mbu/Lake Natron, Lolkisale and Simajiro GCAs between January and July of each year (T Foya, 1998). Limited supplies of game meat are sold to local communities in the GCAs, who are generally dispersed and scattered. Most game meat is sold to pre-selected and authorized butcheries within the Kilimanjaro and Arusha regions (Ndolanga, 1992). Due to the lack of refrigeration and long distances to markets, much of the meat is sun dried. In some years, TAWICO reports substantial losses in its game meat cropping and marketing operations from meat wastage through rotting and pilferage. In addition, profits are lower from dried meat in contrast to preferred and higher-cost fresh meat (PAWM, 1992).

Demand for TAWICO game meat is much higher than supply, with only 19 of the 72 authorized butcheries in Kilimanjaro region receiving game meat during 1997, with most indicating that quality of meat as well as quantity is generally low (T Foya, 1998). Although demand has remained high, animal carcasses supplied by TAWICO to Kilimanjaro region have decreased over the period 1982 to 1996, and correspondingly prices have increased above the rate of inflation from TSH 200 per kg in 1990 to TSH 700 in 1997. For whole zebra and wildebeest carcasses, prices have increased from TSH 20,000 and TSH 15,000 in 1993 to TSH 55,000 and TSH 35,000 in 1997 respectively (T Foya, 1998). For the period 1983 to 1997, 31,303 animals were cropped by TAWICO of which 23,078 were zebra and 8,225 were wildebeest. Meat supply over this period was 4,250 mt representing 283.4 mt per annum at a value in 1997 of USD 328,280 (T Malima, 1998). This is a conservative estimate as other species of animal are cropped by TAWICO, with for example 2,688 animals such as Cape Buffalo and gazelles cropped and supplied to Kilimanjaro region between 1982 and 1996 (T Foya, 1998). Although representing an important commercial supply of game meat in Arusha and Kilimanjaro regions,

difficulties in maintaining financial viability of the sector and a declining level of support from the Ministry of Natural Resources and Tourism has resulted in the initiation of TAWICO becoming privatized (Chotara pers. comm., to R. Barnett, 1997)

Problem Animal Control:

Problem animal control (PAC) is regulated under the *Wildlife Conservation Act of 1974*, (Sect. 50) which specifies that any animal may be killed in defense of property or life, although the killing of national game requires the permission of the Director of Wildlife (Stronach and Siege, 1995). Local Wildlife Division personnel usually grant permission, and in the case of larger species assistance is provided with culling. Wildlife policy recognizes the necessity within Tanzania to control wildlife, but concern is noted in the large numbers of animals controlled (MTNRE, 1996), which is felt to be higher than warranted and due primarily to the direct tangible meat benefits received by rural communities (T Malima, 1998).

Meat derived from PAC is legally allowed to be distributed to rural communities as a form of compensation for damage actually suffered, although trophies remain the property of the state (Sect, 50. 3.). PAC has a long history in Tanzania with a staggering 3-4,000 elephants shot per year on control between the years 1922 and 1973 (Rodgers, *et al.*, 1978). In the 1970s when the Ujamaa villagization was initiated, many small villages were moved away from borders surrounding protected areas and re-settled, which resulted in a decrease in human-animal conflict and subsequently the need for control culling (Rodgers, *et al.*, 1982). However, in more recent years and with the ending of Ujamaa, levels of conflict with wildlife have increased in areas such as the Selous Game Reserve (GTZ, 1996; SCP pers. comm., to R. Barnett, 1997), with for example 22 people killed and 17 injured by wild animals in Liwale District during 1994. The resulting antagonism it creates contributes to illegal bush meat off-take (Mwalyosi, 1991; GTZ, 1996; T Malima, 1998). Game meat distribution from PAC animals currently represents the main form of compensation that these communities receive (Ndunguru, 1994; Seige, 1996).

In buffer zones surrounding the Selous Game Reserve, whole elephant carcasses (1,686 kg) are sold at TSH 5,000 (USD 8) which when compared to the cost of a chicken (1.5 kg) at TSH 2,000 not surprisingly entices communities in some cases to falsely report crop raiding, although in many areas communities regard elephant as a taboo species which contributes to its low PAC price (SCP/GTZ, *in litt.*, to R. Barnett, 1997). The potential meat supply from elephants alone to communities if equitably distributed is substantial, with the 25 elephants culled in Liwale district during 1996 representing a dressed carcass weight of over 42 mt of game meat (TRAFFIC survey data, 1998). For the period 1988 to 1996, a total of 11,655 problem animals were reported culled from all regions throughout Tanzania averaging 1,295 animals per annum. Overall, the six animals culled in the largest quantities within Tanzania are the baboon (2,941), monkey (2,799), Bush Pig (2,373), hippo (913), Cape Buffalo (885) and elephant (554). During the period under review, an average of 210.9 mt of meat per annum with an economic value of USD 137,085 was supplied from 18 antelope and pig species reported culled from a total number of 21 species that also included Lion, Leopard and hyena, which are generally not consumed within Tanzania (TRAFFIC survey data, 1998).

Many other species of animal are culled directly by rural communities as allowed for under existing policy, and are not reported to Wildlife Division (Kabigumila, 1991). Hence, national estimates are conservative and still represent a considerable source of game meat that results in tangible compensation for crop raiding or property destruction, although more animals than necessary may be culled due to their meat production value (T Malima, 1998).

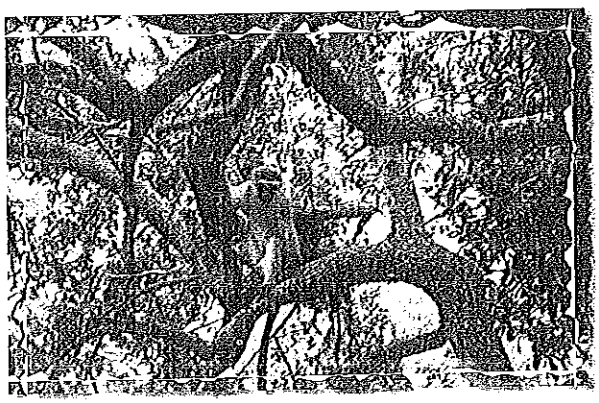
Game Ranching and Farming:

The development of game ranching and farming in Tanzania is still in its infancy and results in almost negligible supplies of game meat because of limiting factors associated with land tenure and wildlife ownership (Leader-Williams, *et al.*, 1995). Tanzania has five crocodile farms and one Ostrich farm currently in operation (T Malima, 1998). No plains game ranches occur within Tanzania. Crocodile farms supply negligible quantities of meat for human consumption, and instead derive income from tourism and visitor fees. The Ostrich ranch mainly obtains income through the sale of live chicks for export (T Malima, 1998). As such, legally ranched and farmed game meat supply is almost non-existent within Tanzania, although the Government (MTNRE, 1996) intends to promote the sector and two management plans for the Nile Crocodile and Ostrich respectively came into force in mid-1993 (Department of Wildlife, 1993a,b).

ii.) Illegal Utilization of Bush Meat

Illegal off-take of wildlife for the subsistence consumption and trade of bush meat has always been a major conservation issue facing Tanzania, with Melamari (1989) reporting that meat poaching was the major issue in 13 out of 27 protected areas within Tanzania. In Moyowosi Game Reserve for example, the occurrence of poaching camps and meat drying racks observed from aerial surveys has increased significantly since 1990 (TWCM, 1994). Bush meat utilization is an integral part of the lives of many communities, and provides a focus for seasonal rituals, rites of passage, and exchange, and also feeds people during times of drought and times of plenty. Bush meat constitutes an important source of protein and income for many people in Tanzania (T Forestor, 1998).

Illegal bush meat utilization is by far the largest supply of wildlife meat within Tanzania due to high levels of poverty experienced by most rural communities (Bagachwa, *et al.*, 1995; MNRTE, 1996; T Foya, 1998), and the unavailability of alternative domestic meat in large parts of southern Tanzania because of tsetse fly and trypanosomiasis. In Infakara Division situated in the Kilombero Valley, which is representative of many areas of southern Tanzania, beef is rarely consumed by only 20% of the population, and has resulted in a heavy reliance and preference for wild meat, which is regarded as a traditional food item. The majority of residents (89%) consume wild meat. This constitutes their main meat source together with fish, and the population of 62,545 inhabitants was estimated to represent a demand of 28.4 mt and 18.3 mt per annum of hippo and Cape Buffalo meat respectively (Kabigumila, 1990). Wildlife meat is not only in high demand in tsetse fly areas, but by many urban and rural communities throughout the country.



Vervet monkey.
Nina Marshall-TRAFFIC

Trade in urban areas is becoming increasingly evident within the Tabora, Lindi, Mwanza and Mbeya regions (T Malima, 1998), and certain towns such as Mahenge in Ifakara Division are believed to have a substantial trade (SCP, *in litt.*, to R. Barnett, 1997). In the past few years in the regions of Kigoma, Kagera and Ruvuma, the emergence of refugee camps has also been thought to result in such high levels of bush meat utilization that little wildlife

currently remains (T Malima, 1998). In certain areas such as Kilimanjaro region where increased human and cultivation densities have resulted in a decline of larger species, hyrax are utilized primarily for their fur, but meat is also highly prized and traded as a lucrative by-product (Kundaeli, 1976). Primates are also utilized in many areas, with Mozambican immigrants in Liwale District reported to consume baboons (Herd, *in litt.*, to R. Barnett, 1997), and in Mbinga District located in Tanzania's southern highlands over 60% of the area's 200,000 residents have now resorted to consuming monkey meat (Ndimbo, *in litt.*, to R. Barnett, 1997).

Smaller bush meat species such as duiker and Suni are traded in substantial quantities on Zanzibar Island with 1,124 animals hunted over six months during 1994 (Archer and Mwinyi, 1995; Williams, *et al.*, 1996). In an island characterized by limited production of domestic meat and a consequent reliance on beef imports from the mainland, bush meat provides an important source of meat protein at the village level and additional income through trade (CWT, 1995). The Suni, Blue Duiker and Ader's Duiker are all hunted mainly through the use of firearms and netting, with the Suni providing almost 80% of all wild meat consumed and traded. Although a smaller proportion of hunters rely on bush meat trade as their only source of livelihood (30%), the majority regard bush meat sales as an important additional income, and mainly sell at the village level with Suni and Blue Duiker obtaining TSH 700 per carcass in the villages (1994 prices) and more than TSH 1,000 per carcass in urban markets. Trade in the urban markets of Zanzibar town has increased with middlemen traders obtaining in excess of 100% profits at an urban retail price of TSH 2,250 per carcass (Archer, 1994).

Hunting for game meat supply in Zanzibar is provided for under the *Wild Animals Protection Act, 1959* (Cap, 128) but hunters and traders are not licensed and do not abide by official hunting seasons, with enforcement of the Act limited as reflected in bush meat being openly sold in urban markets on Zanzibar (Archer, 1994; Williams, *et al.*, 1996). Unsustainable off-take motivated by high demand for bush meat has resulted in a 20-30% decline in population numbers (Archer, 1994), and the viability of future populations of Ader's and Blue Duiker to sustain current hunting pressure is uncertain (CWT, 1995; Williams, *et al.*, 1996). Such declines in utilized bush meat species seem to be an increasing trend and are indicative of many areas throughout Tanzania (T Forestor, 1998).

A wide variety of species are utilized by many different socio-economic and ethnic peoples through out Tanzania, ranging from the Hadzabe (Watindiga) traditional hunter/gatherers in Lake Eyasi to the Chagga peoples in Moshi town (Woodburn, undated; T Foya, 1998). However, and due to Tanzania still maintaining viable populations of larger plains game within and outside of protected areas, species such as wildebeest, Topi, zebra and to a lesser extent Cape Buffalo, hippo and Giraffe are utilized in the largest quantities (T Foya; T Forestor, 1998; T FCF, 1998). In many cases, wildlife populations within protected areas have suffered as a result of prevailing high demand for bush meat and the use of unsustainable hunting techniques. In Maswa Game Reserve during the 1980s, wildlife populations drastically declined because of the use of wire snaring that consisted in some cases of lines of hundreds of snares up to two km long. Illegal off-take was bush meat motivated by sales enticing hunters to obtain as much meat as quickly as possible. Long line snaring under favorable conditions often results in more animals being caught than can be carried out of the area leading to a large proportion of meat wasted (Hurt and Etling, 1991).

Bush meat hunting is also one of the major impacts on wildlife populations within the Selous Game Reserve, with aerial censuses conducted during 1986 identifying substantial quantities of bush meat poachers camps and long lines of snares that in some cases completely surrounded watering holes (T Malima, 1998). Communities in the north west and western boundaries of the Reserve have traditionally relied on bush meat as their only source of protein due to the prevalence of tsetse fly (Ndunguru, 1994), and human populations rising at a rate of 3-6% are causing increased demand (Selous, 1995;

Newmark, *et al.*, 1993). Bush meat demand and use is believed to be prevalent in many areas (Eltringham, 1980), such as Mogori Forest (Wily, 1995), the Ruaha National Park buffer zone, the Mbiki Open Area and Saadani Game Reserve (Kuylen and Mlema, 1991). In the West Kilimanjaro Basin, it is thought to occur at unsustainable rates and represents the greatest impact on wildlife populations (Poole and Reuling, 1997).

Possibly the best known and documented example of the effect that bush meat trade and utilization can cause on wildlife populations and the role it plays in rural communities is provided in the Serengeti ecosystem of Tanzania (TRAFFIC survey data, 1998). Bush meat is important to the people living in and near the Serengeti ecosystem (Mkama, 1997; Muya, 1997; Turner, 1987), and is an increasing commercial activity (Malpas and Perkins, 1986). Socio-economic surveys with selected communities in three of the districts bordering the park in 1993 and 1996 (SNP, 1997) revealed that 54% of people surveyed found the availability of wild animals an advantage to living near the park, and 35% admitted to hunting (37% in Ngorongoro District) reflecting the significant role that bush meat plays in community livelihoods within the Serengeti ecosystem (T Forestor, 1998).

Animal populations within the Serengeti ecosystem are dynamic. Of particular interest is the large increase in wildebeest numbers after the disappearance of rinderpest in the early 1960s. The wildebeest population increased six-fold between 1963 and 1977, and has remained relatively stable at 1.2 to 1.4 million animals since 1977 (Sinclair 1995). As the Wildebeest population was increasing, human population in and around the Serengeti ecosystem also expanded rapidly. There was a general human migration away from the shores of Lake Victoria to the boundaries of the protected areas. Between 1957 and 1967, the population in the area adjacent to the western boundary of the Serengeti National Park increased at the rate of 10% per year (Borner and Maregesi 1985).

Agriculturists and agro-pastoralists inhabit this western area. In the seven western districts the population was estimated at 1,777,620 in 1988 (Hofer, *et al.*, 1996). Within 50 km of the protected area boundary the average population density was 35.2 people per km^2 (Campbell and Hofer, 1995). For the ten years prior to 1988, there was a higher than average population increase (3.5%) in areas close to the protected area boundaries (<10 kms) (Hofer, *et al.*, 1996). Regional patterns of population change were evident, including a large decline in some areas in the northwestern portion of the ecosystem (Campbell and Hofer 1995). Campbell and Hofer (1995) and Hofer *et al.* (1996) speculate that people moved into areas bordering the protected areas because of increased opportunities for hunting and the availability of other natural resources. They also suggest that regional migration patterns may indicate movement from areas where wildlife numbers have been seriously depleted to areas more favorable for hunting (T Forestor, 1998).

Illegal bush meat off-take has long been a problem in the Serengeti (Turner 1987) and it has been estimated that 10,000 animals per year were taken in the 1960s, 30,000 in the 1970s, and 40,000 in the 1980s (Babu 1975; Malpas and Perkin 1986). Hofer *et al.* (1996) used human population figures to estimate a yearly poaching off-take of 159,811 animals (44,958 resident and 111,691 migratory). Mduma (1996) estimates a yearly off-take of 20,000 to 40,000 wildebeest, using estimates of the number of hunting tools and their success rates. He finds this lower estimate to be consistent with wildebeest population dynamics (T Forestor, 1998).

Clearly, poaching in the Serengeti ecosystem is on the increase (Arcese, *et al.*, 1995). Poaching has been expanding from a subsistence activity to a commercial enterprise (Malpas and Perkin 1986). Based on answers to questions posed to arrested poachers, half of all meat poached in the Serengeti is sold (Hofer, *et al.*, 1996). Markets for this meat extend as far as Musoma and Mwanza in Tanzania and

Kisumu in Kenya (Malpas and Perkin, 1986; Muya, 1997). Members of local communities maintain that poaching is increasing because of the high cost of food and the lack of food stuffs during certain times of the year (SRCS pers. comm., to R. Barnett, 1997).

Hofer *et al.* (1996) estimate that there are 17,856 hunters operating in the ecosystem, each killing 8.95 animals per year. Yet very few of these poachers are apprehended. Serengeti National Park rangers arrested an average of 581 poachers per year between 1988 and 1995 (Serengeti National Park, 1997). In Grumeti and Ikorongo Game Reserves combined, 121 poachers were arrested annually between 1993 and 1997 (Amasi and Msocha, 1997). Such low levels of arrest and seizure in an area characterized by substantial levels of bush meat utilization and trade suggests a limited law enforcement deterrent which seems to be a prevailing dynamic throughout the country (T Forestor, 1998)

Although being of primary conservation concern to wildlife conservation, and constituting possibly the largest impact on wildlife populations throughout the country, regulation of illegal bush meat off-take has been limited since the completion of "Operation Uhai" in the late 1980s when a greater sustained level of law enforcement occurred primarily to combat trophy related poaching (Mapunda, 1992). Quantities of bush meat being officially recorded as illegally supplied over the period 1991 to 1997 are low at 156.1 mt or only 22.3 mt per year and are not indicative of the extent of illegal bush meat utilization occurring throughout the country. The numbers of bush meat illegal users arrested in Tanzania are similarly low, with a total of 1,039 people apprehended in areas administered by the Wildlife Division between the years of 1991 and 1997, amounting to an average of about 148 people per year. The total number arrested within Tanzania when taking into account other protected areas administered by TANAPA and NCAA rises to 1,235 in 1996/97, representing 465 actual game cases going to court due to the occurrence of group hunting in many cases. Official records do show, however, that of the 1,039 animals seized with poachers, the larger species such as wildebeest (349), Cape Buffalo (111) and zebra (101) are in most demand due to the larger quantities of bush meat derived from these animals (T Malima, 1998).

The number of arrests made does not represent the only indicator for measuring law enforcement as an effective deterrent to illegal off-take and utilization. In Tanzania, provision is also made under Section 82 of the *Wildlife Conservation Act, 1974* that empowers wildlife personnel to impose spot fines, and under section 76 to erect temporary barriers across roads, and search any vehicle for wildlife products. However, there is a ceiling on the amount of the fine with many not exceeding TSH 200 (USD 0.33) and in most cases are not representative of the meat value of the animal. In addition the *Economic and Organized Crime Control Act, No. 13/84* relates to the hunting and capturing of animals within National Parks (s.16 to Act 27/74) and specifies more severe sentences than those provided for under the *Wildlife Conservation Act, 1974*. However, in practice this law is rarely implemented and is used mainly for trophy related arrests. Low spot fines and limited numbers of arrests suggest that law enforcement within the country acts as a limited deterrent to illegal bush meat off-take, and is still mainly directed at combating trophy hunting (T Malima, 1998; T Forestor, 1998).

Due to limited law enforcement deterrent, low socio-economic status of many communities, and the unavailability of domestic meat in many parts of the country, bush meat continues to play an important role in the food security, nutritional and economic status of many households within Tanzania. This is reflected in current research conducted during 1997 in which communities in the Kilimanjaro region, and those in the western Serengeti and Meatu Districts bordering the Serengeti National Park and Maswa Game Reserve respectively were found to utilize bush meat as an integral part of their daily lives. A summary of the key parameters and dynamics of the trade and utilization of bush meat in these survey areas is provided in Table 25.

Table 25

Dynamics of bush meat utilization in selected survey areas of Tanzania during 1997

Survey Areas:	Western Serengeti (n 707)	Meatu District (n 50)	Kilimanjaro Region (n 983)
Species Utilized:	18 species 83% large, 17% small	13 species 85% large, 15% small	21 species 55% large, 45% small
Proportion Of Users	75%	94%	67.9%
Quantities Utilized (kg)	106.3 mt traded over 8 months	Hunter catch 150.3 kg per month	Household consumes 1.575 kg per month
Bush Meat Most Important Meat Protein Source	95%	55%	-
Demand: Cheaper Prefer Taste Available Habit Other	47% 38.8% 0% 0% 14.2%		
Price of Bush Meat verses Domestic Meat per kg.	Bush Meat USD 0.83 Domestic Meat USD 0.98 Bush Meat 17.6% cheaper		
Supply: % Traded % Subsistence	61.5% 38.5%	57.2% 42.8%	67% 33%
Main Customers	Low income	Low income	Low income
Conservation Implications	1) high demand; 2) trade is greatest supply dynamic; 3) increased prices; 4) declining wildlife populations, but still predominant reliance on larger species; 5) increased use of wire snaring (long lining) and other more "effective" hunting techniques; 6) no identifiable traditional hunting seasons.		

Note: Small bush meat species characterized as those having a dressed carcass weight of less than 5 kg.
Hhld.=Household; n = sample size
Source: TRAFFIC survey data, 1998.

Importance of Bush Meat Utilization:

Current research indicates that bush meat continues to be utilized by the majority of many rural communities living in a variety of diverse areas. The Moshi-Rural and Hai Districts of Kilimanjaro region represent one end of the spectrum by being areas characterized by high human and cultivation densities and reduced wildlife populations, and the western Serengeti and Meatu District areas bordering National Parks and Game Reserves being representative of areas with lower human populations and a larger wildlife resource base. Although the dynamics of bush meat utilization and trade differ markedly across these survey areas, one similarity that is constant is the importance that all communities associate with bush meat. In Hai and Moshi-Rural Districts, 67.5% and 68.3% of households consumed 1.74 kg and 1.4 kg of dressed bush meat per month with an estimated consumption for each district of 529 mt and 261 mt per year, respectively (T Foya, 1998). In the less densely populated survey areas a larger proportion of communities utilize bush meat frequently with over 75% of western Serengeti households consuming bush meat between two and four times a week (T Forestor, 1998), and in the Meatu District over 94% of households in 20 villages utilize bush meat frequently, with 54.3% having a hunting member that on average catches approximately 150.3 kg of bush meat per month (T FCF, 1998).

The bush meat resource in all survey areas provides an important contribution to households' standards of living throughout the year, with a high frequency of bush meat consumption being an integral

component of the daily lives of most residents. Even though the survey areas have significant domestic livestock production, and are not inhibited by the prevalence of tsetse fly, most communities rely more on bush meat than domestic meat with for example 55% of households in Meatu District indicating that bush meat is more important to the household than domestic meat (T FCF, 1998). Reliance on bush meat increases during times of economic hardship with over 95% of consumers in western Serengeti eating more bush meat during such difficult times (T Forestor, 1998).

Bush Meat Species Utilized:

Many species are utilized (Kundaeli, 1976; Makombe, 1994) but primarily larger species are preferred when they are still available in the local environment due to larger quantities of meat supplied per carcass, as indicated by communities bordering Serengeti National Park and Maswa Game reserve who utilize 84.6% and 83.3% of larger species respectively. This compares to people in the high human density area of Kilimanjaro region who have had to resort to a greater variety of the smaller species representing 54.8% of all species used (T Forestor, 1998; T Foya, 1998; T FCF, 1998).

Communities in Kilimanjaro primarily rely on smaller species such as mole rat, dik diks, hare and bird species that are still available within the modified and cultivated habitat. Larger species are primarily supplied from remaining protected areas within each district. In Hai District, 45.7% of the larger species were reported to be hunted from Longido Game Controlled Area and West Kilimanjaro forest. Only smaller species such as birds, dik diks and Grey Duiker were hunted in West Kilimanjaro farm areas (T Foya, 1998). In western Serengeti, the most hunted species are Thompson's Gazelle (391), wildebeest (370), Impala (302) and Topi (265) because their meat is preferred, they are easy to hunt, and their larger size provides good commerce (T Forestor, 1998).

The extent of taboos and totems that regulate the type of species utilized has less impact in areas such as Kilimanjaro District where communities have been forced to search for new bush meat species as wildlife numbers decline. In such cases, the importance of maintaining traditional management systems such as the cultural taboo belief system is outweighed to some extent by the need to maintain bush meat supplies from new sources of species. Consequently in Kilimanjaro, the taboo and totem system plays a limited role (T Foya, 1998). In contrast, a greater number of species are reported to be taboo or totem animals within the context of communities living in areas with a greater wildlife resource base and potential supply of bush meat (T Forestor, 1998; T FCF, 1998). In such areas as western Serengeti, there are a total of 20 taboo or totem species, with no carnivores consumed because they eat other animals, and no primates because they resemble man (especially baboon). Warthog, Bush Pig, and zebra are not eaten for different religious reasons. Bushbuck are culturally forbidden because there consumption is believed to cause leprosy and bad luck respectively, and Aardvark are not consumed due to the smell of its meat (T Forestor, 1998). In western Serengeti and Meatu Districts, indications are that a significant proportion of the communities adhere strictly to these belief systems (T FCF, 1998; T Forestor, 1998).

Tanzania is probably endowed with one of the richest wildlife resource bases in and outside of protected areas in sub-Saharan Africa, and this is reflected in many rural communities benefiting from the larger bush meat species which are still plentiful, although higher human population and cultivation density areas result in the emergence of the need to identify a broader spectrum of species, which is characteristic throughout the countries of this study.

Bush Meat Demand:

Preference for bush meat is based on availability, especially in tsetse areas, but more generally due to cheapness of bush meat compared to domestic meat. Preference for taste is a lesser but still considerable demand dynamic and is likely to be indicative of most rural communities in northern Tanzania. In Hai and Moshi-Rural Districts of Kilimanjaro region, bush meat is in demand predominantly because of its cheaper price (47%) and because of a preference for taste (38.8%). Demand for bush meat is associated with the wealth and socio-economic status of users, with lower income farmers more motivated by its cheap price and relatively higher income civil servants and formally employed residents motivated by a preference for taste and the medicinal values of bush meat (T Foya, 1998).

Rural communities in western Serengeti and Meatu Districts also showed a reliance on bush meat because it is readily available and cheaper in most cases than domestic meat (T Forestor, 1998; T FCF, 1998). The main identifiable groups of bush meat consumers are from lower socio-economic backgrounds in the three survey areas, although comparatively wealthier groups do utilize bush meat (T Foya 1998; T Forestor, 1998; T FCF, 1998). A greater reliance on bush meat by lower income groups is also found in areas adjacent to Selous GR (Newmark, *et al.*, 1993). A large proportion of bush meat users in western Serengeti generate alternative sources of income through subsistence farming (80%), some through livestock production (15%) and the remaining through business, casual labor and more formal employment (T Forestor, 1998), and this is indicative of the trend in predominant users throughout the survey areas (T FCF, 1998; T Foya, 1998).

Bush Meat Trade and Subsistence Use:

The trade of bush meat constitutes the most important source of supply in the survey areas. In western Serengeti, hunters sold 61.5% of their catch during 1997 of which the majority (56.6%) is sold directly by the hunter or household within the local village area, with a smaller amount (36.9%) sold to visiting traders and only 6.5% sold to market vendors. Trade is predominantly localized and involves sales to trusted neighbors. Income derived through bush meat trade is important, with 34.3% of hunter/traders relying on bush meat as their only source of income. The most popular species traded are wildebeest (243), Topi (241), Impala (211) and zebra (109) with a total of 106.3 mt sold over an eight month period during 1997. Meat is sold in many forms. Dried pieces the size of a hand are common, and meat is also sold by the limb, half, neck, chest, ribs, stomach and whole animal. Barter is also common practice with large bush meat carcasses sometimes exchanged for cattle, sheep, or goats. Trader income varied greatly over the study period during 1997, but the average monthly income obtained from bush meat by 173 traders was substantial at USD 93.9 per trader, and likely to be much higher than incomes obtained from alternative livelihoods in the area. Profit margins between buying and selling prices for market vendors were 36.6% and represent a profitable informal industry within the western Serengeti rural area (T Forestor, 1998).

In western Serengeti, the four surveyed villages obtained considerable quantities of bush meat through hunting representing a possible 2,027 animals over an eight month period. Villages located on the boundary of the Serengeti National Park (Area 1) hunted over 66% of all animals due to their greater abundance within the protected area meaning that hunters only have to make short forays into the park of an average of 1.8 days per hunting trip. Villages located at a considerable distance from the park (Area 2) obtained smaller quantities of bush meat although were still motivated by bush meat rewards to commit to the much longer hunting trips necessary of about 13.5 days. In line with a greater supply of bush meat, hunters in Area 1 were able to obtain bush meat for free through subsistence hunting and were motivated to hunt mainly for direct consumption (76%), in contrast to hunters in Area 2 with a comparatively smaller wildlife resource base who hunted mainly for trade (86.6%) (T Forestor, 1998).

In villages on the boundary of the park, hunter/traders sell surplus meat they cannot use, and traders primarily hunt their own supplies and rarely act as middlemen purchasing supplies from hunters. In villages further away from the park, a more developed and directed bush meat marketing system seems to have been established. In these areas, prices are higher due to a stable demand and less potential for supply. Bush meat trader middlemen, in the sense of individuals who buy from hunters and sell to customers or retail traders, are more evident with over 90% of traders operating in this way. In addition, bush meat trade is the sole income source to a higher proportion of over half of all traders in this area. Large hunting camps are set up for several days to a month and meat is dried in the field. Major transportation networks involving people, bicycles and donkeys are necessary to move the meat to the villages and other markets, and in many cases hunters build up supplies of dried meat for sale to visiting traders who transport it to urban markets (T Forestor, 1998). In western Serengeti, it seems that the greater availability of wildlife has led to villages (Area 1) relying on the subsistence supply and consumption of bush meat, in contrast to villages with a smaller available resource (Area 2) resorting to a greater level of trade. Overall, however, the marketing of bush meat is still the major dynamic in all villages surveyed, with over half of all meat sold.

The importance of trade is also reflected in Meatu District and the Kilimanjaro region. In Meatu District 57.2% of inhabitants in 20 villages obtained their bush meat supplies through purchasing with Cape Buffalo, Impala, Boho Reedbuck and warthog being the species most available. Bush meat traders are commonplace within the area and earn average monthly incomes of TSH 18,359 (USD 28.2), which is an important source of livelihood for many full-time traders and part-time hunter/traders (T FCF, 1998). In the survey districts of Kilimanjaro region, 67% of bush meat utilized is obtained through trade, with 33% through direct hunting and meat sharing. Supplies are purchased from legal and illegal traders. Of interest is the dynamic that higher wealth bracket customers, such as civil servants and employed inhabitants, rely on purchasing to a greater extent (70.2%), in comparison to lower income subsistence farmers (60%) who hunt to a greater degree for crop protection but also to obtain meat for free (T Foya, 1998).

Although a preference exists for certain species of bush meat, the predominant criterion seems to be based on the weight and amount of meat supplied from one dressed carcass. In western Serengeti, Meatu and Kilimanjaro rural communities, prices for all types of bush meat are uniform with taste and preference for a species not contributing greatly to its level of utilization. Prices are also similar for dried and fresh bush meat with dried meat being slightly cheaper in Meatu District by TSH 20 per kg and in western Serengeti about TSH 32 per kg more (T Forestor, 1998; T FCF, 1998). Average overall prices in Meatu District were TSH 421 (USD 0.65), in western Serengeti TSH 432.5 (USD 0.69) and in Hai and Moshi-Rural Districts of Kilimanjaro region were TSH 700 (USD 1.13) per kg during 1997. Within each survey area these prices are fairly uniform between species. However, between areas such as western Serengeti and Meatu District that have a larger wildlife resource base and hence supply than Kilimanjaro region, overall prices are much cheaper by about 63%. Average bush meat prices across the survey areas are TSH 517.7 per kg (USD 0.83) and are cheaper by 17.6% than domestic meat prices of about TSH 609.1 (USD 0.98) (T Foya, 1998; T Forestor, 1998; T FCF, 1998). A smaller economic saving from bush meat consumption of only

Giant African land snails for sale in city market.
Rob Barnett-TRAFFIC

17.6% confirms that the unavailability of domestic meats and a preference for the taste of bush meat also play an important role in generating demand.

Conservation Implications of Bush Meat Utilization and Trade:

Even though Tanzania has a large wildlife resource base, high demand and the emergence of a substantial bush meat trade market has placed severe strains on the resource (PAWM, 1994), and many wildlife populations have declined. Pressure from subsistence and commercial bush meat hunting is undoubtedly contributing to this decline with a considerable proportion of communities in western Serengeti, Meatu and especially Kilimanjaro indicating reductions in wildlife populations and corresponding increases in the market value of bush meat (T Foya, 1998; T Forestor, 1998; T FCF, 1998).

Although declines in wildlife populations are reported in all survey areas, they are less severe in Meatu and western Serengeti due to the larger resource base available to these communities bordering protected areas. In Meatu District, 30.5% of households indicated an increase in price and 27.7% felt that bush meat species had become scarcer in recent years (T FCF, 1998). In western Serengeti, 46.5% of hunters indicated a decrease in supply due to fewer animals and increased security, with 38.4% also indicating an increase in prices (T Forestor, 1998). In contrast, 91.7% and 95% of respondents indicated a reduced supply of bush meat in Hai and Moshi-Rural Districts. Prices have also increased substantially in the past seven years by as much as 300%, with a kilogram of bush meat in 1990 costing about TSH 200 in contrast to average prices of TSH 700 in 1997. Larger wildlife declines and corresponding higher prices are associated with increased human settlement and land clearing for agriculture as well as past unsustainable hunting pressure in this area. A stable or increasing demand from a declining resource has increased prices and the variety of species that are utilized (T Foya, 1998). The occurrence of smaller population declines in Meatu and western Serengeti areas may be attributed to population change being less apparent as well as to the occurrence and success of community-based programmes in these areas that are trying to provide viable alternatives to illegal bush meat use.

The continuous supply of bush meat reported hunted and utilized in the three survey areas indicates that hunting occurs at relatively constant rates throughout the year. Hunters in western Serengeti and Meatu District showed no clear seasonal trends or traditional hunting seasons throughout 1997, although it is believed that the hunting of zebra and wildebeest is much less during the November to April rainy season when the majority of animals have migrated (T Forestor, 1998; T FCF, 1998). Likewise in Kilimanjaro region, bush meat is hunted throughout the year, with increase in supply due only to legal sources from TAWICO culling schemes occurring between January and June of each year (T Foya, 1998). Hence traditional hunting seasons and resulting off-season recovery periods for bush meat species do not seem to occur.

In addition, a predominant reliance on more effective hunting strategies occurs in the survey areas and the country as a whole. Subsistence and commercially orientated bush meat hunting is widespread and undertaken predominantly with sophisticated weapons such as rifles, shotguns, muzzle loaders, wire snaring and night torching representing 84.7% (8,245) of all weapons seized between 1993 and 1997 (Wildlife Division, *in litt.*, to R. Barnett, 1998). Methods of snaring are more prevalent within the Serengeti ecosystem with 4,842 wire snares recovered on average each year in the Maswa-Makau GMA (Wallas, *in litt.*, to R. Barnett, 1998; FCF, *in litt.*, to R. Barnett, 1998). In western Serengeti, 42% of hunters indicated that hunting methods have changed to become more efficient with a greater amount of wire snares (44%), night torch hunting (13.4%) and firearms (5%) being used, although traditional bow and arrow hunting (23.3%) is still a frequently used strategy. The same use of more efficient hunting methods is seen in Meatu District where wire snares account for 24.4% of hunting and firearms 4.9%. As with western Serengeti hunters, traditional forms of hunting are still popular such as bow

and arrow (29%) and traditional "Rombo" group hunts (41.5%). Within Tanzania an increase in the use of more efficient weapons is likely to be related to the high trade dynamic associated with bush meat supply and in some areas due to a greater level of law enforcement forcing hunters to spend less time in protected areas (T Forestor, 1998; T FCF, 1998).

The high demand suggests that bush meat off-take represents a significant impact on wildlife populations. However, the conservation implications of such use being unsustainable are not so clear. For example in the Serengeti ecosystem, Mduma (1996) noted that poaching is not the predominant limiting factor in the wildebeest population. Arcese *et al.* (1995) noted that while poaching has seriously impacted rhinoceros and elephant populations in Serengeti, there is "less evidence that hunting has had a significant negative effect on other ungulates." On the other hand, Hofer *et al.* (1996) suggest that unchecked bush meat poaching will become unsustainable in the long run as wildebeest off-take "approaches the limits of sustainable use", and Campbell and Hofer (1995) suggest that the demand for bush meat is far greater than the supply.

Dublin *et al.* (1990) attribute 50-90% declines in Cape Buffalo populations in the north and west of the Serengeti ecosystem to poaching. Campbell (1989) suggests that Giraffe and Waterbuck declines in some areas may be due to poaching and Turner (1987) ascribes a decline in Roan Antelope to poachers. Periodic aerial surveys of wildlife numbers in the Tanzanian portion of the ecosystem are undertaken. During a one-week survey in late November 1996, 56 ±47 poachers' camps were observed. The survey also found significant declines in populations of zebra, Topi, and hartebeest, and non-significant population declines in warthog, Giraffe, Waterbuck, Impala, and gazelles (Thompson's and Grant's merged), though the causes of these declines were not documented (TWCM, 1997). Bush meat off-take has undoubtedly played a role in these population dynamics, but to what extent is still uncertain. Current research, however, does suggest that high demand and the emergence of a predominant trading dynamic is only going to be further catalyzed by increasing human populations leading to an increased impact on wildlife populations in the future.

Although on a national basis, bush meat off-take is regarded as of major conservation concern, positive progress in addressing the issue has been made in the survey areas of western Serengeti and Meatu Districts by community-based management programmes conducted by Serengeti Regional Conservation Strategy, and safari hunting operators (Friedkin Conservation Fund and Cullman and Hurt Community Wildlife Project). These initiatives have led to a greater supply of legal game meat to communities, and a higher level of law enforcement at the village level. As a result 47% of households in Meatu District who reported a decrease in hunting and trade of bush meat attributed this to increased law enforcement which was also believed to have contributed to increasing prices due to the extra risk of hunters/traders being apprehended (T FCF, 1998). In western Serengeti, 21% of residents believed that hunting had decreased as a direct result of the SRCS legal game meat distribution programme (T Forestor, 1998). Such indications are positive, but bush meat trade and utilization still provides critical benefits to the vast majority of communities in the survey areas, and nationally is still the major conservation issue.

IV. SUMMARY/CONCLUSION

Legal game meat supply within Tanzania represents an important source of meat to rural communities estimated to provide 1,282 mt at an economic value of USD 1,141,218 annually. It provides benefits to a large number of people and constitutes in many cases the most tangible compensation for living with wildlife. Resident and safari hunting are the largest legal supplies, followed by commercial and community-based cropping schemes and problem animal control. The game ranching and farming

sector has not developed due to fundamental land tenure and wildlife ownership policy limitations. The expansion of community-based wildlife management programmes, which are supported by government policy, are also not yet facilitated through legislative change. Until such change, game meat supply through licensed hunting, cropping and PAC remains the greatest legal benefit that most communities throughout the country obtain from wildlife. Although within the current context game meat supply is critical for achieving government objectives of greater community participation in wildlife management, its potential is not fully realized, with considerable wastage occurring in all sectors.

Obtaining illegal benefits from wildlife in the form of bush meat is still the predominant and largely understandable trend in Tanzania. The bush meat resource represents one of the most utilized natural resources, and its importance in maintaining standards of living is believed to be substantial. Illegal bush meat use is characterized by the greater reliance on larger species supplied mainly through trade that results not only in community benefits from cheap and generally available meat supplies, but also in the generation of cash income in a country classed as one of the poorest in the region. Although blessed with a large bush meat resource, present levels of use within Tanzania cannot continue indefinitely with signs of reductions in the preferred larger bush meat species already apparent. Action is required to institute sustainable harvesting and use levels so that communities in the future can continue to derive important food and income benefits from the resource.

V. RECOMMENDATIONS

- There is a need to review the licensed resident hunting sector within Tanzania to ensure that the people and nation obtain the greatest possible benefits from the wildlife resource. License fees should be reviewed to reflect the actual value of wild animals, and should not be less than the market value of its meat product. To promote greater use by less wealthy rural communities as intended, the differential fee structure for citizen and non-citizen residents should be maintained and increased. An assessment of the requirement to hunt only using firearms that are largely unavailable to rural communities should be undertaken, and the possibility of allowing traditional hunting weapons and techniques to be used considered. The number of animals issued on one license and to individuals should be restricted to discourage further commercialization of the sector.

  Urgent attention is required to instigate and increase the level of monitoring that currently exists, and greater emphasis should be placed on ensuring higher levels of regulation by WD District Officers in rural areas, with specific attention placed on WD game scouts accompanying all resident hunters. Revenues obtained from increased license fees should be made available to WD to initiate greater monitoring levels.

  Progress made under the Selous Conservation Programme (SCP) and other initiatives in instituting the right of villages to issue and receive payment for "Certificates of Entitlement" for resident hunting in their proposed WMAs, that is in addition to usual hunting fees paid to WD District Game Officers should be actively supported. Cost of village "Certificates of Entitlement" should be based as a minimum on the actual meat value of the hunted species. Increased implementation by communities of such a scheme will result in a greater level of effective monitoring and regulation of resident hunting in proposed WMAs, which is currently not being achieved by WD district game scouts due to limited staff capacity. Experiences gained from the initiation of such a pilot scheme during 1997/98 season under the SCP in Ngarambe village, Rufigi District, should be used to determine the viability of such a scheme. It is hoped that the success of Ngarambe village in charging "Certificates of Entitlements" to resident hunt a Cape Buffalo, for example, at the more realistic price of TSH 150,000, and in ensuring that all resident hunting in the proposed WMA is undertaken only if accompanied by a village scout, will lay the foundation for similar initiatives throughout the country.

- The effective distribution of game meat from the safari hunting sector should be a formalized requirement within hunting concession agreements. As community-based projects initiated by the safari hunting sector currently number only a few, game meat supply constitutes the most immediate mechanism for achieving stated government policy objectives of transferring greater benefits of the wildlife resource to rural communities. Present prices of illegal bush meat, and potential quantities of meat made available through safari hunting is likely to entice village communities to undertake much of the work necessary to achieve greater game meat use of trophy hunted animals. Greater communication between safari hunting operators and communities is needed to evaluate possibilities of community representatives being based in hunters' camps with the sole responsibility for ensuring that meat is recovered and processed.

  If meat recovery is determined not to be practical in a given area, consideration should be given to operators being required to pay a nominal fee in lieu of meat recovery, with the aim of providing financial incentives to ensure as much meat is recovered and distributed. Increased monitoring of meat distribution is required, and could possibly be achieved through hunt return forms making provision for recording operators' meat distribution records for animals hunted. During the Wildlife Division's review of hunting concessions which involves an assessment of the safari operator's records of quota utilization, development of the hunting block, anti-poaching activity, and community participation, their record for meat distribution should be viewed as one of the major indicators for assessing their commitment to rural community participation.

- The process towards achieving the allocation of village title deeds, granting of villages as authorized associations, and the creation of Wildlife Management Areas (WMA) should be supported as a matter of priority. With the creation and effective implementation of WMAs, the wildlife resource is likely to be more effectively utilized according to the most lucrative use option available in the area in question.

  It is recommended that an assessment be undertaken with the view to providing overall community wildlife quotas in such rural areas where suitable community management infrastructure exists. Such quotas should be deducted from the district resident hunting quota and the safari hunting quota in order to maintain a sustainable quota for the whole district. Villages should be allowed to decide on the use of wildlife quotas from their proposed WMAs, and this should include whether they opt for resident hunting, tourist hunting or other forms of wildlife utilization such as cropping for meat production.

  In many areas, the option for obtaining greatest returns from wildlife through sport hunting and/or tourism may be limited due to the unavailability of the large variety of species generally required for tourism, or the trophy species preferred for safari hunting. In such cases, cropping for meat sales and distribution is likely to be the most practical use option remaining to communities. Experience gained by such initiatives as the Selous Conservation Programme and Serengeti Regional Conservation Strategy from community-based cropping schemes should be used to promote and initiate similar schemes by applicable communities. Even in WMAs where safari hunting is a potential use option, game meat supply from trophy hunted animals should be regarded as a complementary activity and village communities should actively communicate with safari operators to identify all hunted carcasses and initiate village porters to dry and collect meat for sale and effective distribution.

- Options for improving the wildlife revenues to local communities from community-based wildlife management programmes are presently restricted due to the prevailing lack of legislative change that would facilitate implementation of government policy for creation of Wildlife Management Areas, and because many suitable community/wildlife areas in Tanzania have limited scope for more lucrative safari hunting or tourism. Within this current environment, large-scale cropping programmes of such species as hippo and zebra have been suggested as one of the possible options for generating additional income for rural communities. Due to past experiences of such cropping schemes, it is recommended that this possible option be thoroughly investigated in detail on a case-by-case basis before any move to initiate such a programme is made.

- Although the necessity in certain circumstances to cull problem animals is recognized, a review of current authorization procedures by Wildlife Division outposted personnel should be conducted to assess ways to reduce numbers of animals falsely destroyed because communities are motivated to obtain cheap supplies of meat. Crop protection shooting should also be fully incorporated into community-based village wildlife management schemes, with the aim that greater community participation will result in the view that wildlife culled for crop protection and the resulting supply of its meat represents a small return in contrast to other uses such as safari hunting for the larger more charismatic species such as elephant. However, in the present legislative environment, concern should be noted that communities currently obtain most benefits from wildlife through its meat supply and, due to the limited returns from such uses as safari hunting, may still be motivated in part by PAC for obtaining game meat until such time as WMAs are fully operational.

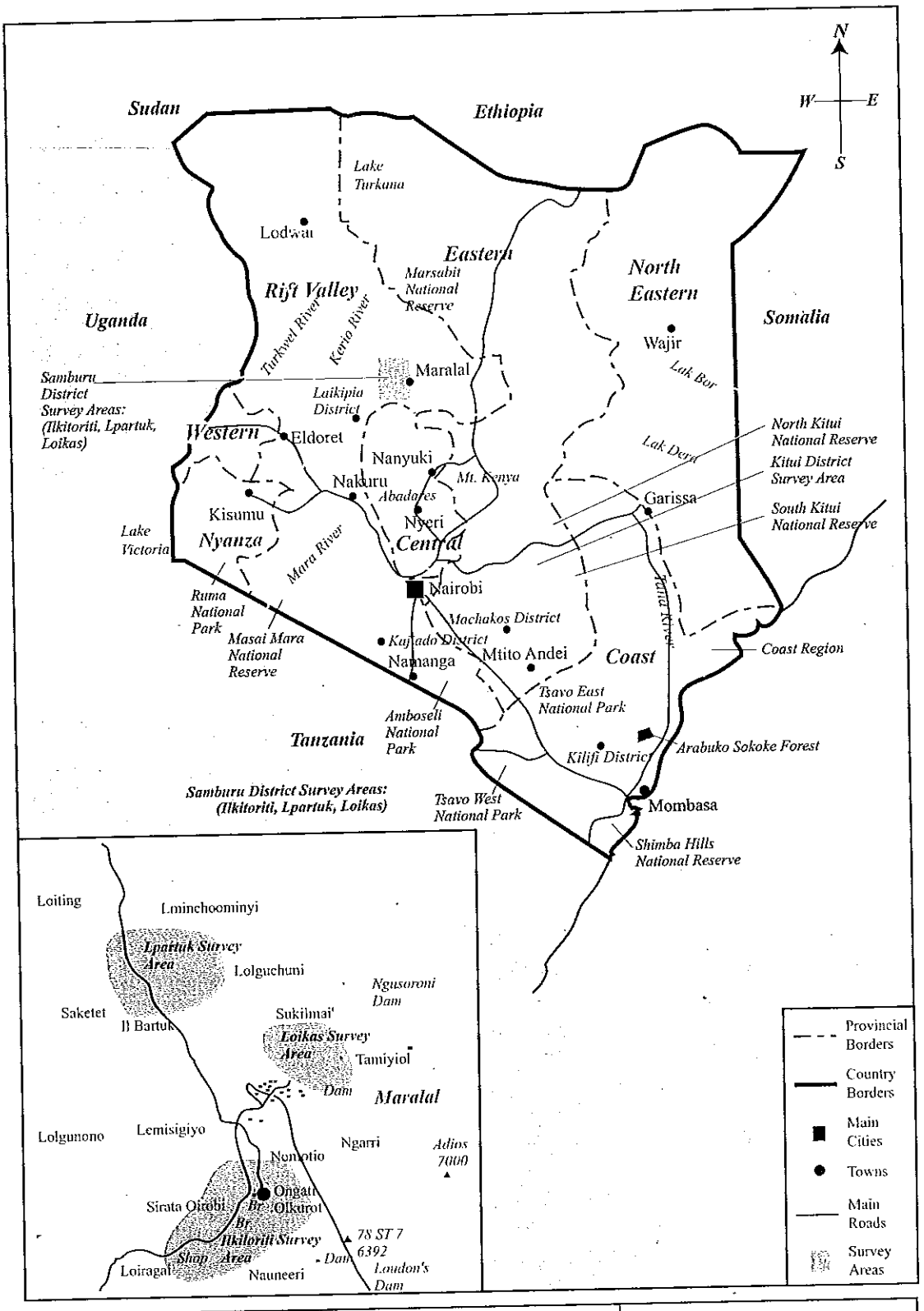
- The current understanding of the impact of illegal bush meat use on wildlife populations and its contribution to community development within Tanzania is still incomplete, and additional research is required. Several pertinent areas of research deserving further study include:

  Research resulting in hard data on the numbers of animals poached and the population dynamics of target animals is essential to determine if fluctuating population numbers are part of normal dynamics or if illegal harvesting is already passing the "limits of sustainability." Up to date information on the population dynamics and status of bush meat target species is required.

  Research on the economic and dietary importance of bush meat to local populations is required. Based on current research it appears to be substantial, as many individuals earn all or part of their income through the trade, and most bush meat is purchased. Consumption is widespread and wild animal meat appears to be a significant part of the diet. Additional quantification of these and related issues is crucial to our understanding of the far-reaching consequences of bush meat procurement, use, and trade.

  Research on what viable protein and income-earning alternatives exist is required. Community-based programmes are trying to increase commitment to conservation, and to develop alternatives to poaching and other illegal activities. The challenge is great and the resources few. Improved knowledge and understanding of the magnitude and intensity of hunters and their harvest, the impact on resident and migratory wildlife populations, and the importance of this source of protein and income to local communities, coupled with identifying socially and culturally acceptable alternatives, can help in formulating and implementing strategies to moderate reliance on bush meat and insure that it is kept within sustainable limits. Active partnerships between development and conservation agencies and local communities will be needed.

KENYA



Survey Areas	Samburu District Lpartuk, Ilkiloriti, Loikas Areas	Kitui District
Survey Sample Size	919 Households	853 Households

CHAPTER EIGHT
KENYA

1. BACKGROUND

Area: 580,644 km^2. ***Population:*** Estimated at 27.7 million with an annual growth rate of 3.7%. ***Density:*** 41 per km^2.

Kenya lies between Somalia to the north, Tanzania to the south and Uganda to the west, with a coastline measuring some 450 km (IUCN, 1990). The country is characterized by a remarkable diversity of people, ecosystems, flora and fauna. These range from the highest montane forests and grasslands in Africa to the most extensive tropical coastal ecosystems on the continent, from highland savanna with its spectrum of "big game" to rich montane remnant forests of the Western Congo-Zaire complex (COBRA, 1991). The central highlands of the country are characterized by high human populations with much of the land cultivated, while the north and east are mainly dry bush land and the south filled with grassy plains. The coastal regions contain mangroves and some forest, while the west is mostly cultivated with a few remaining forest patches and some swamps along Lake Victoria (Marshall, 1998).

In Kenya, over 75% of the population lives in rural areas and is dependent on the agricultural sector for its livelihood. The rest of the economy is also indirectly dependent on agriculture which contributes the most significant proportion of per capita Gross National Product (GNP) levels, estimated at approximately USD 340 (World Bank, 1998). The Government's development strategy since independence in 1963 has been based on the development of the agricultural sector. Accordingly, the Government developed policies and programmes that favored the development of agricultural and livestock activities (KWS, 1995). The need for food security in the face of increasing population pressure and limited arable land led the Government to intensify programmes in semi-arid and arid areas. Most of the programmes comprised tax exemptions and subsidies, high expenditure on research and development, subsidized credit facilities, as well as protection from imported commodities (Mwau, 1995). Tourism is also an important foreign currency earner for Kenya, and its significant contribution to national Gross Domestic Product (GDP) has been largely responsible for influencing wildlife policy to focus almost exclusively on non-consumptive wildlife utilization systems. In 1996, international and domestic tourism generated 9.2% of Kenya's total GNP. Tourism is exceptionally important to the country providing USD 304 million in revenues representing a contribution of 11.2% to total government revenue during 1996 (TTC, 1998), and explains in part the considerable government commitment to protecting the wildlife resource base within the country's protected areas network.

The impressive contribution of tourism to the national economy is based on Kenya's protected area system, which contains many internationally famous national parks and reserves, and its exceptionally rich biodiversity, which includes more species of antelope than any other country (Hillman, *et al.*, 1988). Of the total land area of Kenya, some 7.65% (44,562 km^2) is protected and consists of 22 national parks representing 5%, and a further 41 wildlife areas representing 2.65 % that have been gazetted as either national reserves (30), game reserves, sanctuaries or biosphere reserves (COBRA, 1991; Gichere, 1995a; KWS 1991a). Of the 22 national parks, Tsavo East and Tsavo West account for nearly 80% of the total wildlife protected area within the country (COBRA, 1991). Although the wildlife resource base within the protected area network is far higher than the world mean of 2.65% and the sub-Saharan African mean of 3.5% (KWS, 1991b), these areas only account for 26.5% of the country's wildlife populations (Heath, 1995b; Kock, 1995). The majority of wildlife such as Giraffe, Lesser Kudu, Grant's Gazelle and Gerenuk remain outside of the protected area system, and indeed many of the animals located in protected areas continue to depend on larger dispersal areas that border parks

and reserves (COBRA, 1991; Butynski, *et al.*, 1997). Hence, areas outside of the protected areas network account for the majority of the country's wildlife resources (73.5%) and are critical in many cases to the continued viability of many wildlife populations within protected areas (KWS, 1994).

The tourism industry provides the main incentive for the maintenance of protected areas within the country. Most wildlife management activities in the past has been directed at Kenya's protected areas due to their importance in attracting international tourists, to the detriment of areas outside of the protected area estate (Butynski, *et al.*, 1997). Although progress in addressing this imbalance has been made in recent years through such community-based initiatives as the Conservation of Biodiverse Resource Areas (COBRA) programme, the inequitable distribution of management and policy initiatives in the past has compounded the problems facing wildlife outside of protected areas today (T Esposito, 1998).

In the last 20 years, Kenya has witnessed a dramatic shift in land use patterns with wildlife utilization giving way to other types of land use such as agriculture, human settlement and other development activities (Mwau, 1995). Whereas in the past most wildlife areas were sparsely populated, this has changed within the past 30 years with the human population of Kenya increasing from 8 to 28 million; land is now at a premium throughout the country. A striking feature of this phenomenon has been the rapid movement towards individual land titles through subdivision, and the sale or leasing of land to private individuals for agricultural production. Moreover this trend has taken place in communal land, group ranches, and private land as well as in state land (Heath, 1995a). Under private land ownership, landowners have title to their land and ownership may be granted to individuals, companies or co-operatives and may take the form of ranches or small-scale holdings. Ranches are common in Laikipia and Machakos (Gichere, 1995b). Communal ownership may be in the form of group or co-operative ranches, both having common characteristics in that they are in imminent danger of subdivision in many areas. Group ranches are located in the pastoral areas e.g. Narok, Kajiado, and Transmara Districts where land is governed and managed on the basis of customary law (KWS, 1995).

Increasing human populations and demand for land have resulted in considerable wildlife declines in areas outside of the protected area estate (Hillman, *et al.*, 1988). In high potential agricultural areas such as found in western Kenya, wildlife has proved to be incompatible with agriculture and has largely disappeared. The majority of wildlife is now found in the rangeland areas that are suitable for pastoralism, and on ranches that manage livestock extensively (COBRA, 1991). Certain flagship species, located almost exclusively in protected areas that are important to the lucrative tourism industry, have made significant recoveries since 1989. Between 1970 and 1990, severe commercial poaching, lack of wildlife authority capacity and extensive corruption within the system (Leakey, 1988) led to the reduction of the country's elephant population by 85%, with numbers falling from 150,000 to 20,000 (Western, 1991). In 1995, the elephant population had recovered to 25,000 animals (Butynski, *et al.*, 1997), although analysis of wildlife population trends outside of protected areas by Grunblatt *et al.* (1996) revealed that populations of most wild ungulates have declined drastically by 40-60% since the 1970s. Although most declines were observed over the 1970 to 1980s period, ten out of the 14 declining ungulate species exhibited continuing declines until the last census survey in 1994.

Reasons for the considerable declines in wildlife numbers outside of protected areas are mainly attributed to increased subdivision, fencing, land encroachment and rangeland degradation due to extensive agriculture and pastoral production in many areas of the country (Hillman, *et al.*, 1988; COBRA, 1991; KWS, 1991b; KWS 1994; KWS, 1995). Although these developments are believed to produce the primary impacts on wildlife populations within the country, a traditional reliance on the wildlife resource for meeting protein requirements by many ethnic groups is also believed to have major impact on the status of wildlife populations (Parker, 1977a; Mogaka, 1992; Fitzgibbon and Mogaka, 1994; Obari, 1994; Gichere, 1995b; Heath, 1995a; Mwau, 1995; KWS, 1995). In certain areas of the country such

as Northern Province where human populations densities are less (5 per km^2), illegal hunting in the context of the increasing insecurity of the area is likely to result in the largest impact on wildlife populations (Hillman, *et al.*, 1988; Butynski, *et al.*, 1997; T Esposito, 1998).

Substantial increases in the human population in the last decade, together with high levels of poverty and food insecurity in many provinces, has increased reliance on the bush meat resource. Currently, this resource is believed to be important to many more areas and ethnic groups than previously documented (MPND, 1998). Outside of the protected areas estate, wildlife policy and legislation since 1977 remains the most restrictive of those countries examined in this study in terms of options for consumptive uses of wildlife. This factor has resulted in the utilization and trade of bush meat throughout the country being undertaken secretly. As such, the extent of past research on the use of the resource is limited, although its absence does not reflect a minimal use. In contrast, current research suggests that the utilization and trade of bush meat is an ongoing but increasing activity in many areas of the country (T Nalugala, 1998; T NRP, 1998; T Esposito, 1998).

II. POLICY AND LEGISLATION

In Kenya, all wildlife comes under the jurisdiction of the Kenya Wildlife Service (KWS), which was established in 1989 and falls under the Ministry of Tourism and Wildlife (KWS, 1995). The Kenya Wildlife Service is a parastatal organization that is entitled to retain and use its own revenue (Butynski, *et al.*, 1997). It is responsible for protecting and conserving all of the country's wildlife resources and for managing most of the terrestrial protected areas such as national parks, game reserves, national reserves, nature reserves, and all of the marine national parks and reserves (Mulolani, 1995; Butynski, *et al*, 1997). Kenya has 30 national reserves that were created in 1933 by the Kenya Land Commission which are currently under the management of local authorities, with the exception of Marsabit, Shimba Hills and the marine national parks and reserves that are managed by KWS. These reserves are located on trust land, which is held in trust by County Council local authorities, on behalf of the customary users, with KWS playing only an advisory role in their management (Gichere, 1995a).

Throughout recent history, Kenya's wildlife authority has alternated between supporting and restricting the commercial exploitation of wildlife. On attaining independence in 1963, the Kenya Government retained the State monopoly on wildlife use ownership with minimal use rights granted to landowners (Parker, 1977a; Mwale, 1995). The 1960s gave way to a new innovation of granting regular quotas to landowners with extensive game stocks, enabling them to sell hides and other trophies, but not meat. However, pressure gradually built up to permit the sale of game meat. Initially, authorities responsible for public hygiene standards opposed this on the grounds that a clean product would not be possible. However, in 1971, it was agreed that game meat could be sold if it was produced to the same standards covering the slaughter of domestic stock in Government-controlled abattoirs. A game cropping exercise on Kekopey Ranch was the first endeavor to meet these requirements in a commercially viable operation (Parker, 1977b). In 1975, the Government outlined a concept of conserving and managing wildlife while optimizing returns from its utilization for the benefit of landowners who co-existed with wildlife (*Sessional Paper No 3, 1975*). This concept was incorporated in the *Wildlife Management Act of 1976* (Ottichilo, 1995; TCK, 1995; Heath, 1995b), which allowed for sport hunting, cropping for game meat and game ranching and farming (Mwale, 1995).

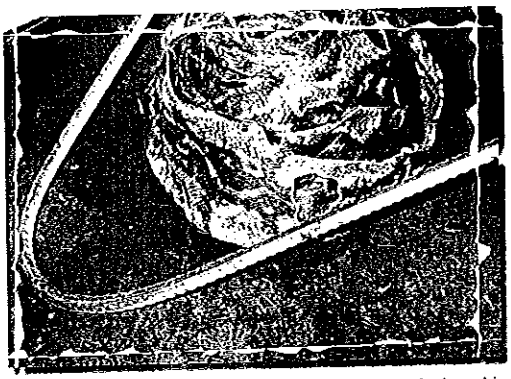
However, the Wildlife Conservation and Management Department (WCMD) was largely not capable of implementing the policies contained in both the 1975 policy and 1976 Act. Eventually, WCMD's inability to manage consumptive utilization led to the ban on hunting and trade in wildlife products in 1977, which effectively ended all consumptive utilization by landholders (Parker, 1977b; Ottichilo,

1995). The Government of Kenya banned all mammal hunting in Kenya (*Legal Notice No 120, 1977*) and one year later, followed with a ban on the sale of trophies and wildlife curios (*Act No 5, 1978*), thereby putting an end to the once thriving legal consumptive utilization of wildlife (Mwau, 1995). The main objective of and rational for this policy reversal, was that it intended to halt a widespread and rapid depletion of wildlife numbers that had occurred during the 1970s as a result of illegal bush meat and trophy hunting (Leakey, 1988; Bensted-Smith and Cobb, 1995).

Since the ban, Kenya has maintained a very restrictive consumptive wildlife utilization stance, with wildlife policy focused on the promotion of all non-consumptive forms of utilization such as photographic tourism to achieve greater wildlife management throughout the country (Ottichilo, 1995). Government policy generally asserts that consumptive utilization through safari hunting in particular is incompatible with the conservation of wildlife and sustainable use of the resource (TCK, 1995). In general, policy has been formulated that reflects the view that although the commercial utilization of wildlife is recognized as a potential integral component of management, that the tourism viewing benefits in Kenya are probably greater than those that could be derived from the consumptive utilization of wildlife (Leakey, 1990). The significant contribution of photographic tourism to the national economy has largely promoted the non-consumptive wildlife policy of the country (TTC, 1998). Hence, mechanisms for achieving "the sustainable use of the country's wildlife resources for the benefit of the nation and people", an objective forming the basis for the establishment of the KWS, have mainly consisted of non-consumptive wildlife management programmes (T Esposito, 1998).

Kenya's wildlife policy is embodied in the *Statement on Future Wildlife Management Policy in Kenya* (*sessional paper No.3 of 1975*) and the *Policy Framework and Development Programme 1991-1996* document that was produced by KWS in 1990 and reflects the non-consumptive stance that wildlife management has continued to take within the country (Ottichilo, 1995; Mulolani, 1995). Although KWS is in the enviable position of being a parastatal with the ability to retain all revenues it derives from protected area visitor fees, it has since the early 1990s relied heavily on external donor support. In 1992, the Protected Areas Wildlife Service (PAWS) project funded by the World Bank and other donors commenced its first five year USD 143 million phase, with the objective that KWS would evolve into a sustainable self-financing wildlife authority based on the lucrative tourism industry (Butynski, *et al.*, 1997).

Although significant progress was made towards this goal, a reliance on only non-consumptive tourism revenues restricted the ability of KWS to fully maximize the range of possible revenue earning options that the country's wildlife provided. Progress in achieving sustainability was clearly linked with the performance of the international tourism sector, with domestic tourism providing minimal and far less lucrative returns (T Esposito, 1998). For the period 1985 to 1994, the potential for the international tourism industry to sustain the costs of wildlife management in the country looked promising with international tourist arrivals increasing from 541,000 to 863,000 (Butynski, *et al.*, 1997). However, the tourism industry is renowned for its sensitivity and fickle nature and due to factors such as adverse weather conditions (El Niño) and internal political trouble, visitor levels stabilized and declined, resulting in reduced revenues to KWS and a continuing heavy reliance on external donor support (T Esposito, 1998). The extent to which the required level of donor support



Python skin.
Rob Barnett-TRAFFIC

will be made available is uncertain, leading to consideration of other avenues of generating revenues, including the reintroduction of safari hunting (Cumming, 1990b; Nation, 1995) and increased support to the game ranching and farming sector (T Esposito, 1998).

Actual changes in the direction of policy have been related to the increasing recognition in Kenya, as elsewhere in Africa, that conservation cannot succeed without the active participation of local communities in wildlife management that is achieved through the greater devolution of financial and social benefits from the wildlife resource (Olubayo and Grootenhuis, 1990; SCP, 1995). Progress at meeting these objectives in the past had largely been unsuccessful. Since the 1970s, there have been attempts to involve pastoralists living adjacent to Amboseli National Park and the Masai Mara National Reserve in managing wildlife and tourist developments in and around these protected areas (Douglas-Hamilton, *et al.*, 1988). Despite a promising start to the Amboseli scheme (Western, 1982), the direct benefits to landowners on group ranches were few and generally insufficient to provide real incentives to conserve wildlife or adopt a wildlife management option (Lindsay, 1987). Less than one percent of the KSH 198.2 million earned in the Masai Mara area from tourism in 1987 went back to the group ranches (Cumming, 1990b).

As a result of past difficulties, and the emergence of an increased importance associated with involving local communities in wildlife management, policy from the early to mid-1990s began to involve a greater community emphasis with the introduction of a Community Wildlife Programme aimed at developing benefits from protected areas to those living on adjacent lands (Butynski, *et al.*, 1997). Capacity remains limited in introducing more effective community participation and wildlife management beyond the borders of Kenya's protected areas due mainly to the large mandate of KWS in managing all wildlife resources in the country. The Kenya Wildlife Service's widely publicized policy of sharing 25% of all national park revenues with local people has not been implemented and is regarded as largely impractical at this time in view of KWS's goal of financial self-sufficiency (KWS, 1994). Although certain protected areas and other wildlife areas under group ranches and conservancies have achieved notable success, most rural communities living in wildlife areas that attract significant tourism visitors receive limited benefits (both social and financial) from the non-consumptive use of wildlife. In addition, tourism benefits are only available to a small number of communities living in wildlife areas, due to most being unsuitable for attracting international visitors because of poor infrastructure, lack of the "big five" species, or in general, not being scenically beautiful (T Esposito, 1998).

The reliance on non-consumptive tourism imposed by current wildlife policy and legislation has restricted the variety of options that would become available to many communities if consumptive utilization such as safari and resident hunting were allowed. As seen in other countries of the study such as Tanzania (Selous Conservation Programme), Zimbabwe (CAMPFIRE), Zambia (LIRDP, ADMADE) and Botswana (NRMP), community-based programmes rely heavily on consumptive wildlife utilization options such as safari and resident hunting, and community-based cropping for game meat distribution. Revenues from such uses provide the bulk of financial benefits accruing to communities with photographic tourism in most cases being of secondary importance (SCP, 1995, Kalyocha, 1996; LIRDP, 1997; NRMP, 1994). The tangible distribution of affordable and even free supplies of game meat from all consumptive uses plays an important role in these community-based programmes (T Esposito, 1998).

Consumptive options are more applicable to many rural areas and provide increased possibilities for devolving more benefits to communities through revenue and meat distribution. However, the lack of such options is seen by many as one reason for the limited progress made in greater community participation in wildlife management outside of protected areas in Kenya, and for the continuing decline in wildlife populations in these areas (TCK, 1995; Kock, 1995). Such proponents argue that without the potential for wildlife to provide a benefit to communities, wildlife will continue to be viewed

negatively in terms of crop raiding and competition for grazing, and will be impacted by increased subdivision, fencing and illegal hunting for meat and trophy. Consumptive wildlife utilization, it is argued, provides increased potential for landowners and communities to derive benefits from wildlife that will result in their viewing the resource as a competitive land use. Hence, greater involvement should result in sustainable management (T Esposito, 1998). Others argue that such use would be impossible to regulate or control, and that uncontrolled exploitation of wildlife would soon reach the levels experienced in the 1970s and 1980s. This would threaten the tourism industry and reduce its importance to the national economy (TCK, 1995).

Current wildlife policy largely continues to reflect this latter view (Ottichilo, 1995). Currently, the principal legislation affecting the utilization of game meat is the *Wildlife (Conservation and Management) Act of 1989* (Mwale, 1995). Ownership of wildlife in Kenya is vested in the government on behalf of the people, and user rights are only granted to landholders under special dispensation from the Director of Kenya Wildlife Service (KWS, 1990; AWF, 1997). Because user rights for the consumptive use of wildlife are not legally provided for, many landowners have been unwilling to invest in game ranching and cropping for meat production, and have adopted a wait and see attitude that has been largely responsible for the under-development of the industry (KWS, 1994). The forms of consumptive utilization that result in the provision of game meat that are allowed under current legislation are limited and include game ranching and farming on a pilot utilization programme basis, licensed bird hunting and problem animal control (Mulolani, 1995; T Esposito, 1998). The principal *Wildlife Act of 1989* consolidates and amends earlier legislation and sets out the provisions for the control of hunting, issuing of hunting licenses and the prohibited methods of hunting. The Act also includes the schedules of game animals, birds, and protected species (KWS, 1990).

A 1997 draft *Wildlife (Conservation and Management) Bill, 1996,* is being internally reviewed for presentation to parliament and, although still restricting consumptive wildlife use options within Kenya, does recognize the possibility of its increasing role in wildlife management, and importantly devolves ownership of wildlife to authorized game ranches and farms, together with the recognition that the state may grant wildlife user rights to individuals, groups or corporate bodies (Wanjala, and Kibwana, 1996). The increased importance of the game ranching and farming industry in Kenya is the one component of current policy that has been expanded in recent years. Although always a provision within Government policy (*Republic of Kenya, 1975*) since the 1977 hunting ban, the policy has not been clear until recently (TCK, 1995).

III. CONSUMPTIVE WILDLIFE UTILIZATION CONTEXT

Rural communities in many cases do not receive tangible benefits from the wildlife resource. Indeed, conflict with agricultural and livestock production land uses has resulted in wildlife being viewed negatively by many (Pendry, 1996). Progress in achieving greater community participation in wildlife management has been limited and restricted by current non-consumptive wildlife utilization policies (T Esposito, 1998). Although prohibition of the use of bush meat is well defined in current legislation and policy, increasing poverty levels and unemployment rates within the country (MPND, 1998), and a lack of law enforcement capacity especially outside of protected areas, has resulted in bush meat being increasingly utilized illegally for protein supply through subsistence consumption, and also for generating cash incomes through trade. The effect of increasing reliance on the bush meat resource on wildlife populations is believed to be extensive, and has been expounded by the dynamic that many land owners throughout the country regard wildlife occurring on their lands as an unwanted asset and consequently are not adverse to its removal through illegal bush meat hunting, or legal means such as fencing (T Nalugala, 1998; T Esposito, 1998; T NRMP, 1998).

The legal game meat production sector primarily consists of game ranching and is not promoted on a national basis as an integral part of policy. In Kenya, many marginal areas are being threatened by the subdivision of land, which has been promoted by a rapidly growing human population and a reduction in financial returns from cattle ranching (Bos, *et al.*, 1996). The unsuitability of these marginal areas for small-scale agriculture has led to land degradation, and this increases the importance of the role that wildlife ranching can play by providing a more sustainable land use option. However, limited support, policy and legislative restrictions have resulted in the industry remaining under-developed and contributing little to promoting wildlife as a land use option (T Esposito, 1998).

i.) Legal Game Meat Utilization

Since 1977, wildlife utilization in Kenya has focused predominantly on non-consumptive tourism, which contributes significantly to the national economy (Mwau, 1995), whilst the consumptive utilization of game meat has remained restricted. In national economic terms, the legal game meat industry barely exists in Kenya. In 1995, the annual legal trade in wildlife products (meat, skin) amounted to a total of USD 650,000 in value, made up of USD 340,000 from ranching for meat production, USD 100,000 for crocodile farming, USD 170,000 for Ostrich farming, USD 15,000 for butterfly farming and USD 25,000 for bird shooting (KWS, 1995). In comparison to the estimated value of the tourism market at USD 304 million during 1996 (TTC, 1998), game meat production revenues are almost non-existent. Taking into account that the current revenue sources for wildlife management in Kenya are derived mainly from international tourists and donors who are to some degree influenced by current wildlife protectionist attitudes prevalent in western developed countries, it is perhaps not surprising that current policy refrains from considering a more consumptive utilization approach (T Esposito, 1998).

As seen in Table 26, the total annual game meat production for the period under review of 1987 to 1997 was estimated at an annual average of 692.2 mt with a value of USD 590,043, of which game ranching was by far the largest contributor (94%). Game farming of crocodiles provides a limited supply of game meat (3.4%), while Ostrich farming is believed to contribute greater amounts. Official records for problem animal control within Kenya reveal a negligible national supply (1.8%) although

Table 26

Estimated average annual legal game meat production during 1987-1997

Description	No.	Estimated Game Meat Production Per Annum (mt)	Average Price per kg (USD)	Estimated Total Value per Annum (USD)	Contribution to National Estimate (%)
Game Ranching	54 ranches 5,273 anim./yr	556.5 mt	USD 0.865	USD 481,372 (Direct) USD 73,454 (Value Added)	94%
Crocodile Farming	4 farms 1,518 anim./yr.	5.9 mt	USD 3.33	USD 19,647	3.4%
Ostrich Farming	n/a	n/a	n/a	n/a	n/a
Problem Animal Control	332 anim./yr.	127 mt	USD 0.86	USD 10,922	1.8%
Licensed Bird Hunting	3,588 birds/yr.	2.8 mt	USD 1.66	USD 4,648	0.8%
Protected Area Ecological Cropping	none	none	none	none	none
Total		**692.2 mt**		**USD 590,043**	**100%**

Source: TRAFFIC survey data, 1998.

it is likely that this represents a considerable underestimate due to non-reporting of many problem animals culled. Bird hunting (0.8%) yields almost non-existent supplies of game meat and revenues on the national scale. Ecological culling of animals in protected areas of Kenya has not been conducted since the 1960s when the Galana Game Management Scheme was implemented in the Tsavo National Parks (Parker, 1977b).

Licensed Bird Hunting:

The hunting ban imposed in 1977 related to all game animals (as per First Schedule of the Wildlife Act), but through legal notice in 1984 the ban was partially lifted for the limited hunting of birds under license (KWS, 1990). The hunting of game birds in Kenya is still provided for under the *Wildlife (Conservation and management) Act of 1989,* and a total of 78 species of birds can be legally hunted under license (Cap 376). However, only about 25 species of francolin, sand grouse, guinea fowl, duck and quail are actively hunted. The country is currently divided into ten hunting areas, which are further divided into hunting blocks of variable size (Eves, 1994). Resident and non-resident hunters are allowed to undertake licensed bird hunting in Kenya. Each hunting block can only be hunted by at most eight people and for a maximum of four consecutive days, after which there must be a four day rest period.

Hunters must pre-book hunting blocks and payment for licenses is made on a daily basis in advance. License fees are paid at KWS headquarters and are KSH 100 for residents and KSH 300 for non-residents (T Esposito, 1998). The hunting season for each hunting block varies and is established each year according to rainfall data but generally occurs for a seven month period. Hunters are required to renew their hunting licenses each year at a cost of KSH 1,000 for residents and KSH 3,000 for non-residents (Eves, 1994; T Esposito, 1998). Quotas are based on a 100 bird daily bag limit. Birds obtained are not allowed to be commercially traded, and in general are subsistence consumed but reports do exist of some limited trade (Rajan, pers. comm., to R. Barnett, 1997). Such low license fees do not represent the meat or safari sport value of birds obtained. Even if only half the allowable daily quota is filled, this amount equates to a traded meat value of KSH 5,000 (using legal Nairobi bird sales prices observed during 1997) (T Esposito, 1998). A portion of license fees are provided to the landowners of hunting blocks, but given the present under valued cost of these licenses, the amounts accrued are negligible (Eves, 1994; T Esposito, 1998).

Overshooting of bird license allocations is not believed to be a frequent occurrence. All hunters are required to report to the KWS station nearest to the hunting block, and a professional hunter must accompany non-residents. Returns from hunting licenses stating the number of birds shot are required and generally adhered too. The need for pre-booking hunting blocks also increases the efficiency of monitoring the bird hunting sector in Kenya, although this is also facilitated by its limited nature. For the period under review (August 1996 to January 1998), a total of 5,383 birds of 31 different species were officially recorded as being hunted, with Yellow Neck Spur Fowl (30%), doves (15%), guinea fowl (11.2%) and francolin (4.3%) being hunted in the largest quantities. Estimates amount to a very small quantity of bird meat being made available from the sector at 2.79 mt per year (T Esposito, 1998).

Problem Animal Control:

Human-wildlife conflict is a critical conservation issue in Kenya, and it is increasing in importance as human populations continue to expand at alarming rates (Ottichilo, 1995; Mwale, 1995). Considerable antagonism is caused by wildlife through endangerment of human life and crop raiding. Conflict occurs to a greater extent in the high potential agricultural areas of the country such as the central highlands,

and in Shimba Hills and Taita Hills (KWS, 1990). Crop raiding results in substantial losses to livelihoods. Omondi (1995), in Laikipia District during the early 1990s, found that out of 2,957 farms, 105 incurred heavy crop losses that amounted to USD 33,000, and in the Masai Mara the majority of farmers reported maize crop losses of KSH 10,000 per annum. Loss of life is also a major issue contributing to increased community antagonism to wildlife with wild animals killing 230 and injuring 218 people between 1989 and 1994 (KWS, 1994). In many cases, such increased antagonism results in illegal hunting to resolve conflicts directly, and to obtain benefits through meat from the problem resource (T Esposito, 1998).

As a central tenet of its wildlife policy, KWS aims to reduce conflict between wildlife and legitimate human activities. This has involved a compensation scheme that is paid by central treasury for deaths and injuries caused by wildlife, but not for crop damage (*Compensation Act, Cap 376 [Amendment] of 1976*) (TCK, 1995). Such schemes, however, have been problematic with current payments for loss of life being limited at KSH 30,000 (USD 500). Payment procedures are inefficient and extremely slow with periods of five years elapsing in some cases before affected families receive payment (KWS, 1990). In the Voi and Taveta Districts, for example, some 36 people were killed by wildlife between 1989 and 1994, but by 1995 not one family had received any compensation (KWS, 1995). As prevention is often the best cure, KWS has instigated a policy of fencing to contain problem animals within the boundaries of protected areas surrounding densely settled agricultural land such as in the Shimba Hills and Aberdares (Western, 1995; Butynski, *et al.*, 1997). Although effective in such areas where fencing has been erected, the scale of the problem and huge costs involved have resulted in a limited national impact at resolving the issue (T Esposito, 1998). As such, the key management option still used in Kenya is the culling of problem animals by the KWS Problem Animal Management Unit (PAMU) personnel and communities themselves. The culling of problem animals results in significant supplies of game meat (Parker, 1977a; Gichere, 1995b).

The culling of problem animals in Kenya is provided for under *the Wildlife Conservation and Management Act (Amendment) of 1989*, where species scheduled as "protected" (endangered species, immature and pregnant animals) can only be culled by KWS personnel. For the culling of problem elephants, permission from KWS headquarters is required (T Esposito, 1998). Other species scheduled as "game animals" may be killed by ordinary citizens in "defense of property and life" only if KWS personnel are unable to deal with the problem in time. In such cases, however, the citizen must inform KWS who then come to deal with the carcass. Species scheduled as "vermin" which include the renowned crop raiding species of porcupine, hedgehog, queleas and mouse birds, may be culled by citizens without informing KWS (KWS, 1990). In many cases, however, lack of vehicles and staff capacity in the field result in KWS PAMU responding to very few problem animal control cases, with most directed at the larger protected species such as elephant (KWS, 1994; TCK, 1995). In reality and due to the "loose" regulations provided under legislation, most PAC culling is undertaken by communities themselves and not reported officially (T Nalugala; T Esposito, 1998).

Game meat derived from problem animal control (PAC) is an important resource. In many areas it is the only legal benefit that rural communities receive from wildlife. High demand for wild meat and a continuing conflict with agriculture and livestock production are likely to have resulted in more animals than necessary being culled under the guise of PAC (T Nalugala, 1998; T NRP, 1998). Definitions of allowing citizens to cull animals "in defense of property and life" are ambiguous where a grazing Impala could legally be classified as destroying property (pasture) (KWS, 1990), and consequently current legislation provides a loophole for the hunting of most animals in Kenya. Meat supplied from KWS culled animals, in the strict sense of the law, cannot be distributed to rural communities who have incurred the damage (T Esposito, 1998). However, carcasses are not removed from the area and officers turn a blind eye to villagers helping themselves to meat (Wandera, pers. comm., to R. Barnett, 1997).

Although PAC occurs extensively throughout the country (KWS, 1990; KWS 1994; Gichere, 1995; TCK, 1995), official records for 1992-1997 reflect the dynamic that KWS PAMU undertakes limited culling of the larger species such as elephant due to limited capacity, with communities left largely to their own devices for dealing with remaining problem animals which are generally not reported to KWS. For the period under review, a total of 1,658 animals comprising of 28 species were officially culled, with baboon (39%), elephant (21.7%), Cape Buffalo (10.1%) and hippo (8%) killed in the largest quantities. Of the consumable species, a total of 762.3 mt dressed meat was supplied amounting to 127 mt per year. Elephant, hippo and Cape Buffalo supplied the greatest quantities of meat, which in all cases was likely to have been effectively utilized by local communities (T Esposito, 1998). Hence meat supplied through PAC provides a limited but important wildlife benefit to communities that acts in part as compensation for damage inflicted.

Game Ranching and Farming:

As an experiment in granting user rights, cropping under quota has been permitted on a number of ranches for several years and a market for game meat has emerged. Up to 1990, only one landholding was authorized to crop game for meat. Since 1990, however, KWS has received many requests for culling game from landowners (KWS, 1990). In 1992 KWS decided to extend the control quota scheme by giving landowners the rights to dispose of wildlife carcasses for meat on a pilot basis. By 1995, KWS had authorized 54 game farms, 45 Ostrich farms, one quail farm, four crocodile ranches and two frog farms to crop and utilize wildlife (KWS, 1995). Currently, the pilot wildlife utilization programme occurs in Laikipia, Kajiado, Machakos and Nakuru and to a lesser extent in Meru and Samburu Districts. Within Kenya, game ranching through the cropping of wildlife for meat production results in the largest supplies of game meat with game farming providing more limited amounts (T Esposito, 1998).

Game farming is mainly restricted to crocodile and Ostrich farming. The production of skins for export is the primary goal of crocodile farming. However, crocodile meat is regarded as a lucrative by-product that has increased in importance in recent years, due to the reduction in world prices for skins. Crocodile meat has a substantial market in Kenya from the tourism industry (T Esposito, 1998). There is currently an unsatisfied demand from this market with crocodile farms only producing approximately 5.9 mt per annum from about 1,518 crocodiles harvested. Quantities are small as only crocodile tail meat enters human consumption markets. Prices per kg are however high (KSH 200 [USD 3.30] per kg, 1997) and expansion of this farming sector is likely to increase to meet local demand, even in light of declines in skin revenues (T Davies, 1998; T Esposito, 1998). Initial enthusiasm for Ostrich farming, which during its peak in 1995 had resulted in 45 farms being authorized, has now declined as operators found financial success to be elusive. Although an Ostrich Producers Association was established in Kenya, it has not been active since 1996 (Ali Jama, pers. comm., to R. Barnett, 1997) and an absence of adequate research and knowledge has restricted Ostrich farming to a handful of remaining players, although some of these are now successful and continued growth is expected. The Ostrich meat market is domestic, and tourist demand is high with lucrative prices achieved (KSH 240 [USD 4] per kg, 1997). However, extensive quarantine, veterinary and health regulations imposed on the industry have restricted potential for supply (T Esposito, 1998).

Game ranching within Kenya still operates under a restrictive environment. The Director of KWS's special authority allows for the utilization of wildlife on an experimental basis, that cannot be extended to full commercialization that would include safari hunting (Heath, 1995b). When granted user rights, the ranch obtains the responsibility to use wildlife, but the State retains overall ownership (T Esposito, 1998). In addition, the legal instruments allowing for the Director's special authority have not been amended, and as a result many potential user rights holders have been afraid to invest in game cropping

and marketing of game meat (Mwau, 1995). The proposed draft *Wildlife Conservation and Management Bill of 1996* makes legal provision for devolution of user rights to game ranches and, if approved, should catalyze greater future investment (Wanjala and Kibwana, 1998).

The ranching industry in Kenya relies primarily on the revenue obtained from the sale of game meat, as the trade of other wildlife products is either illegal or restricted (T Esposito, 1998). Except for the sale of game meat from authorized licensed traders, the sale of trophies is prohibited and the sale of hides restricted. In Kenya, hides with hair remaining cannot be sold (Bos, *et al.*, 1998). The sale of hides with hair is restricted to exports mainly to Botswana, Zimbabwe and Namibia, who process the raw hides. Poor quality of many hides and the lack of domestic "value adding" processing infrastructure has reduced prices which are currently between USD 120 for grade one and USD 75 for grade three skins. This has resulted in most skins being stored and, during the period 1989 to 1993, an average of only 227 skins were exported per year (T Esposito, 1998). The reliance on meat production and sales is likewise restricted by veterinary and health restrictions (Parker, 1969; Parker, 1977a; Grootenhuis, 1995), and the prohibition of advertising and any activities associated with the promotion of game meat sales (AWF, 1997). Veterinary and health restrictions have reduced potential for exporting game meat to lucrative international markets, with European markets closed due to the lack of an approved abattoir, and remaining available Middle Eastern markets untapped. Customs classifications for export do not include the provision for game meat, and thus any quantities exported are categorized as "bovine carcasses" and consequently not monitored. However, exports are believed to be minimal or even non-existent due to prevailing veterinary and health restrictions (T Esposito, 1998).

Quantities of Game Meat Produced: Due to the reliance on game meat production and restrictions imposed on its marketing, the number of authorized game ranches in Kenya has remained static over the past few years at a total of 54 in 1996 and 55 in 1997 (AWF, 1997; T Esposito, 1998). The authority to obtain user rights is based on the provision of management plans by ranches and their adherence to submitting annual returns to KWS on the utilization and marketing of game meat cropped. This system is increasingly being decentralized to Wildlife Forums, which have been formed to represent the interests of ranches with appropriate user rights status. Quotas are set annually by KWS and are based on annual ranch game counts. In general, these quotas represent a 10% sustainable harvest rate. Cropping seasons occur at different times in the three main ranching areas of Laikipia (March to February), Nakuru (June to July) and Machakos (September to August) and are dependent on when quotas are allocated by KWS (AWF, 1997; T Esposito, 1998). During the 1996 cropping season, a total of 52 ranches (96.3%) out of the total 54 were surveyed in relation to the parameters and dynamics affecting the allocation of quotas, the number of animals cropped and quantities of game meat utilized and marketed (refer Table 27). Baseline information was obtained through questionnaire mailings; field research visits to ranches and Wildlife Forums, and through KWS ranch cropping returns (T Esposito, 1998).

During 1996, a total of approximately 556.5 mt of game meat was cropped and utilized in Kenya, with Laikipia contributing 57%, Machakos 21%, Nakuru 11% and other ranches in Samburu and Coast region 11% of total meat production. A total of 11 species are utilized in Kenya through the formal cropping programme, with zebra representing by far the greatest contribution of 61% to game meat production in Kenya, followed by Giraffe at 11.5% and Kongoni at 9.1%. The remaining eight species are utilized in much smaller quantities reflecting smaller population numbers and reduced demand for their meat. The degree of use varies according to the district and the abundance of species naturally occurring in the area. A reliance on one particular species in each of the three districts is predominant. In Laikipia district, zebra constitute the main species cropped (1,721 animals), in Nakuru, the Thompson's Gazelle (611 animals), and, in Machakos, the Kongoni (602 animals).

Table 27.

Game ranch 1996 cropping quotas and returns on numbers of animals and quantity of game meat produced

Ranches	Cape Buffalo	Eland	Giraffe	Impala	Grants Gazelle	Thompsons Gazelle	Water Buck	Zebra	Kongoni	Wilde-beest	Oryx	Total
LAIKIPIA (32 ranches)												
No. Cropped	30	16	99	82	1	83	36	1,721	0	0	0	
Quota	248	260	85	542	69	399	81	3,222	0	0	0	
Cropped as % of Quota	12.0%	6.1%	116.5%	15.1%	1.5%	20.8%	44.4%	53.4%	0.0%	0.0%	0.0%	**33.7% (Av.)**
Dressed Weight (kg)	9,420	4,112	47,025	2,517	29	913	4,320	249,545	0	0	0	**317,881**
NAKURU (3 ranches)												
No. Cropped	5	25	0	139	0	611	5	288	0	0	0	
Quota	28	34	0	225	53	1,129	24	596	0	0	0	
Cropped as % of Quota	17.9%	73.5%	0.0%	61.7%	0.0%	54.1%	20.8%	48.3%	0.0%	0.0%	0.0%	**39.5% (Av.)**
Dressed Weight (kg)	1,570	6,425	0	4,267	0	6,721	600	41,760	0	0	0	**61,343**
MACHAKOS (13 ranches)												
No. Cropped	0	24	36	116	121	296	0	129	602	180	23	
Quota	3	39	35	186	135	315	0	155	920	310	21	
Cropped as % of Quota	0.0%	61.5%	102.9%	62.4%	89.6%	94.0%	0.0%	83.2%	65.4%	58.0%	109.5%	**72.6% (Av.)**
Dressed Weight (kg)	0	6,168	17,100	3,561	3,509	3,256	0	18,705	42,140	19,440	2,254	**116,133**
OTHERS (4 ranches)												
No. Cropped	0	14	0	31	16	70	125	204	124	2	19	
Dressed Weight (kg)	0	3,598	0	952	464	770	15,000	29,580	8,680	216	1,862	**61,122**
Grand Total Cropped (No's)	**35**	**79**	**135**	**368**	**138**	**1,060**	**166**	**2,342**	**726**	**182**	**42**	
Fleshing Index (kg)	**314**	**257**	**475**	**31**	**29**	**11**	**120**	**145**	**70**	**108**	**98**	
Total Weight (kg)	**10,990**	**20,300**	**64,125**	**11,298**	**4,002**	**11,660**	**19,920**	**339,590**	**50,820**	**19,656**	**4,116**	**556,480**
%Contribution	**1.9%**	**3.6%**	**11.5%**	**2%**	**0.7%**	**2%**	**3.6%**	**61%**	**9.1%**	**3.5%**	**0.7%**	

Source: T Esposito, 1998; KWS, *in litt.*, 1997; Laikipia, Nakuru and Machakos Wildlife Forums, *in litt.*, 1997.

Throughout the three districts, however, only 48.6% of allocated quotas were utilized, indicating that in general ranch owners are not benefiting greatly from meat production and only partially use their quotas. If all allocated quotas during 1996 were utilized, the industry would have produced about 976 mt (9,114 animals) of game meat. Restrictions on the marketing of game meat such as prohibition of advertising and excessive veterinary/health restrictions have contributed to the non-realization of quotas. Also, up until 1995, the number of ranches authorized to crop increased substantially and so did potential supply. The increased potential supply has not been accompanied by an increase in demand from high-value markets. This market has remained relatively static and controlled to a large extent by a few of the older and more established ranches. Hence, most ranches have found it difficult to access the limited high-value market, and have had to rely on low-value markets such as supplying the animal feed industry which results in low profits.

The districts of Laikipia and Nakuru are constrained the most by current marketing restrictions. During 1996, ranches in Laikipia (33.7%) and Nakuru (39.5%) utilized the smallest proportion of their allocated quotas in contrast to Machakos ranches (72.6%), which used the majority. Ranches in Laikipia and

Nakuru are additionally restricted from realizing greater profits by being located at considerable distances from the main urban market of Nairobi, which results in increased transport costs. Another key factor responsible for the greater use of quotas in Machakos is inter-ranch sales and cropping agreements with larger ranches. Due to low economic returns, ranches generally have to trade in large quantities to achieve satisfactory profits. The majority of the 54 ranches authorized in Kenya are small landholdings with limited numbers of game. These ranches receive small quota allocations, and generally find it unprofitable to undertake cropping and marketing themselves. Some of the larger ranches capitalize on economies of scale, existing infrastructure and access to markets to undertake the cropping and marketing of game meat for these smaller ranches.

These large intermediate ranch traders predominantly exist in Machakos District, and as such enter into cropping and marketing agreements with the majority of the district's smaller ranches. The availability of intermediate ranch traders in Laikipia and Nakuru is limited with only a few ranches undertaking inter-ranch sales on a small scale. Hence, in Laikipia for example, a greater proportion of six smaller ranches out of 33 did not utilize any of their quota, in comparison with Machakos where two large ranches were responsible for cropping and marketing game meat from all 14 ranches sampled in the district. Inter-ranch cropping in Machakos results in more ranches utilizing their quotas.

Game Meat Markets: Overall, the low realization of quotas (48.6%) is due to restrictions on the marketing of game meat, and possibly the current marketing strategy employed by most ranches. In Kenya game meat is currently marketed as a luxury food that hopes to capitalize on its exotic and novelty value reputation for maintaining high prices predominantly within the restaurant and hotel industry. Table 28 assesses the economic returns to ranches for the 1996 cropping season by reviewing the reported use of 72.5% (403.6 mt) of total meat produced during the year by 27 of the largest ranches in the country.

During 1996, the vast majority (82.5%) of game meat cropped was sold for cash profit, with a smaller but still significant amount consumed directly on the ranch (17.5%). Game meat is utilized directly on the ranch mainly through the provision of meat food rations for ranch staff. In most cases, the meat is provided for free as an "employment perk", but sometimes it is sold at a subsidized price. The majority

Table 28

Game meat marketed directly by game ranches to end markets during 1996 cropping season

	High-Value (12.4%)			Medium-Value (53.5%)			Low-Value (34.1%)		
Ranches	**Hotels, Lodges**	**Restaurant**	**Urban Butchery Human Food**	**Ranch Sales**	**Ranch Local Sales**	**Ranch Staff Rations**	**Butchery Dog Food**	**Animal Orphanage /Zoo Food**	**Total (kg)**
Laikipia									
10 Ranches (kg)	2,488.0	n/a	7,096.0	39,181.2	17,305.8	52,645.5	92,308.5	3,946.1	214,971.1
Nakuru									
4 Ranches (kg)	1,026.0	6,410.0	10,253.1	12,980.9	17,148.8	2,022.8	27,762.7	n/a	77,604.3
Machakos									
14 Ranches (kg)	6,797.0	4,071.5	11,833.3	58,286.7	n/a	16,084.0	n/a	13,966.2	111,038.7
Total	**10,311.0**	**10,481.5**	**29,182.4**	**110,448.8**	**34,454.6**	**70,752.3**	**120,071.2**	**17,912.3**	**403,614.1**
% Contribution	**2.5%**	**2.6%**	**7.3%**	**27.4%**	**8.6%**	**17.5%**	**29.7%**	**4.4%**	**100.0%**

Source: TRAFFIC survey data, 1998.

of meat commercially traded (332.9 mt) was sold to medium to low-value markets representing 85% of all meat traded. Only 15% of meat traded was sold to the desired high-value human consumption markets of hotels/lodges (10.3 mt), restaurants (10.5 mt) and urban butcheries (29.1 mt).

Reliance on medium to low-value markets confirms that the high value hotel/lodge and restaurant markets are limited and have remained static or been monopolized by the few larger ranches. A large proportion of 27.4% of meat cropped in Kenya is sold at lower prices to a few larger ranches who process and market the meat for resale. Three large ranches in Kenya are responsible for purchasing the majority of all game meat sold through inter-ranch sales, and of these, two based in Machakos District account for 81.5% and 15.2% of inter-ranch sales. When also including their own ranch allocated quotas, these ranches accounted for the marketing of about 36% of all game meat cropped during 1996. These large ranches perform a key role in cropping and marketing the quotas from some 17 smaller ranches and hence ensure that they receive some revenue from the resource. These ranches have a greater access to the limited high-value tourism market in Kenya due to their being located close to Nairobi. As such, 37% of inter-ranch purchased meat is sold by three ranches to the high-value hotel/ lodge, restaurant and urban butchery markets (refer Table 29) in contrast to 12.4% by all other surveyed ranches through direct sales (refer Table 28).

Table 29

Game meat marketed as inter-ranch sales during 1996

	High-Value Markets (36.8%)			Low-Value Markets (63.2%)		
Ranches (3)	**Hotels/Lodges**	**Restaurant**	**Butchery Human Food**	**Butchery Dog Food**	**Animal Orphanage Food**	**Total**
Weight (kg)	13,033	11,045	16,567	42,081	27,722	110,448
% Contribution	11.8%	10%	15%	38.1%	25.1%	100%

Source: TRAFFIC survey data, 1998.

Combining the end market uses of game meat sold directly from ranches (Table 28) with that sold initially as inter-ranch sales (Table 29), reveals that only 30.9% of game meat is sold to high-value markets with the majority of 69.1 % being sold to low-value markets (Table 30). Consequently, game ranching in Kenya relies mainly on meat sales to low-value markets in which sales as animal feed represent the considerable proportion of 51.5% of all meat sold. With prices for animal feed (KSH 35 per kg) well under the value of alternative domestic meats (KSH 103 per kg) in a country characterized by severe poverty and malnutrition among many communities, it is hard to conceive why such affordable meat protein resources should be supplied to animals rather than people.

Species Marketed: Of the most abundant species allocated on quotas in the three districts, zebra, Kongoni and wildebeest are mainly sold into the low-value market as animal feed and used for staff rations. Specifically, 75.6% of zebra meat is sold to low-value markets, although significant quantities are also sold through local ranch sales mainly by Laikipia ranches but also to the butchery and restaurant trade. In fact, zebra is the most commonly purchased game meat by butcheries for human consumption, and also by restaurants. This shows that although zebra is considered a taboo species in some areas, its consumption is still popular especially by local Kenya residents who buy directly off the ranch.

Table 30

Total proportion of game meat end markets during 1996

	High-Value (30.9%)				Low-Value (69.1%)			
	Hotels Lodges	Restaurant	Butchery Human Food	Local Sales	Staff Rations	Butchery Dog Food	Animal Orphanage Food	Total
Direct Ranch Sales (kg)	10,311	10,481	29,182	34,455	70,752	120,071	17,912	293,164
Inter-Ranch Sales (kg)	13,033	11,045	16,567	0	0	42,081	27,722	110,448
Total (kg)	23,343	21,526	45,749	34,455	70,752	162,152	45,634	403,612
% Contribution	5.8%	5.3%	11.3%	8.5%	17.5%	40.2%	11.3%	100%

Source: TRAFFIC survey data, 1998.

At 72.2% and 56.2% respectively, Kongoni and wildebeest are both sold mainly to the low-value animal feed and staff rations market. Giraffe seems to have a broad scale appeal to most high and low-value markets. This can be explained by Giraffe being regarded are having a good tasting meat, and that it is a large animal of about 475 kg dressed weight which results in large quantities of meat having to be marketed within a short time period resulting in all markets being targeted for its sale. As such, Giraffe game meat has one of the most variable reported prices within Kenya.

The most sought after species by the high-value markets are generally those animals regarded as having tender and good tasting meat such as the smaller species of Thompson's Gazelle, Grant's Gazelle and Impala, and some larger species such as Eland and Oryx. The majority of Impala (72.2%), Grant's Gazelle (94%) and Thompson's Gazelle (78.3%) are sold into the high-value hotel/lodge, restaurant and butchery markets. For these high-value species, no meat is sold at low prices to the animal feed market, although limited amounts of a total of 1.2 mt are utilized for staff rations. Although slightly cheaper than the gazelles and Impala, Oryx are shown to be marketed to both high and low-value markets, with a predominance directed at use for staff rations. Eland and Oryx meat is popular with the high-value markets but due to their larger dressed carcass weights of 257 kg and 98 kg respectively, it is likely that all markets need to be targeted to sell the larger quantities realized per carcass quickly rather than incur storage and freezer costs. As such, a considerable amount representing 44.6% for Eland and 74% for Oryx are sold into low-value markets, which predominantly consist of subsidized sales to ranch staff.

Market Outlets: During 1996, KWS licensing department (KWS, *in litt.*, to R. Barnett, 1997) reported that 123 market outlets were licensed to sell game meat supplied from authorized game ranches. Of these outlets, 32 were butcheries, 35 restaurants, 49 hotels and lodges and seven were security firms and animal feed companies. The location of the registered high-value market outlets were predominantly in Nairobi with 65 outlets in comparison to only eight in Mombasa and the Kenya coast. The remaining 50 market outlets were scattered throughout the country. Game meat sold to hotels/lodges, restaurants and butcheries for human consumption was assessed to document the dynamics affecting sales in this market and to determine possible explanations for limited total quantities marketed during the 1996 cropping season.

Game meat marketed to high-value markets was sold to only 29 hotels and lodges, 17 restaurants and 16 butcheries. As such, game ranches only accessed 50.4% (62 outlets) of an available 123 registered outlets in Kenya. In addition, the majority of hotels/lodges, restaurants and butcheries sold small amounts of game meat, with only a limited number of outlets in each category trading in substantial quantities of game meat. Table 31 classifies major outlets as those trading in excess of 0.5 mt and those as minor trading in smaller quantities. Specifically, only eight hotels/lodges, two restaurants,

Table 31

Ranch game meat sales (kg) during 1996 cropping season to high value hotels/lodges, restaurants and butchery markets

Hotels/Lodges		Restaurants		Butchery (Human Food)	
Major Outlets:					
Outlet 1	8,745 kg	Outlet 1	17,477 kg	Outlet 1	19,036 kg
Outlets 2-8	9,355 kg	Outlet 2	579 kg	Outlets 2-7	22,021 kg
Subtotal 8		**Subtotal 2**		**Subtotal 7**	
Minor Outlets:					
Outlets 9-21	5,243 kg	Outlets 3-15	3,470 kg	Outlets 8-16	4,692 kg
Subtotal 29		**Subtotal 17**		**Subtotal 16**	
Total 29	**23,343 kg**	**Total 17**	**21,526 kg**	**Total 16**	**45,749 kg**

Source: TRAFFIC survey data, 1998.

and seven butcheries are considered to be major traders in game meat and this reflects the very limited nature of the high-value market in Kenya.

Not only is a small proportion of game meat actually sold to the tourism and local hotel/lodge, restaurant and butchery markets, but what is sold is restricted to only a few key outlets. Even within the major outlet category, there is only one key player responsible for a large proportion of total game meat traded. For hotels and lodges, one outlet traded 8.7 mt or 40.8% of all game meat sold to hotels and lodges. For restaurants, one outlet is responsible for 17.4 mt or 87.2% of game meat traded, and one butchery traded 19 mt or 43.8% of all game meat sold to butcheries for human consumption. The high-value markets are also restricted geographically to the traditional urban market of Nairobi. Surprisingly, Mombasa and the Kenya Coast, which attracts the majority of Kenya's tourists, is responsible for a small proportion of total high-value market sales. The total amount of game meat traded in Nairobi was 72 mt (84.8%), in Mombasa 7.6 mt (8.9%) and 5.3 mt (6.2%) in up country Kenya. Limited quantities are sold to Mombasa because of the large distances between ranches, which necessitate the need for refrigeration and other associated costs.

As such, the high-value game meat tourism market is limited and game ranches rely on only a few key outlets within Kenya. As a total of 123 outlets have registered with KWS to sell game meat, it follows that these outlets are well informed on the dynamics of the game meat industry within Kenya, and the terms and conditions associated with the purchase of meat from ranches. As ranches only achieved sales to about half of these available outlets, it raises the question of why so many registered outlets refrain from trading in game meat. It cannot be explained by the lack of advertising and marketing promotions that would increase the interest and consequently number of outlets registered, as there are already far more than are accessed by ranches. The logical conclusion is that the demand from end consumers for high-priced game meat is limited. Therefore, gearing a marketing strategy towards satisfying the high-value novelty tourism market may not be the best approach. The total quantity of game meat sold to this market at premium prices is limited and results in the non-realization of allocated ranch quotas.

All of the registered market outlets service wealthy customers. Not one could be classified as a low-income customer butchery, restaurant or hotel. A different marketing strategy directed at targeting the lower income local resident market at lower prices but still higher than animal feed values may result in greater quantities of game meat marketed, increased revenues and consequently the greater use of ranch allocated quotas. This would open up a new and substantive market that would achieve social objectives of poverty alleviation and increasing the nutritional status of Kenyan people by providing cheap affordable meat protein.

Game Meat Economic Values: The prices of game meat vary considerably between species and geographically within Kenya. In general, the larger the dressed carcass weight of a species the lower the per kilogram cost, although certain species do obtain slightly higher prices due to preference of meat taste. The abundance of species and their allocated quotas also significantly affect the species price with, for example, zebra being the most abundant species in Laikipia obtaining the district's lowest top end market price, and Kongoni in Machakos being the most abundant and obtaining one of the lowest top end market prices. In terms of species availability, Nakuru district is well positioned, as Thompson's Gazelle is the most abundant species and hence allocated to the greatest degree on authorized quotas. This species, due to small dressed carcass weight and preference for taste, commands a high price and yields greater revenues to Nakuru District ranches.

Prices for the districts of Laikipia and Nakuru are generally lower than that for Machakos due mainly to the larger distances involved to the urban markets, and the greater prevalence of low-priced species such as zebra in Laikipia District. For example, during the 1996 cropping season, one ranch in Laikipia District charged an average of KSH 15.7 per kilogram for delivery to Nairobi, and the average price of zebra and Giraffe meat was significantly lower at KSH 42 per kg for both, in comparison to Machakos ranches which sold at prices of KSH 106.6 kg and KSH 83.3 kg respectively. Lower prices achieved for zebra are due to their larger abundance and limited potential for high-priced sales to top end markets, whereas the lower prices for Giraffe are due more to their large average dressed carcass size of approximately 475 kg.

Taking into account the different geographical, species and market prices obtained from the high, medium and low-value markets found in Laikipia, Machakos and Nakuru, the economic value of game meat obtained directly by all game ranches in 1996 represents KSH 20,931,506 (USD 348,858) at an average value of KSH 51.9 per kg (USD 0.86). The average value of game meat is low since the majority of meat is sold to medium to low-end markets and the prevalence of cheap meat species such as zebra in Laikipia. Average prices of all game meat marketed in Laikipia and Nakuru are KSH 38.9 per kg, which is under half that obtained by ranches in Machakos at KSH 86.7 per kg. This significant difference shows how the greater prevalence of lower-priced species such as zebra in Laikipia, further distances to traditional markets, and inaccessibly to these markets affects the economic viability of cropping game for meat in Laikipia and Nakuru. It is these much lower average prices that are fundamentally responsible for the comparatively low realization of quotas in these districts.

A few larger ranches that purchase game meat make additional revenues through inter-ranch sales. Meat purchased as inter-ranch sales is processed by these ranches resulting in "value added" and re-sold to end markets at a higher price. Net revenues obtained for all species differ (Bos, *et al.*, 1996) with Impala, Grant's Gazelle, and Thompson's Gazelle (KSH 64.6 per kg) realizing higher net revenues after value added processing than Kongoni (KSH 26 per kg) due to their greater demand from high-value markets. Taking into account the different net revenues earned per species and the high, medium or low-value markets that meat was sold to, it is estimated that inter-ranch purchased "value added" game meat resold by the few larger ranches, resulted in a total net revenue of KSH 3,193,450 (USD 53,224) at an average net revenue achieved of KSH 28.9 per kg (USD 0.48). As such additional revenue made by the larger ranches who purchase inter-ranch sales game meat is not excessive, with Bos *et al.* (1996) indicating that these ranches realize greater revenues through the cropping and marketing of their own ranch allocated quotas than they do through inter-ranch agreements due mainly to the additional costs of purchasing animals. However, as only two large ranches based in Machakos are responsible for purchasing most inter-ranch sales game meat, additional "value added" revenues are considered important.

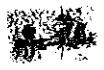
Taking the average price of game meat achieved throughout Laikipia, Machakos and Nakuru from direct ranch sales of KSH 51.9 per kg, the total production of 556.5 mt reported during 1996 cropping season amounts to KSH 28,882,350 (USD 481,372). Including inter-ranch sales "value added" net revenues at an average of KSH 28.9 per kg obtained from an estimated 27.4% (152.5mt) of the total meat production amounting to an additional KSH 4,407,250 (USD 73,454), the total economic value of the game meat industry during 1996 is estimated at KSH 33,289,600 (USD 554,827). Hence game meat production from game ranching in Kenya represents a limited contribution in contrast to its potential, and remains restricted not only by policy and legislation, but also by the absence of appropriate marketing strategies.

ii. Illegal Utilization of Bush Meat

In Kenya, Parker (1977a) maintained that in many rural areas protein intake was considerably augmented from wildlife sources, and in some cases exceeded 50% of all meat consumed. In the past, bush meat utilization has been attributed primarily to societies with a hunter/gatherer tradition. This is reflected in the limited amount of past research being conducted mainly on forest dwelling hunter/gatherer societies (T Esposito, 1998). Such communities include the Okiek Dorobo and the Sanye and Mijikenda groups in Kenya who maintain to this day a reliance on the bush meat resource. During 1991, at least 80% of all Okiek Dorobo household heads in the Mau forest of Kenya hunted at least occasionally, and 50% hunted regularly with a quarter of all hunting trips being successful. The estimated quantity of bush meat supplied to each family in a year through hunting was 20 kg, which equaled an off-take of over 22,000 animals. The value of the animal's meat was estimated to be in the region of KSH 3,450 per household per year, and the value for all animals hunted from the forest representing 100,000 hunting excursions during the year was KSH 3.3 million (Heath, 1995b).

Bush meat plays an important role in maintaining the livelihood status of the Okiek Dorobo. This role is also apparent among the forest dwelling Sanye and Mijikenda of the Arabuko Sokoke Forest in Kilifi District (Stiles, 1981; Mogaka, 1992). In the early 1990s, a total of 63% of households bordering the forest and 33% living a few kilometres away undertook hunting mainly of elephant shrews, wild pigs and primates. With an average of 48% of households harvesting bush meat, it can be seen that bush meat is an integral part of people's livelihoods that results in an estimated 130,000 kg being utilized per year. Regular hunters were earning about KSH 11,000 each from bush meat, which was a high return when compared with the annual per capita income at the time (Fitzgibbon, *et al.*, 1995). Other research conducted in Mount Kenya forests, and on communities bordering the Tsavo East National Park and Ruma National Park, also provide some indication on bush meat utilization and trade in Kenya.

In Mount Kenya during the early 1990s, 20% of respondents hunted once a month to obtain species such as duiker, antelope and wild pig. Although bush meat is mainly used for subsistence (although some exchange and bartering does occur), it represents an important contribution to household monthly income representing KSH 2,000 of a total potential value of forest products worth KSH 10,000 (Emerton, 1993). A reliance on bush meat has also been shown in the past to have had considerable impact on protected areas within Kenya. In Tsavo East National Park, bush meat off-take was believed to be one of the major reasons for drastic declines in wildlife populations. In the 1970s an estimate of 1,380 hunters were believed to be entering the park every three months to obtain primarily bush meat but also trophies, resulting in massive pressure being exerted on wildlife populations. Areas between Tsavo, Mtito Andei and the Yatta Plateau were by the late 1970s almost denuded of wildlife due to bush meat motivated hunting. A general trend of hunting changing from being subsistence orientated and primarily undertaken by traditional hunter/gatherer ethnic groups such as the Kamba and Waliangulu



peoples, to the emergence of more commercially orientated hunting by Somalis, soon become apparent (Sheldrick, 1976). In more recent years in the Ruma National Park, a continuing off-take of wildlife for bush meat is apparent. Use is subsistence, but increasingly becoming commercialized and undertaken by communities living in high density areas around the park. Subsistence use is primarily directed at smaller species, with larger animals such as Cape Buffalo targeted by commercial hunters for sale to retail outlets on an arranged basis. Of the 20 major ungulate species occurring in the park, 14 are reported to be frequently hunted for bush meat (Obari, 1994)

Hence, there is limited evidence suggesting that the utilization of bush meat has always been an integral part of the daily living of certain tribes. Research is, however, skewed largely in favour of traditional hunter/gatherer societies especially in forest habitats (Stiles, 1981; Mogoka, 1992; Fitzgibbon, *et al.*, 1995; Heath, 1995a; Emerton, 1993) providing an unsubstantiated view that all use is restricted to people pursuing more traditional lifestyles. Contributing to this is the fact that Kenya maintains the most restrictive use legislation within the region. This has led to the use of bush meat and its trade being undertaken very secretly, which has largely resulted in peoples outside of the involved society being largely unaware of its existence or extent. With much of the country characterized by inadequate rainfall, the presence of tsetse fly and inefficient agriculture and livestock production, the simple fact that people have been able to survive in these areas probably means that bush meat hunting and use is more prevalent than hitherto believed (T Esposito, 1998, T Nalugala, 1998)

Although the existence of legislation has driven the activity of bush meat hunting and trade underground, the extent of bush meat related law enforcement outside of protected areas especially, is limited and generally ineffective (T Esposito, 1998). The result has been a generally conducive environment in these areas for the utilization and trade of bush meat to occur largely uninhibited. A review of KWS national law enforcement data resulted in only 31 bush meat related offences occurring during 1997, in which a total of 65 people were arrested. Outside of protected areas, KWS law enforcement effort is limited due to lack of capacity for supervising such large areas. A review of law enforcement data from 16 Kenya police stations from all over the country indicated that only 66 bush meat related arrests had been made during 1996 primarily by police officers. This suggests that police as wildlife law enforcers do play an additional role, but overall there is a limited effort (T Esposito, 1998).

Table 32

Bush meat related offences during 1996 from a sample of 16 Kenya police stations

No. Cases	Species	Av. Dressed Carcass weight per Animal (kg)	Av. Fine (Kshs.)	Av. Prison Sentence
19	Game Meat	n/a	2,188	4.2 months
21	Zebra	139	1,914	2.7 months
1	Water buck	120	7,500	-
8	Bushbuck	21	833	2.5 months
2	Topi/Hirola	34	6,000	-
3	Warthog	39	800	3 months
2	Giraffe	475	-	8 years
1	Eland	257	3,000	-
3	Cape Buffalo	314	1,150	-
6	Impala/Gazelle	27	1,416	2 months

Source: TRAFFIC survey data, 1998.

In addition, the number of acquittals, and the low fines and prison sentences incurred result in law enforcement acting as a limited deterrent. Of the 66 arrests recorded from the sampled police stations, 12% were acquitted, and the rest either fined or imprisoned. On average, a period of 14 months elapsed between date of arrest and appearance in court. This is generally due to bush meat related cases in Kenya requiring more complex preparation in that exhibits of meat need to be laboratory tested to identify the species involved. Courts provide the option of a fine or imprisonment sentence and records in most cases do not indicate which was chosen. However, Esposito (1998) suggests that in the majority of cases

the option of paying fines is preferred. This is corroborated by the fact that when separately recorded, a total of 15 (23%) fines were paid compared to only four (6%) prison terms served (T Esposito, 1998).

As indicated in Table 32, the dressed weight of the animals and hence the economic value of its meat is not taken into consideration when imposing fines or prison sentence terms. For example, Cape Buffalo weighing about 314 kg were associated with lower fines of KSH 1,150 than fines for Impala at KSH 1,416, which weighs approximately 11 times less at about 27 kg per dressed carcass. However, protected species such as the Hirola were associated with one of the highest fines at KSH 6,000 indicating the court's awareness of the species' conservation status. Prison sentences are generally short and the level of fines small when compared with their economic value on the informal market. Meat from one zebra sold on the informal market would generate about KSH 3,625 in comparison to average fines of KSH 1,914, and a Cape Buffalo represents a value of about KSH 6,280 in comparison to average fines of KSH 1,150. Due to the dynamic of imposing similar fines for all bush meat species, fines for the smaller species such as Impala are more realistic amounting to an average of KSH 1,416 for an informal market meat value of the animal at KSH 2,220 (Esposito, 1998). Overall, low fines, high rates of acquittals and limited law enforcement result in restrictive legislation being largely theoretical, and in practice bush meat utilization and trade is largely unrestricted (Grunblatt, *et al.*, 1996; T Esposito, 1998).

Table 33

Dynamics of bush meat utilization in selected survey areas of Kenya during 1997

Survey Areas:	Kitui District (n 853)	Samburu District (n 919)		
		Ilkiloriti	Lpartuk	Loikas
Species Utilized:	23 species, 52% large, 48% small	14 species, 71% large, 29% small		32 species, 59% large, 41% small
Proportion Of Consumers:	79.7%	98.2%	93%	85%
Quantities Consumed:	14.1 kg Hhld/month	1.13 kg Hhld/month	1.4 kg Hhld/month	5.4 kg Hhld/month
	73.6 mt/year	27.9 mt		
Bush Meat Critical to Household:	67%	32.9%		51.9%
Demand: Cheaper Prefer Taste Available Habit Other	 42.6% 15.8% 27.8% 9.6% 4.2%	 98% 0% 0% 2% 0%		 62.3% 0% 0% 19.2% 0%
Price of Bush Meat verses Domestic Meat	Bush Meat USD 0.75 Domestic Meat USD 1.73 Bush Meat 129% Cheaper			
Supply: Traded: Subsistence:	 25.1% 74.9%	 0% 100%	 0% 100%	 2.1% 97.9%
Main Customers	72.6% low income 27.4% high income	low income	low income	low income
Conservation Implications	1) high demand; 2) declining wildlife populations; 3) reduced catch per effort indices; 4) increased commercial trade in Kitui; 5) increased use of sophisticated weapons; 6) higher prices for certain less available species; 7) off-take from protected areas; 8) negligable external law inforcement; 9) limited traditional wildlife management systems; 10) increased use of larger variety of species in Loikas and Kitui; 11) increasing length of hunting seasons.			

Note: Small bush meat species characterized as those having a dressed carcass weight of under 5 kg; Hhld.=Household; n = Sample size.
Source: TRAFFIC survey data, 1998.

In light of an ineffectual law enforcement in areas outside of protected areas, bush meat use and trade is emerging as a major industry within Kenya (T Esposito, 1998; T Nalugala, 1998; T NRMP, 1998). Current research conducted among the Kamba peoples of Kitui District during 1997 seems to substantiate the role that bush meat continues to play to communities with a strong tradition of hunting and gathering. Other studies also reveal that communities who have in the past had a limited tradition of bush meat use, such as the Samburu pastoralists in Samburu District, have in recent years begun to rely heavily on bush meat. A summary of the key parameters and dynamics of the trade and utilization of bush meat in the survey areas of Kitui and Samburu Districts of Kenya is provided in Table 33.

Importance of Bush Meat Utilization:

The survey areas of Samburu and Kitui are different in terms of ethnicity of inhabitants, types of livelihood, and in habitat and wildlife availability. Samburu pastoralists, whose main livelihoods derive from livestock production, inhabit two out of the three survey areas of Lpartuk, and Ilkiloriti in Samburu District. These group ranch areas have good access to a wide range of large wildlife species. In contrast, the third survey area in Samburu of Loikas is inhabited mainly by Turkana agro-pastoralists who are recent immigrants into the area and are located near the district's main urban center of Maralal town. Wildlife availability in Loikas is limited, and livelihoods are diverse and range from charcoal trade, beer sales and other informal activities, with livestock ownership and wealth status being far lower than their Samburu neighbors. Kitui District is similar to Loikas in Samburu, in that the Kamba people are also agro-pastoralists and wildlife availability is less. Livelihood status is also low, with Kitui District being characterized as a semi-arid area which suffers from recurrent droughts and famines. Although the survey areas are diverse, all inhabitants maintain a high demand for bush meat with many relying heavily on the resource for maintaining their food security, nutritional and household economic status (T Nalugala, T NRP, 1998).

Bush Meat is utilized as an integral part of daily living by the vast majority of survey area inhabitants. In Kitui District, 79.7% of Kamba consume bush meat regularly. The random sampling of 834 households in the district revealed that quantities utilized are substantial and contribute importantly to household economies and food security status with 14.1 kg of dressed bush meat being consumed per household (2.1 kg per capita) each month. Bush meat is consumed at least once a week (1.51 times) by the majority of consumers (84.3%) and is an integral component of people's eating strategies. Bush meat represents an important informal village industry in Kitui, with 13 representative villages (average 576 inhabitants per village) of the district consuming 11.7 mt per month representing 73.6 mt per year at an economic value of KSH 3,475,877 (USD 57,931) when taking into consideration seasonal availability and different prices of bush meat species consumed (T Nalugala, 1998).

Such economic values reflect the low price attributed to bush meat in the district. The actual contribution to household economies and food security status is far higher. Consumption of 14.1 kg of bush meat represents KSH 638.70 household expenditure per month, which equates to 34% of households average monthly incomes of KSH 1,872.80. The importance of bush meat is especially prevalent for lower income inhabitants of the district with for example subsistence farmers consuming amounts of bush meat equivalent to 50.8% of their average monthly incomes in contrast to wealthier inhabitants such as teachers whose consumption of bush meat equated to only 8% of monthly incomes. Because bush meat is far cheaper than domestic meat, households are able to consume far larger quantities of meat. Such quantities would be unaffordable if more expensive domestic meat had to be purchased. In Kitui, bush meat is a valued resource, especially by poorer households, and is far more important in providing protein than domestic meat. Of all meat consumed by respondent households, domestic meat contributed only 4.71 kg per month (28.7%) in comparison to bush meat at 11.7 kg (71.3%) (T Nalugala, 1998).

Such reliance on bush meat is not restricted to Kitui. 98.2% and 93% of Samburu pastoralists also consumed bush meat in Ilkiloriti and Lpartuk group ranch areas, and 85% of Turkana inhabitants in the Loikas area of Samburu District. Quantities are less in Samburu District, although still important with Loikas, Ilkiloriti and Lpartuk survey area inhabitants consuming 5.4 kg, 1.4 kg and 1.13 kg per household per month respectively. In the three survey areas, the vast majority of inhabitants (919 households) consume bush meat, which amounts to 27.9 mt per annum. Although smaller quantities than seen in Kitui, bush meat contributes importantly to the standard of living, especially in the poorer Turkana area of Loikas (T NRP, 1998).

The importance of bush meat to households in the survey areas varies according to the quantities consumed. In Kitui, 67% of households regard bush meat as being critical to their livelihoods and food security status. During times of economic hardship, bush meat is relied upon to a greater extent and 73% of households consume greater quantities during these times. Households in Samburu District, although consuming bush meat throughout the year, utilize smaller quantities and consequently only 32.9% of households regard bush meat as critical for their standard of living. In the Loikas survey area, which obtains over three times the quantities of bush meat as the other Samburu areas, reliance is more important at 51.9%, and during drought or times of economic hardship 82.1% utilize greater quantities of bush meat. Households in Lpartuk and Ilkiloriti generally do not rely more on bush meat during times of hardship (9.1%) which is mainly due to these pastoralist communities having greater access to domestic meat during times of drought and famine as a result of greater mortality in their herds (T NRP, 1998; T Nalugala, 1998).

Bush Meat Species Utilized:

Although larger bush meat species such as Impala are still available within the rural areas of Samburu and Kitui Districts, both communities at 72% and 95.6% respectively reported a drastic decline in populations over the past five years. This has resulted in the Kamba people of Kitui District being forced to obtain a greater amount of these generally preferred species from protected areas. In addition, and with a decline in preferred larger species, a greater variety of bush meat species that are still available in communal areas are used. In Kitui District, 11 species (47%) out of a total of 23 that were utilized during 1997 are small with an average dressed weight under five kg per carcass (T Nalugala, 1998). With decreasing habitat and declines in larger species, a greater reliance on a wider variety of smaller species is seen.

Of the 211.9 mt of dressed bush meat hunted during the 1997 season, Kirk's Dik Dik (9,848 animals) contributed by far the largest amounts of meat at 45.3 mt or 21.4% of total production. Contribution to meat supply was followed in corresponding order by Bush Pig (40.2 mt), bushbuck (36.9 mt), Cape Buffalo (25.2 mt), Harvey's Red Duiker (12.2 mt), Lesser Kudu (12.1 mt), Common Duiker (10.4 mt) and Guenther's Dik Dik (8.1 mt). On a monthly basis and due to smaller average dressed carcass weights, the Kirk's Dik Dik (1,349), Guenther's Dik Dik (178), bushbuck (122) and Common Duiker (120) are hunted in the greatest numbers. These species are all reported to be relatively abundant and "not hard to hunt" with 92.3% being supplied from a variety of habitats ranging from farmland, thick/thin bush and open grasslands. In general, these species have been able to cope with increased human populations and clearing of wild habitats for farming to a greater degree than other species and consequently are hunted in the greatest quantities for longer periods, averaging 6.7 months of the year (T Nalugala, 1998).

In contrast, other larger and more preferred species such as the Cape Buffalo, Lesser Kudu, Grant's Gazelle and Thompson's Gazelle are hunted in much smaller numbers, because they are largely unavailable in the local habitat of Kitui district with hunters reporting them "difficult to hunt". Their

primary habitat of open grassland is fast disappearing, and the general nature of these species has resulted in them being less able to cope with the increasing human population in the district. Hunters are forced to target these animals in protected areas where 66.8% were reported supplied from Tsavo East National Park, Kitui North and South Reserves and other gazetted areas within the district. Hunting seasons are much shorter at 4.6 months of the year and occur primarily over the long dry season when hunters have more time to travel the distances required to hunt these animals. During the dry season, hunting is facilitated by reduced vegetation and the fact that animals search for water making them easier to locate. Crop raiding animals are also hunted in large quantities but for shorter periods of the year (4.9 months) for the protection of crops, with Bush Pig and North African Crested Porcupine hunted mainly in February and June/July harvest seasons when they raid crops, and the Crested Guinea Fowl and Vulturine Guinea Fowl predominantly trapped in the March and October planting seasons when they raid newly planted crops (T Nalugala, 1998).

In the Samburu pastoralist survey areas of Ilkiloriti and Lpartuk, a greater availability of larger species occurs. For both areas, a smaller amount of 14 species are utilized with the majority of ten species (71.4%) being larger with only four being under five kg dressed carcass weight. Species most utilized in Ilkiloriti are Cape Buffalo (49%) followed by the Kob Antelope (29%), and in Lpartuk the Cape Buffalo (40%) followed by the Eland (19.1%). In both areas, a limited proportion of bush meat is obtained from smaller species such as Scrub Hares, guinea fowl and, interestingly, insect larvae. In the Loikas area of Samburu District, larger animal species are relatively unavailable and as a result a much greater variety of species (32) were utilized during 1997 of which 13 species (41%) were characterized as small (T NRP, 1998). Culturally, the Turkana are also less inhibited by traditional taboos and totem customs (which seem to affect the Samburu to a greater extent), and hence a much greater variety of species in smaller proportions such as Rock Hyrax (0.3%), Scrub Hare (2.4%) and Guenther's Dik Dik (3.7%) are utilized (T NRP, 1998).

Availability of species is the largest dynamic affecting bush meat supply in the survey areas of Kenya, although preference for the taste of meat, economic values, crop raiding tendencies of species and taboos and totems do also affect the extent of supply.

Bush Meat Demand:

The demand dynamic of bush meat utilization is primarily economic. Cheapness of bush meat (42.6%) was by far the most cited reason for use in Kitui District, followed by a greater availability of bush meat (27.8%) in comparison to domestic meat. Preference for taste although important (15.8%) plays a much lesser role in determining demand. Reliance on the economic contribution to rural households as suggested by Kitui and Samburu Districts is not surprising considering an average bush meat price in Kitui District of KSH 45.3 per kg in comparison to domestic meat at KSH 103.8 per kg, which is 129% more expensive (T Nalugala, 1998; T NRP, 1998).

Low-income socio-economic groups primarily utilize bush meat in the survey areas of Kenya, with 80.9% of pastoralist inhabitants in Lpartuk and Ilkiloriti relying on subsistence livestock production, and the majority of Turkana agro-pastoralists living on the poverty line with very small agricultural landholdings of only about 0.25 acres per household. In Kitui, low-income earners represent 72.6% of bush meat consumers with an average monthly income of KSH 986.30 (USD 16.40) and reinforce the general dynamic within the survey areas of Kenya that bush meat provides important benefits primarily to low-income households. However, in Kitui, a significant proportion (27.4%) of bush meat consumers derive from higher socio-economic backgrounds that include teachers with average monthly incomes of KSH 5,600, extension workers at KSH 4,000 and other formally employed inhabitants with an overall

average monthly income of KSH 2,759 per month. As such, bush meat is seen to affect a large variety of the district's people and is not solely directed at lower-income families. In relation to quantities consumed, wealthier inhabitants such as teachers were revealed to consume quantities (9.9 kg per Hhld. per month) that were similar to lower income subsistence farmers (9.2 kg per Hhld. per month). Each dependent in teacher households, however, consumes larger quantities at 1.9 kg per capita in comparison to subsistence farmer households at 1.1 kg per capita each month due to teacher households having smaller family sizes (5.3) than subsistence farmer households (8). Hence, wealthier families are able to purchase larger quantities of bush meat due to their greater wealth, and they benefit significantly from household savings made in buying cheaper meat. However, with lower monthly incomes, the poorer subsistence farmers rely more heavily on cheap supplies of bush meat with 89.2% compared to 62.2% of teacher households reporting that they could not do without the resource without suffering undue economic hardship (T Nalugala, 1998).

Although bush meat contributes more importantly to maintaining lower income household food security status, higher income households also rely heavily on the cost savings that bush meat consumption represents to their household economies. All surveyed households in Kitui District consumed larger quantities of bush than domestic meat, and even wealthier families such as teachers who have the ability to consume larger quantities of more expensive domestic meat refrain from doing so. For example, bush meat still represents the largest contribution to total meat-protein intake by teacher households at 62.4% in comparison to only 37.6% for domestic meat. Hence, regardless of socio-economic status, bush meat consumption represents a significant consideration in household monthly expenditure, allowing for savings to be made that can be expended on other costs such as education. Wealthier households do, however, purchase greater overall quantities of domestic meat (8.8 kg per month) than lower income households (2.91 kg per month). This indicates that domestic meat, when it is affordable by higher income households, is purchased in larger quantities suggesting that it may be regarded as superior meat. Regardless, wealthier households still rely on bush meat for the majority of their needs due to the savings to household expenditure (T Nalugala, 1998).

Indeed, domestic meat is preferred for its taste, and many regard it has being hygienically superior because most domestic meat is subjected to veterinary inspection when slaughtered. When based on taste, respondents prioritize preference for all meat as goat, chicken, beef, bush meat and then fish. Inhabitants of Kitui, who as Kamba agro-pastoralists have a cultural affiliation with livestock, incline towards the taste of domestic meat above bush meat, and the only reason they do not consume more is because of its prohibitive cost. When prioritizing on importance of meat to household economies, bush meat, as would be expected, is ranked first, followed by beef, goat, chicken and fish. Inhabitants of Kitui regard their livestock as a cultural and capital asset, and as such are in most cases not willing to utilize their livestock for household consumption if a ready alternative exists. In Kitui, cheaper available bush meat supplies represent this alternative in most cases, with domestic meat being consumed only on special occasions or during severe drought or famine (T Nalugala, 1998).

The Samburu survey areas also reflect the demand dynamic of Kitui District, with a clear emphasis being placed on the affordability of bush meat, and the tendency for inhabitants to want to keep livestock as a cultural and capital asset if other alternatives are available. In the Ilkiloriti and Lpartuk Samburu pastoralist survey areas, 98% noted the affordability of cheaper bush meat as the key factor for demand. With a history of Samburu pastoralists not utilizing bush meat, only 2% cited "out of habit" as a reason for consumption. The Turkana inhabitants of Loikas have a greater history of use, citing "out of habit" in 19.2% of the responses, although as with all survey areas affordability of bush meat was the main demand factor at 62.3% (T NRP, 1998).

Bush Meat Trade and Subsistence Use:

One important criterion that has emerged from current research in Samburu and Kitui Districts is that although the significant majority of sampled pastoralists and agro-pastoralist rural communities have both been documented as utilizing bush meat, different trading dynamics are apparent. For example in Kitui District, 25.1% of bush meat consumed is purchased and a substantial illegal trade industry occurs. In contrast, the Samburu pastoralist peoples obtain all of their bush meat supplies (100%) through subsistence hunting/gathering methods, while the Turkana agro-pastoralist peoples in the Loikas area of the district trade and purchase a greater but still very limited amount (2.1%). The ethnicity of rural communities, wildlife availability, as well as other factors such as income levels, are found to affect to a considerable degree the extent of commercial trade and subsistence use of bush meat. In Lpartuk and Ilkiloriti survey areas, wildlife availability of larger species is high and may partly explain the limited need for trade as bush meat is available for free to most inhabitants who are willing to hunt and gather it. In Loikas, monthly incomes are lower and wildlife availability limited. In line with a high demand, traded supplies have begun to emerge to satisfy this demand with supplies sourced from outside the immediate local area (T Nalugala, 1998; T NRP, 1998).

In Kitui District, the bush meat resource is declining and demand increasing in relation to growing human populations. Trade is responsible for a substantial amount of supply and results in many hunters and traders securing additional and, in some cases, sole sources of income. In a district characterized by poverty, limited formal and informal wage employment and the frequent occurrence of droughts and famines (that requires in most years famine food relief), the supply of bush meat through trade, and incomes thus generated, are considered critical to many. Of all bush meat hunted in Kitui, 32% is motivated by commercial trade with the majority of catch being sold, while the remaining 68% of hunting is motivated for subsistence consumption. Hence most hunting is still undertaken to provide meat directly to the household. For these hunters, it is likely that the savings they make from not having to buy more expensive domestic meat for household needs is the main reason for high rates of subsistence consumption. However, even for the hunters whose main objective is to supply their families, the sale of any excess meat after dependents have been satisfied represents in many cases (34%) an important additional cash income that contributes significantly to household economies. Subsistence farmers consume a greater proportion of their catch (71.6%) in contrast to higher income groups, such as those employed in informal businesses like illegal brew sales, who sell the majority of their catch for cash profit. As such, lower income hunters rely more on the subsistence values of bush meat, whereas those that have entered the cash economy do more hunting for commercial profit (T Nalugala, 1998).

The trade of bush meat in Kitui is a well-developed informal industry that affects many inhabitants, with 172 traders reporting the sale of 82.2 mt of dressed bush meat from 24 species during 1997. Taking into account the different species prices and seasonal availability of each animal reported sold, this represents an annual economic value of KSH 2,983,903 (USD 49,731). Males mainly undertake trade in bush meat (87.3%). Hunters and traders regard the inclusion of women in any activity associated with the hunting of wildlife as against tradition. In general, women traders only sell the smaller species such as insects and birds, although reports do exist of a greater emergence of female traders in other species in recent years. Traders in Kitui can be categorized as full-time commercial traders (56%) that are supplied by hunters, those supplied by middlemen, and those that source their own supplies through hunting on a commercial and full-time basis. The remaining 44% of commercial traders are those defined as subsistence traders who sell only excess bush meat after their dependents have been satisfied. Profits from bush meat sales are the main source of income for the majority of full-time traders in the district, although additional income through the occasional sale of excess hunted bush meat also represents a large proportion of traded supply. Subsistence traders represent a significant proportion

of all traders within the district. Most are subsistence farmers with low monthly incomes, but trade is conducted on a part-time basis, with such income representing in many cases the main source of cash income. Consequently, trade is a very important activity. Crop protection by these traders is an important stimulus for hunting (35.2%), but in all cases bush meat is regarded as a significant and lucrative by-product (T Nalugala, 1998).

Of the total quantity of bush meat traded per month of 9.7 mt, commercial traders account for 73% (7 mt) in contrast to 27% (2.7 mt) that is supplied by subsistence traders selling excess bush meat. Correspondingly quantities sold are much larger for each full-time commercial trader with 58.7 kg of dressed meat sold per month in contrast to 30.8 kg sold by subsistence traders. Full-time trade undertaken by inhabitants purely motivated by cash profits is the greatest trading dynamic, with subsistence part-time oriented trade being of secondary importance in the industry. The supply of bush meat for consumption is still mainly achieved through subsistence hunting for free, but in line with a decreasing resource base this has begun to be replaced by a larger, full-time commercially orientated trade supply. Profits achieved by traders are enticing. For commercial traders buying their supplies for resale, profit margins of 24.8% are achieved with average buying prices being KSH 40.60 per kg and selling prices KSH 50.70 per kg. Such traders acting as middlemen reported selling an average of 66.4 kg per month, representing a monthly profit of about KSH 670.60. Traders hunting their own supplies for free enjoy far greater profit margins than those who purchase, and sell larger monthly quantities of 84.8 kg resulting in profits of KSH 4,299. Part-time subsistence traders selling smaller quantities of 30.8 kg per month earn KSH 1,318.2 profit per month. Of the 172 traders identified in the district, 77.7% earned under KSH 5,000 at an average of about KSH 1,000, with a significant amount earning in excess of KSH 5,000 at 22.3% per month. With average monthly incomes obtained from other formal livelihoods throughout the district being about KSH 1,827, the standard of living and cash profits achieved by the majority of bush meat traders more than adequately competes with alternative formal livelihoods (T Nalugala, 1998).

Of particular importance in Kitui District is the effect trade has had on particular species that are reported to be preferred for taste. Such species as the Thompson's Gazelle, Grant's Gazelle and Lesser Kudu are all preferred for their taste. However, availability of these species has declined drastically within the local environs of the district, with traders reporting them as "almost impossible to obtain". Increased demand for these species and reduced supply has resulted in their prices per kg being considerably higher at an average of KSH 54.9 than the overall average bush meat price of KSH 45.3. Hence, greater profit margins for these species and their relatively larger dressed carcass weights have motivated hunters to continue supply from a dwindling resource, resulting in the majority of these animals reportedly being supplied from protected areas (66%) (T Nalugala, 1998).

Giraffe.
Rob Barnett-TRAFFIC

Other, more available, species that still occur at relatively abundant levels in the district such as Kirk's Dik Dik (KSH 31.5/kg), Guenther's Dik Dik (30.5/kg), bushbuck (34.5/kg), Common Duiker (33.3/kg) and Harvey's Red Duiker (28.7/kg) command the lowest prices at an average of KSH 31.7 per kg, and are correspondingly traded and consumed in the largest numbers. In addition, logistics of supply affect prices, with the large quantities of meat that result from the less preferred

Cape Buffalo having to be sold quickly before spoiling. Cape Buffalo commands one of the lowest prices at KSH 19.55 per kg. The North African Crested Porcupine is considered taboo by many Kamba inhabitants, but is supplied in large quantities due to its renowned crop raiding tendencies. Supply is high and demand low, resulting in the lowest kg price of KSH 12.40. Birds such as the francolins and guinea fowl have the highest prices per kg at KSH 76.10, because their meat is preferred and perceived to be similar to chicken. As such, the availability of supply and the preference or dislike for the meat of a species are largely responsible for determining their price and the quantities and numbers of animals traded and utilized (T Nalugala, 1998).

Households who reported purchasing the majority of their supplies bought smaller quantities (3.7 kg) but more frequently (1.9 times a week) in contrast to households who hunted their own supplies and consumed large quantities per meal (4.6 kg) less frequently (1.2 times a week). Meat available through trade enables residents to purchase the required smaller amounts more frequently such as a hind leg of a duiker. Due to the general lack of refrigeration, hunters must consume and/or trade all their catch as quickly as possible before it spoils. Hence trade has enabled the more efficient use of the resources. Bush meat is sold in Kitui using a variety of different trading mechanisms that result in most inhabitants having a regular and reliable supply of bush meat. These include hawking from house to house within the local village area, trading through established contracts made between hunter and end consumer customers, trading through contracts made between hunter and trader middlemen, selling at temporary open air markets located in the bush, and selling from established commercial outlets such as kiosks and illegal brew bars (T Nalugala, 1998).

Hawking in the local village area from house to house is regarded as the safest mode of sale as it involves trusted customers only. Hawking is the most popular form of trade (35.6% of traders) and is mainly conducted by subsistence traders and involves the sale of small quantities (26.4 kg) of a hunter's excess meat per month. Sales through customer contracts with hunters also occur mainly in the local area and are a popular form of trade as payment is often made in advance (15.2% of traders), although quantities traded mainly by subsistence traders are small at 21.4 kg per trader per month. These trading methods occur primarily in the local hunting areas within villages and account for 25.9% (2.51 mt) of all meat traded on a monthly basis. These are undertaken as a main form of trade by 50.8% of traders (T Nalugala, 1998).

Other forms of bush meat marketing such as through trader middlemen contracts, open air markets and sales through commercial outlets such as illegal brew bars, kiosks and butcheries, account for 74.1% of all meat traded (7.18 mt) and are undertaken by 49.2% of traders. These marketing methods are more commercially orientated and undertaken by full-time traders in areas that are usually located at a distance from hunting supply areas. Quantities traded per month are larger and prices generally higher at an average of KSH 50.70 per kg in comparison to KSH 42.8 kg achieved through the more subsistence orientated marketing methods of hawking in the local hunting supply areas. Commercial traders achieve higher profit margins due to larger quantities and higher prices that capitalize on a high demand and reduced supply in more urbanized areas of the district. Trader middlemen contracts are an important trade method (13.2 % of traders) resulting in the largest quantities of meat sold at an average of 126.4 kg per month per trader. In such cases commercial hunters supply large quantities on a contractual basis to end traders located in more urbanized areas. Sales through open air markets occur mainly on weekends and are closely associated with the occurrence of more formal markets. Bush meat sales occur in the bush at a distance from the formal market and customers are identified by "touts" in the formal market and brought back to the area of sale. Such methods of sale are a frequent activity within the district (10.2% of traders) and result on average in each trader selling about 49.8 kg per month.

Commercial trade outlets (25.8% of traders) which predominantly consist of illegal brew bars, kiosks selling general goods and butcheries, are responsible for a large proportion of traded supply especially in the more urbanized areas of the district. Illegal brew bars represent the most popular outlet due to the illegal selling of both brew and bush meat requiring the same level of security precautions. Quantities sold on average by each trader are generally large at 71.4 kg per month. In illegal brew establishments bush meat is sold in both fresh and cooked form. Only trusted customers are served in illegal brew bars, whereas in kiosks and butcheries a system of signals or the simple statement that the "cheap" meat is required to be purchased will generally result in a sale. As such, marketing mechanisms employed for the sale of bush meat in Kitui are diverse and result in a reliable supply to most inhabitants. In recent years, the sale of bush meat has emerged as a major informal industry.

Conservation Implications of Bush Meat Utilization and Trade:

The conservation implications of the utilization of bush meat in the survey areas of Kenya indicate that in Kitui District and Loikas in Samburu District, a greater reliance on and adaptation by communities to smaller more available species is apparent. In the Lpartuk and Ilkiloriti survey areas of Samburu District, where the resource is still relatively abundant, current use levels do not seem to have impacted the resource negatively. However, in the Loikas area and in Kitui District the decrease in the bush meat resource, in line with a constant or increasing demand, has resulted in a greater proportion of trade, especially in Kitui District (T Nalugala, 1998; T NRP, 1998).

Increasing bush meat demand in Kitui, in line with the increase in human population, high poverty levels and limited potential for employment, has resulted in the emergence of a significant illegal market for bush meat. Declines in wildlife populations in the district are evident with 99.3% of hunters reporting a reduced hunting supply mainly attributed to drastic declines in wildlife populations (78%). Traders reported selling smaller quantities of bush meat than in the past due to declines in supply and animal numbers (94.1%). Consumers (95.6%) reflect the same reduction in hunted and traded supply caused mainly by reductions in animal numbers (87%). All categories of respondents, however, indicated an increasing demand for bush meat (87%), which was attributed to the decreasing socio-economic status of inhabitants, recurrent droughts in recent years and the increasing price of alternative domestic meat. Prices of bush meat have accordingly increased at a considerable rate over the past five years as indicated by 99% of hunters, traders and consumers, but have not reached levels that compare with domestic meat and remain at under half the price. Consequently, supply is still relatively plentiful, especially of smaller more adaptable species such as the dik dik, duiker and bushbuck. Reduced supply, increasing prices and demand has, however, resulted in the emergence of a substantial illegal trade industry within the district (T Nalugala, 1998).

Traders remain enticed by lucrative profits to ensure a continuing supply of bush meat from an ever-dwindling resource. This scenario is likely to continue until such time as prices compare to domestic meat. The benefits of trade are now an important consideration for most hunting in the district, and although a considerable proportion of meat is subsistence consumed its economic value in terms of household savings, and the potential to sell any excess bush meat to generate additional incomes, is regarded as critical to the maintenance of household standards of living. The emergence of trade and the increased economic value of bush meat have resulted in the gradual erosion of the traditional hunting seasons. All subsistence motivated hunters reported their hunting season for each species to be on average 6.8 months per year, primarily over the short (January to February) and long dry seasons (July to October). Traders and commercially orientated hunters in contrast reported hunting and trading seasons of 8.9 months per year, suggesting that obtaining cash returns from bush meat sales to meet a

demand that is apparent throughout the year has resulted in the increased length of commercially motivated hunting and trading seasons. The result is the decrease in periods of the year for wildlife population recovery, and the increased hunting of more species during breeding seasons. Such unsustainable off-take trends are reflected in a large sample of hunters reporting that 46.9% of animals hunted during 1997 were female and, of these, 34.2% were gravid. In the past such hunting of breeding populations would not have happened. This has occurred with the erosion of traditional management systems, and is facilitated by an increasing bush meat value and continuing declines in the local standard of living. Bush meat is now regarded as an open access resource that yields the most benefit to those who get it first (T Nalugala, 1998).

The increasing trend in unsustainable off-take is indicated by the emerging use of more sophisticated hunting techniques and weapons. Traditional weapons such as bow and arrows (34.1%) and traps (29.4%) are still the most prevalent methods employed, but increasingly unsustainable methods such as wire snaring (26%) and night torch hunting (4.2%) are being used. The majority of hunters reported changes in the use of hunting methods to more efficient and unsustainable techniques. Such changing trends are attributed to declining catch per effort rates (78%). Hunters have to travel further and spend more time than in the past to catch the same quantity of animals. During 1997, hunters reported small catch rates within the local environs of their villages with a catch per effort rate of 1.42 kg of dressed meat per hour of hunting, conducted within a 2.5 km radius of their villages. Catch rates increased with larger distances traveled with the highest levels reached of 2.74 kg per hunting hour of effort in areas between 5 and 7.5 km from their villages, involving a total distance traveled of up to 16 km. Such trends reflect the decreasing availability of larger species within the communal lands of the district and the need to travel further distances, often to protected areas, to ensure sufficient catch returns. The increased value of bush meat has resulted in hunters continuing to hunt even under reduced catch per effort rates. New and more unsustainable hunting methods are, however, increasingly being utilized to improve catch per effort rates such as wire snaring and night torch hunting. Greater efficiency of these techniques is reflected in all hunters using wire snares to hunt reporting a catch per effort of 1.539 kg per hour of effort, and those using night torch hunting, 1.198 kg per hour of hunting effort, in contrast to only 0.723 kg for hunters using traditional traps (T Nalugala, 1998).

The result has been an increased off-take of animals from a declining resource. Conservation concerns are increased for the larger and preferred species such as Lesser Kudu, Thompson's Gazelle and Grant's Gazelle. These species are continuing to be supplied from the last remaining pockets of suitable habitat and increasingly from protected areas. This is due to the higher prices achieved for these species and hence larger returns to motivated hunters and traders who are willing to run the increased risk of law enforcement apprehension from poaching within protected areas.

Although the majority of bush meat hunters, traders and consumers had a basic knowledge of wildlife laws (56.3%), some were unaware that it was illegal to use bush meat (7.1%). Many believed that it was legal to hunt in unprotected and ungazetted areas (13.2%), that hunting all birds was legal (10.4%), and that killing any animal for crop protection was legal (13%). Hence, awareness of laws is somewhat confused and inhabitants continue to utilize bush meat undeterred. All respondents, not surprisingly, indicated that bush meat use should be legalized due to it being critical to household food security and economic status, especially in an arid and drought-prone district such as Kitui. However, many provided management suggestions for reducing the decline in wildlife populations from hunting, ranging from introduction of licensed resident hunting, enforced closed hunting seasons, and use of only sustainable hunting techniques (14%), to protection should be increasingly enforced only in protected areas to allow wildlife to breed (8.6%) (T Nalugala, 1998).

Confusion surrounding legislation and the importance associated with its use have resulted in the utilization and trade of bush meat occurring at an unregulated and substantial rate. This situation is facilitated by both external law enforcement by KWS and Kenya Police, and internal traditional management regulation within the district having achieved little in regard to regulating off-take. Many hunters, traders and consumers (63%) indicated that although they were aware to some extent of the illegality of using bush meat, they were not concerned due to limited law enforcement activities occurring in the area. The majority reported that there was a general lack of seriousness in implementing bush meat related laws, and often KWS and Police officers turned a "blind eye". This is reflected in the amount of bush meat related arrests in the district. A review of all police records pertaining to the district for the period 1987 -1997 revealed only eight bush meat arrests, at less than one per year. In a district that has been shown to have a substantial bush meat industry with 79.7% of all households utilizing regularly, such non-existent law enforcement is surprising. In reality, the illegal hunting, trade and consumption of bush meat is of little concern to Kenya Police (T Nalugala, 1998).

Kenya Wildlife Service does not operate extensively in the communal areas of the district, with law enforcement mostly directed at protected areas and to some extent the buffer zones surrounding them. In these areas, law enforcement effort is higher. A review of patrol registers, occurrence books and arrest records for Tsavo East National Park, and the Kitui North and South Reserves for the period 1993 – 1997, reflects that bush meat is the major impact on wildlife in these protected areas. Although records were incomplete, a total of 230 effective patrol days were assessed for the period under review, and revealed that 13 bush meat related, eight trophy related, five livestock grazing related and three logging related seizures were made. As such, it is likely that bush meat is a major motivation for illegal entry into these protected areas (T Nalugala, 1998).

Traditional management through such systems as cultural taboo and totem restrictions on the utilization of bush meat seems to have some effect on regulating bush meat use within the district. In the past, such systems were an integral part of bush meat hunting and use in the district (Lindblom, 1920; Fidders, 1979), but with the increasing value attributed to bush meat their current impact is declining. The extent of current taboos and totems are, however, still extensive with 484 hunters, traders and consumers revealing certain species that would not be consumed. Of the 26 species not hunted or consumed, 16 species were due purely to traditional beliefs, whereas only three species were purely for religious beliefs, and five were due to a combination of both. Rock Hyrax and Red and Yellow Barbet were not hunted for the more pragmatic reasons, the former having a reputation for high levels of tape worm, and the latter having a bad and bitter taste. Survey respondents indicated that owls (95), ground squirrels (78), woodpeckers (67), monkeys (53) and mongoose (43) were most protected species through traditional taboo beliefs in the district. However, other taboo species are not protected to the same extent and indeed species such as North African Crested Porcupine (32), Bush Pig (31) and ground squirrels (78) are still hunted, traded and consumed in large quantities, especially Bush Pig. This may be due to their greater supply from crop protection, but it does show that taboos are only important within some sections of society and that others do not abide by the beliefs. Taboo species are still hunted and utilized through the trade network by inhabitants who do not adhere to restrictions related to their consumption (T Nalugala, 1998).

Wildlife products on sale.
Rob Barnett-TRAFFIC

External KWS and Kenya Police law enforcement is limited, and traditional management systems are performing a declining role in regulating bush meat off-take. Increased demand and a declining resource have resulted in the emergence of a substantial trade supply, and unsustainable off-take practices are prevalent. This is likely to have a serious impact on the ability of bush meat species to sustain current off-take levels and maintain viable populations within the district. The effect of bush meat hunting, trade and consumption on wildlife populations is believed to be substantial in Kitui District. However, land clearing and habitat encroachment for farming, and soil degradation through excessive livestock production in this semi-arid district are also believed to play a major role in reducing wildlife populations. The importance of both impacts is hard to differentiate (T Nalugala).

IV. SUMMARY/CONCLUSION

Kenya relies heavily on a wildlife based tourism industry that contributes substantially to government revenues and wildlife management operating funds. Such reliance on non-consumptive revenues generated from the wildlife resource has largely been a key factor in formulating Kenya's wildlife policy and legislation over the past three decades, and has resulted in one of the most restrictive consumptive wildlife use policies and legislation within Africa. Consumptive forms of wildlife use are limited, and those allowed have had to endure non-conducive operating environments that have impeded development and expansion. Policy and legislative restrictions have been especially prohibitive for the game ranching sector, which although undertaken on a pilot programme basis, has not been allowed to achieve its full potential under present restrictive marketing strategies. Hence, the legal game meat production sector in Kenya results in minimal annual supplies of about 692.2 mt with an estimated value of USD 590,043.

Increasing human populations, poverty and unemployment levels within the country have resulted in many communities relying on natural resources that in the past were either not utilized to any considerable extent, or used under traditional management systems that ensured sustainable harvesting. Currently, it is likely that more communities such as the Samburu pastoralists are turning to the bush meat resource as a way of sustaining livelihoods. Other peoples of Kenya such as the Turkana and Kamba who are traditionally more associated with bush meat use, are also likely to be increasingly motivated to undertake greater off-take of the resource due to increased values related to bush meat.

A non-consumptive wildlife policy has resulted in landowners outside of the protected wildlife estate not valuing the wildlife resource in areas where tourism is not an option. Wildlife's only role under current legislation and policy in such areas, which constitute the majority of the country's land area, is in competing with other more valued land uses such as livestock and agricultural production. Competition in the form of wildlife grazing, crop raiding, and threats to human lives has manifested itself in considerable antagonism and human-wildlife conflict. Wildlife is actively being fenced out of subdivided land, and hunted out for its increasing bush meat value. Outside of protected areas, government has not effectively taken ownership of its wildlife, with law enforcement contributing negligibly in regulating illegal use. Greater community participation in sustainable wildlife management is also limited due in part to the paltry benefits that can be obtained from wildlife under present non-consumptive policies and legislation. The likely result as indicated in Kitui is the increasing unsustainable use of wildlife for its meat value that is harvested on a first come first serve basis under an open access regime. Conservation implications are considerable, as is the impact that the loss of the bush meat resource will have on the community development, food security and nutritional status of many communities.

V. RECOMMENDATIONS:

- The licensed bird hunting sector in Kenya currently provides a small financial contribution directly to community (group ranches) and private landowners of hunting blocks and to the national economy. In light of the need for increased devolution of wildlife benefits to landholders, it is recommended that the sector be reviewed with the aim of developing mechanisms for increasing revenues derived from licensed bird hunting. License fees should be raised to reflect a more realistic cost of bird hunting both for its meat and sport hunting value. Disparities in license fees between residents and non-residents should be maintained and even increased, as the latter are likely to represent more affluent international tourists. It is recommended that the option of KWS setting a minimum license fee that can be increased by landholders and communities in hunting blocks according to the value that they themselves set be assessed as a way of providing stakeholders greater financial benefits from their bird hunting resource.

- The introduction of community-based cropping schemes in suitable areas throughout the country following the lines of the Lerohgi-Karisa Wildlife Conservancy initiative in Samburu District, should be assessed as a matter of priority. Under current conditions within the country of increasing human populations, demand for land, and the resulting increases in human-animal conflict, the supply of affordable meat from cropping schemes represents one of the most tangible and direct benefits that communities can receive. In areas outside of protected areas, demand for wild meat is extensive, and resulting illegal off-take is significant and not regulated to any large degree due to a lack of directed law enforcement capacity within these areas. Provision of legal and sustainably harvested game meat provides the potential to devolve greater wildlife benefits to communities, hence increasing community participation in wildlife management. It may also decrease the need for illegally and unsustainably harvested bush meat supplies especially if legal supplies are substantial and valued at lower prices.

- A review of problem animal control mechanisms is required to develop appropriate strategies for reducing the extent of communities culling most species under the legal guise of PAC, and increasing the level of monitoring of numbers culled nationwide. Limited capacity in both staff and vehicles leading to a limited response rate by KWS to reports of problem animals, needs to be resolved through greater NGO and donor support directed at the KWS Problem Animal Control Unit (PACU). Existing programmes such as those initiated through European Union funding in the KWS Elephant Programme, which aim to resolve elephant-human conflict, need to be fully supported. The potential for increasing capacity for more effective implementation of PAC and its monitoring and regulation through devolving its responsibility to capable individuals and companies and specifically KWS Honouree Wardens, should be assessed. An assessment of policy and legislation that provides for a more distinct definition of animals allowed to be culled directly by communities needs to be included in the forthcoming revised draft *Wildlife Conservation and Management Bill of 1996*. Provisions also need to be included that legally allow for the distribution of meat from PAC culled animals. Possibilities for selling meat derived from PAC culled animals should also be assessed as a means of generating revenue to PACU for increased monitoring and regulation of its activities.

- Current awareness of bush meat related wildlife laws is low or confused. It is recommended that increased effort should be directed at increasing the knowledge of these laws throughout Kenya. In addition, the judicial system should also be made aware of the increasing impact that unregulated bush meat utilization is believed to be having on wildlife populations. Fines and prison sentences should be revised to increase the effectiveness of the legal system as a deterrent to the commercialization of bush meat use. Fines should be well in excess of the meat product value of animals seized. Kenya Wildlife Service and Kenya Police should be made fully aware of the seriousness of such commercialization of bush meat use, and should be actively encouraged to increase bush meat related law enforcement especially outside of protected areas. A greater level of monitoring of law enforcement bush meat related activity should be promoted.

- A review of policy concerning the game ranching industry within Kenya is required as a matter of priority. This should involve the assessment of current legislative restrictions imposed in terms of veterinary, health and devolution of user rights. The impending draft *Wildlife Conservation and Management Bill of 1996* should include revisions to allow for legislated provision of game ranch wildlife user rights, which should facilitate greater private investment in the future. Policies regarding game meat marketing in Kenya should be reviewed. Although it is recognized that present policy aims to inhibit wild meat demand within the general populace of Kenya, current research suggests that demand is already prevalent and not restricted to any degree by existing legislation or law enforcement activity outside of protected areas. In light of this, a policy aimed at targeting lower income domestic markets with a social objective of poverty alleviation should be assessed. This would result is opening up a needed market to the legal game meat industry with larger quantities of game meat and revenues achieved, and the realization of a greater proportion of allocated cropping quotas.

  Lessons learned from initiatives implemented in targeting sales of game meat to lower income markets, such as those undertaken in Laikipia through local ranch sales and in Samburu through the Lerohgi-Karisa Wildlife Conservancy, should be fully incorporated into any assessment. A revised game meat marketing strategy would involve the need to allow for game meat advertising and promotion, and the identification and authorization of suitable low-income customer trade outlets. Increased levels of monitoring and regulation would be required to ensure sufficient safeguards against the possibility of illegally supplied bush meat entering the legal market.

  Bush meat demand is extensive in the survey areas of Samburu and Kitui. In Kitui, such demand has resulted in extensive off-take and utilization that is having a serious impact on wildlife populations levels. Other land uses in this semi-arid and unproductive district continue to take precedence to wildlife as a land use option, although in theory it could be more productive. The impact of restrictive use legislation in the district is non-existent. Wildlife is effectively an open access resource, and this is reflected in national wildlife census data, which shows an alarming rate of decline. Bush meat benefits from wildlife are extensive, both in terms of food security and household economies. In light of such trends in Kitui, it is recommended that a pilot community-based natural resource management programme (CBNRMP) be implemented to access ways of increasing regulated access to the wildlife resource for bush meat supply through sustainable harvesting regimes. This should involve the development of a comprehensive project proposal in close collaboration with other CBNRMP such as CAMPFIRE, Selous Conservation Programme, LIRDP, ADMADE and NRMP initiatives throughout the region. Such a pilot initiative should be viewed as providing the potential on a focal case basis to assess both the positive and negative impacts to conservation and community development. However, for such a pilot initiative to be implemented, policy will have to be revised in part, and KWS Director's special authority provided to granting wildlife user rights to communities directly.

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LIST OF ACRONYMS

ADMADE	Administrative Management Design
AI	Avian Influenza
BDF	Botswana Defense Force
BOP	Bulawayo Ostrich Producers
CA	Conservation Area
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CAWM	College of African Wildlife Management
CBNRMP	Community Based Natural Resource Management Programme
CFAZ	Crocodile Farmers Association
CFU	Commercial Farmers Union
CHA	Controlled Hunting Area
CMA	Community Management Area
CM	City Market
COBRA	Conservation of Biodiverse Resource Areas
DNFFB	National Directorate of Forestry and Wildlife
DNPW	Department of National Parks and Wildlife
DNPWLM	Department of National Parks and Wildlife Management
DNPWS	Department of National Parks and Wildlife Service
DPAP	Provincial Directorate of Agriculture and Fisheries
DVS	Department of Veterinary Services
DWASO	Dwanga Sugar Corporation Estate
DWNP	Department of Wildlife and National Parks
ESP	Environment Support Programme
EU	European Union
FMD	Foot and Mouth Disease
FR	Forest Reserve
GCA	Game Controlled Areas
GDP	Gross Domestic Product
GMA	Game Management Area
GNP	Gross National Product
GR	Game Reserve
KWS	Kenya Wildlife Service
LIRDP	Luangwa Integrated Resource Development Project
LSCF	Large-Scale Commercial Farms
MAP	Ministry of Agriculture and Fisheries
NCAA	Ngorongoro Conservation Area Authority
NCD	Newcastle Disease
NCS	National Conservation Strategy
NEAP	National Environmental Action Plan

NERP	New Economic Reform Programme
NGO	Non-Governmental Organization
NP	National Park
OA	Open Area
PAC	Problem Animal Control
PACU	Problem Animal Control Unit
PAMU	Problem Animal Management Unit
PA	Protected Area
PAWS	Protected Areas Wildlife Service
PFAP	Provincial Forest Action Programme
PROAGRI	National Programme for Agrarian Development
RAD	Remote Area Dweller
RADP	Remote Area Development Programme
RAO	Recommended Allowable Off-take
SAP	Structural Adjustment Programme
SCP	Selous Conservation Programme
SPFFB	Provincial Services for Forestry and Wildlife
SRCS	Serengeti Regional Conservation Strategy
SSCF	Small-Scale Commercial Farms
SUCOMA	Sugar Corporation of Malawi
SWRI	Serengeti Wildlife Research Institute
TANAPA	Tanzania National Parks
TAWICO	Tanzania Wildlife Corporation
TC	Trade Centers
TOPAZ	Ostrich Producer's Association of Zimbabwe
TRAFFIC	Trade Records Analysis of Fauna and Flora in Commerce
VIDCO	Village Development Committees
VMWR	Vwaza Marsh Wildlife Reserve
VWMC	Village Wildlife Management Committee
WARDCO	Ward Development Committee
WCMD	Wildlife Conservation and Management Department
WCRF	Wildlife Conservation Revolving Fund
WD	Wildlife Division
WMA	Wildlife Management Area
WPA	Wildlife Producers Association
ZFAP	Zambia Forest Action Programme
ZAWA	Zambia Wildlife Authority
ZFU	Zimbabwe Farmers Union
ZOPA	Zimbabwe Ostrich Producers Association

ANNEX I

National and Focal Case Studies Implemented on Legal Game meat and Illegal Bush Meat Utilization and Trade:

I.) TANZANIA:

Project No.1 (T Malima, 1998)

Description: National survey on the importance of formal game meat supply in Tanzania

Objective: To document from existing government data the importance and relative contribution of game meat supplies from licensed hunting, problem animal control, game ranching/farming and cropping schemes.

Project No.2 (T Forestor, 1998)

Description: A survey of bush meat procurement, trade, and use in western Serengeti, Tanzania

Objective: To assess the parameters and dynamics of the utilization of bush meat by a rural community located near to a protected area.

Project No. 3 (T Foya, 1998)

Description: The utilization and trade of bush meat in Kilimanjaro Region of Tanzania

Objective: To document the parameters and dynamics of bush meat use by communities living in a high human population and cultivation density area.

Project No.4 (T FCF, 1998)

Description: Informal bush meat resource utilization in Meatu District of Tanzania

Objective: To assess the importance of bush meat to a rural community bordering the Maswa Game Reserve and document the trade and subsistence parameters of use.

II.) MALAWI:

Project No. 1 (T Phiri, 1998)

Description: Survey of utilization and trade in large species by communities surrounding the Dzalanyama Protected Area, Kasungu Wildlife Reserve and Nkhotakota Wildlife Reserve.

Objective: To ascertain the importance of traditional informal wildlife utilization and its contribution nutrition and the standard of living of the target communities.

Project No. 2 (T Sangalukala, 1998) (T Mwapatira, 1998)

Description: A) Survey of the insect, bird and rodent trade in urban areas of Malawi's Central Region; B) survey of the insect, bird and rodent trade in the rural areas of Mwanza, Dowa and Salima Districts.

Objective: Ascertain the importance of bush meat derived from smaller animals such as insects, rodents and birds and their role in livelihood and food security.

Project No. 3 (T Munthali, 1998)

Description: Review of source of wildlife meat utilized in Malawi, with emphasis on problem animal control as a source of meat

Objective: To document the importance and relative contribution of the formal and informal supplies of wildlife meat to the country.

III.) BOTSWANA:

Project No. 1 (T Triall-Thomson, 1998)

Description: National survey of the utilization and trade of the formal game meat and informal bush meat industry in Botswana.

Objective: To ascertain the importance of the supply and marketing of legalized sources of game meat to the national economy and assess the extent of informal commercial bush meat trade in Botswana.

Project No. 2 (T Traill Thomson, 1998)

Description: Survey of the dynamics of wildlife meat contribution to food security and household economies through subsistence and trade use in Kweneng and Kgalagadi districts of western Botswana.

Objective: To document the importance of wildlife meat to rural communities and the benefits attained through trade and subsistence supply to livelihoods.

Project No. 3 (T Letsie, 1998)

Description: Botswana mopane worm trade study

Objective: To ascertain and document the dynamics of Mopani trade, the volumes, trade routes, markets, buyers and dealers.

IV.) ZIMBABWE:

Project No. 1 (T Davies, 1998)

Description: Study on the formal (legal) production and trade of game meat in Zimbabwe

Objective: To document through baseline survey and collation of existing data the value and importance of game meat production from ranching, farming cropping/culling and licensed hunting.

Project No.2 (T Mukamuri, 1998)

Description: Trade and utilization of bush meat in rural areas of Lupande and Chivhu and urban areas of Harare and Bulawayo

Objective: To ascertain and document the parameters and dynamics affecting the hunting, trade and subsistence use of bush meat in urban and rural survey areas.

Project No.3 (T Ballan, 1998)

Description: Bush meat in Dande: social dynamics beyond legality and illegality

Objective: To determine the social dynamics affecting the utilization of game meat (legal) and bush meat (illegal) and to assess relationships existing between the two supplies.

V.) ZAMBIA:

Project No.1 (T Saiwana, 1998) (T DNPWS, 1998)

Description: Bush meat trade in Lusaka, Livingstone and Kabwe urban areas of Zambia

Objective: To document the parameters and dynamics affecting bush meat trade in urbanized areas of Zambia

Project No.2 (T Kalyocha, 1998)

Description: Legal and illegal wild meat production and utilization in Zambia

Objective: To document from existing and baseline data importance of game meat supplies from legal production sectors in the country, and through detailed baseline surveys to determine the parameters, quantities, species affected and trade routes associated with bush meat utilization in the Luangwa Valley of Zambia.

VI.) MOZAMBIQUE:

Project No.1 (T IUCN, 1998)

Description: Documenting wild meat production and use in Mozambique

Objective: To assess through comprehensive literature search and compilation of annotated bibliography existing literature pertaining to the legal and illegal use of wild meat in Mozambique.

Project No.2 (T Macuacua, 1998)

Description: Literature review on the formal (legal) and informal (largely illegal) bush meat trade in Mozambique

Objective: To provide a historical perspective on the utilization and trade of wild meat with particular attention to impact of civil war and history of large scale cropping for meat production

Project No.3 (T Longamane, 1998)

Description: Collection of data and information from government sectors on the formal and informal utilization of wild meat in Mozambique

Objective: To collate and document existing data on all legal game meat production sectors, and data in illegal use of bush meat through assessment of law enforcement and other relevant records.

Project No.3 (T Guissamulo, 1998)

Description: The bush meat trade in urban areas of Maputo province

Objective: To document through baseline survey the importance, value, quantities, species, market mechanisms and trade routes affecting the trade of bush meat in urbanized villages, towns, city and other market location (roadsides) of the province.

Project No.4 (IUCN-Beira, 1998)

Description: Bush meat trade and utilization in rural areas of the Zambezi Delta and in the urban market of Beira town in Sofala province, Mozambique

Objective: To document the parameters, dynamics and importance of bush meat trade and utilization.

VII.) KENYA:

Project No. 1 (T Nalugala, 1998)

Description: Survey on the hunting, trade and consumption of bush meat in Kitui District, Kenya

Objective: Through extensive baseline surveys to document the quantities, economic value, species affected and dynamics surrounding the hunting, trade and consumption of bush meat.

Project No.2 (T NRP, 1998)

Description: Survey on the utilization of bush meat in Ilkiloriti, Lpartuk and Loikas communities in Samburu District Kenya

Objective: To evaluate through baseline survey the role of ethnicity of pastoralist (Samburu) and agro-pastoralist (Turkana) on bush meat utilization and trade.

Project No.3 (T Esposito, 1998)

Description: Study on the legal game meat production sectors in Kenya and collation of existing wildlife authority data and information on illegal bush meat use

Objective: To document game ranching/farming, problem animal control and licensed bird hunting supply and use of game meat, and assess the extent of illegal hunting through review of law enforcement data.

ANNEX II

Bush Meat Species Utilised in the East/Southern Africa Region:

English Name	Latin Name
Mammals (excluding Carnivores and Rodents):	
Aardvark	*Orycteropus afer*
African Elephant	*Loxodonta africana*
Black Lechwe	*Kobus leche smithemani*
Blesbok	*Damaliscus dorcas*
Blue Monkey	*Cercopithecus mitis*
Blue Wildebeest	*Connochaetes taurinus*
Bohor Reedbuck	*Redunca redunca*
Burchell's Zebra	*Equus burchelli*
Bush Buck	*Tragelaphus scriptus*
Bush Pig	*Potamochoerus porcus*
Cape Buffalo	*Syncerus caffer*
Cape Pangolin	*Manis temmincki*
Cape Rock Hyrax	*Procavia capensis*
Chacma Baboon	*Papio ursinus*
Common Duiker	*Cephalophus grimmia*
Common Eland	*Tragelaphus oryx*
Common Hartebeest	*Alcelaphus buselaphus*
Common Reedbuck	*Redunca arundinum*

Common Wart Hog	*Phacochoerus africanus*
Gemsbok	*Oryx gazella*
Gerenuk	*Litocranius walleri*
Giraffe	*Giraffa camelopardalis*
Grant's Gazelle	*Gazella granti*
Greater Bush Baby	*Galago crassicaudatus*
Greater Kudu	*Tragelaphus strepsiceros*
Grevy's Zebra	*Hippogris grevyi*
Guenther's Dik Dik	*Madoqua guentheri*
Harvey's Duiker	*Cephalophus harveyi*
Hippopotamus	*Hippopotamus amphibius*
Impala	*Aepyceros melampus*
Kirk's Dik Dik	*Madoqua kirkii*
Klipspringer	*Oreotragus oreotragus*
Lesser Kudu	*Tragelaphus imberbis*
Nyala	*Tragelaphus angasi*
Oryx	*Oryx gazella*
Puku	*Kobus vardoni*
Red Hartebeest	*Alcelaphus caama*
Red Lechwe	*Kobus leche leche*
Roan Antelope	*Hippotragus equinus*
Rock Hyrax	*Heterohyrax brucei*
Sable Antelope	*Hippotragus niger*
Sharpe's Grysbok	*Rhaphicerus sharpei*
Sitatunga	*Tragelaphus spekii*
Springbok	*Antidorcas marsupialis*
Steinbok	*Raphicerus campestris*
Suni	*Neotragus moschatus*
Thompson's Gazelle	*Gazella thomsoni*
Tree Dassie (Hyrax)	*Dendrohyrax arboreus*
Tsessebe/Topi	*Damaliscus lunatus*
Vervet Monkey	*Cercopithecus ethiops*
Warthog	*Phacochoerus aethiopicus; P. africanus*
Waterbuck	*Kobus ellipsiprymnus*
White-Throated Guenon	*Cercopithecus albogularis*
Yellow-Backed-Duiker	*Cephalophus silvicultor*

Bird Species:

African Mourning Dove	*Streptopelia dicipiens*
African Pygmy Geese	*Nettapus auritus*
African Snipe	*Gallinago nigripennis*
Black Korhaan	*Eupodotis afra*
Black-Faced Sandgrouse	*Pterocles decoratus*
Blue-Capped Cordon-Blue	*Uraeginthus cyanocephalus*
Blue-Cheeked Cordon-Bleu	*Uraeginthus angolensis*
Buff-Crested Korhaan	*Eupodotis ruficrista*
Cuckoo Finch (Parasitic Weaver)	*Anomalospiza imberis*

Cape Shoveler	*Anas smithii*
Cape Teal	*Anas capensis*
Cape Weaver	*Ploceus capencis*
Chestnut Weaver	*Ploceus rubiginosis*
Common Button-Quail	*Turnix slyvatica*
Crested Guinea Fowl	*Guttera pucherani*
Dark-Backed Weaver	*Ploceus bicolor*
Dusky Turtle- Dove	*Streptopelia lugens*
Eastern Yellow-Billed Hornbill	*Tockus flavirostris*
Egyptian Goose	*Alopechen aegyptiacus*
Forest Weaver	*Symplectes bicolor*
Grey Francolin	*Francolinus afer*
Harlequin Quail	*Coturnix delegorguei*
Helmeted Guinea Fowl	*Numida meleagris*
House Sparrow	*Passer domesticus*
Knob-Billed Duck	*Sarkidiornis melanotos*
Kori Bustard	*Ardeotis kori*
Namaqua Dove	*Oena capencis*
Ostrich	*Struthio camelus*
Pied Mannikin	*Lonchura fringilloides*
Red Headed Weaver	*Aneplectes melanotis*
Red-Billed Quelea	*Quelea quelea*
Red-Billed Teal	*Anas erythrorhynchos*
Red-Cheeked Cordon-Blue	*Uraeginthus bengalus*
Red-Eyed Dove	*Streptopelia semitorquata*
Ring-Necked Dove	*Streptopelia capicola*
Scaly Feathered Finch (Scaly Weaver).	*Sporopipes sqwamifrons*
Southern Brown-Throated Weaver	*Ploceus xanthopterus*
Southern Pochard	*Netta erythrophthalma*
Spur-Winged Goose	*Plectopterus gambensis*
Swainson's Francolin	*Pternistis swainsoni*
Tawny-Flanked Prinia	*Prinia subflava*
Vulturine Guinea Fowl	*Acryllium vulturinum*
Wattled Crane	*Bugeranus carunculatus*
Weaver Birds	*Ploceidae*
White-Faced Whistling-Duck	*Dendrocygna viduata*
Yellow-Billed Duck	*Anas undulata*
Yellow-Necked Spurfowl	*Francolinus leucoscepus*
Yellow-Throated Petronia	*Petronia superciliaris*
Zebra Waxbill	*Amandava subflava*

Carnivores:

Aardwolf	*Proteles cristatus*
African Civet	*Civetticus civetta*
African Wild Cat	*Felis libyca*
Bat-Eared Fox	*Otocyon megalotis*
Black-Backed Jackal	*Canis mesomelas*

Brown Hyena	*Hyaena brunnea*
Bush-Tailed Meerkat	*Cynictis penicilatta*
Cape Clawless Otter	*Aonyx capensis*
Cape Fox	*Vulpes chama*
Caracal	Caracal *caracal*
Cheetah	*Acinonyx jubatus*
Honey Badger	*Mellivora capensis*
Large-Spotted Genet	*Genetta tigrina*
Leopard	*Panthera pardus*
Lion	*Panthera leo*
Serval	*Felis (Leptailurus) serval*
Side-Striped Jackal	*Canis adustus*
Slender Mongoose	*Herpestes (Galerella) sanguineus*
Small Spotted Genet	*Genetta genetta*
Spotted Hyena	*Crocuta crocuta*
Striped Hyena	*Hyaena hyaena*
Suricate	*Suricata suricatta*
Wild Dog/Hunting Dog	*Lycaon pictus*
Zorilla/Striped Polecat	*Ictonyx striata*

Rodents:

Black Rat	*Ratus ratus*
Cane Rat	*Thryonomys swinderianus*
Cape Gerbil	*Tatera leucogaster*
Cape Hare /Brown Hare	*Lepus capensis*
Dormouse	*Graphiurus micritis*
Fat Mouse	*Steatomys paatensis*
Giant Gambian Rat	*Cricetomys gambianus*
Ground Squirrel	*Xerus inauris*
Jameson's Red Rock Rabbit	*Pronolagus randensis*
Mouse	*Mus spp.*
Mole Rat	*Heliophobius argenteocinereus*
Multimammate Rat	*Mastomys natalenzis*
North African Crested Porcupine	*Hystrix cristata*
Pouched Mouse	*Saccostomus campestris*
Pygmy Mouse	*Mus minotoides*
Red Veld Rat	*Aethomys chrysophilus*
Scrub Hare	*Lepus saxatilis*
Smith's Bush Squirrel	*Paraxerus cepapi*
South African Crested Pocupine	*Hystrix africae-australis*
South African Hedgehog	*Erinaceus frontalis*
Springhare	*Pedetes capensis*
Vlei Rat	*Otomys angoniensis*
Water Rat	*Dasymys incomtus*

Insects:		
	Black Flying Ant	*Carebara vidua*
	Cicada	*Platypleura*
	Giant Cricket	*Brachtrypes mmbranesceus*
	Grass Hopper	*Acanthracris ruficornis*
	Lake Fly	*Chaoborodae chaoboridae edulis*
	Large Green Cricket	*Homorocorphus vicinus*
	Large Green Shield Bug	*Nezara robusta*
	Red Locust	*Namadaris septemphasciata*
	Sand Crickets	*Brachytrypes mimbraneceus*
	Shield Bug	*Sphaerocois spp*
	Termites	*Macrotermes spp*
	Mopane Worm	*Imbrasia belina*
Reptiles:		
	African Rock Python	*Python sebae*
	Kalahari Tent Tortoise	*Psammobates aculifer*
	Leopard Tortoise	*Geochelone pardalis*
	Nile Crocodile	*Crocodiylus niloticus*
	Water or Nile Monitor	*Varanus niloticus*

ANNEX III

Foreign Exchange Rates for Countries Studied in East/Southern Africa:

Country:	Currency:	USD:
Botswana	BWP 2.8	1 USD
Mozambique	MZM 9,090	1 USD
Zimbabwe	ZWD 15	1 USD
Zambia	ZMK 1,300	1 USD
Malawi	MWK 15	1 USD
Tanzania	TSH 600	1 USD
Kenya	KSH 60	1 USD

IUCN
The World Conservation Union

The TRAFFIC Network is the world's largest wildlife trade monitoring programme with offices covering most parts of the world. TRAFFIC is a programme of WWF – World Wildlife Fund for Nature and IUCN (The World Conservation Union), established to monitor trade in wild plants and animals. It works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The TRAFFIC Network shares its international headquarters in the United Kingdom with the World Conservation Monitoring Centre.

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