

# Cattle and Wildlife Ranching in Zimbabwe

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In semi-arid African savannas, multi-species wildlife communities tend to use heterogeneous vegetation more completely than cattle alone (Walker 1976, 1979). Wildlife production may thus be ecologically the most rational form of land use in these areas (Child and Child 1986). It has also been claimed that wildlife can produce more biomass per unit area than cattle (Dasmann and Mossman 1961, Hopcraft 1986) due to niche separation and/or dietary plasticity among wild herbivores, but other studies have not corroborated this (McDowell et al. 1983, Taylor and Walker 1978). The biggest advantages of wild animals over conventional livestock are now generally considered to be their higher value and multiple-use potential (Cumming 1989, Johnstone 1973). But claims that African wildlife may generate greater profits than cattle have seldom been based on comprehensive economic studies.

The commercial ranching sector of Zimbabwe provided a rare opportunity for estimating the efficiencies of extensive cattle and wildlife production systems because there is a long history of commercial cattle ranching and landowners have the right to commercially use wildlife on their land. This study was based in the Midlands Province, which contains the most productive semi-arid rangelands in the country, because economic trade-offs between cattle and wildlife ranching could be more easily identified in this area than in other wetter or more arid areas.

## Midlands Province

The Midlands Province lies in the center of Zimbabwe (Fig. 1) and it ranges in altitude from 920 to 1,475 meters (3018 to 4,840 feet) with undulating topography that becomes broken towards the eastern and western drainage systems. It receives a mean annual rainfall ranging from 650 to 800 millimeters (26 to 32 inches) along an east-west gradient, which occurs mainly during summer storms. *Miombo* woodland savanna is the dominant vegetation type but plateau grasslands, particularly *Hyparrhenia* species, dominate the Chivhu and Somabhula areas (Fig. 1). Wildlife in the Midlands consists mainly of plains-game species but a few larger herbivores, such as elephant,

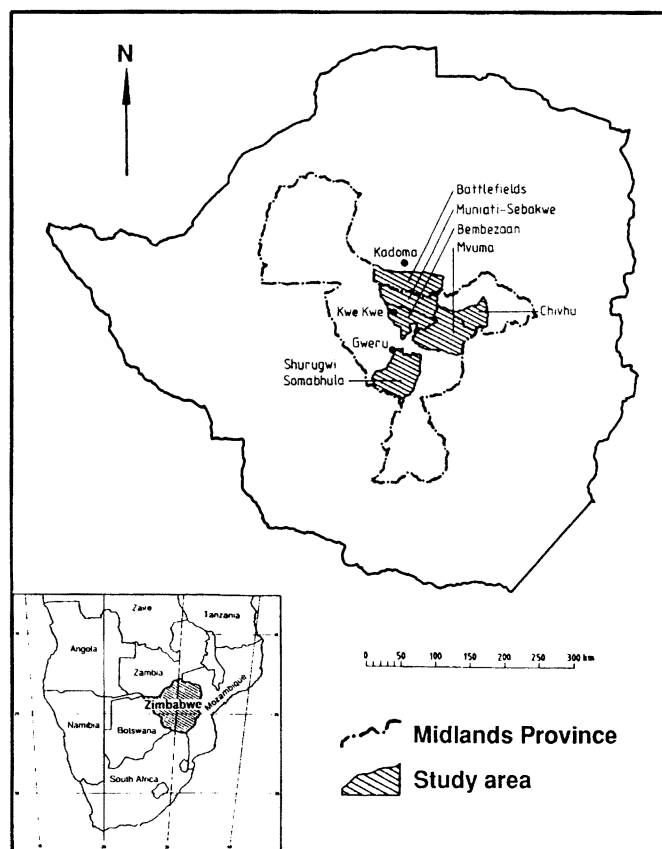


Fig. 1. The Midlands Province of Zimbabwe and the six areas included in the study.

rhino, hippo, giraffe and buffalo, also occur. The most populous species in 1990 were impala, warthog, baboon, kudu, and duiker. The most valuable game-species were leopard, sable antelope, eland, water buck, kudu, tsessebe and zebra (Table 1). Erratic rainfall has generally restricted agricultural activities in these semi-arid, mainly sandy areas to drought-tolerant crop and livestock production. Wildlife has been used commercially since the late 1970's.

Fifty Midlands ranches in four areas with significant wildlife stocks (Battlefields, Umriati-Sebakwe, Bembezaan, Mvuma) and two areas with scarce wildlife (Chivhu and Shurugwi-Somabhula) were selected for study (Fig. 1). In the first four areas the study included 15 cattle, 7 wildlife, and 13 mixed ranches, ranging in size from 1,424 to 132,840 hectares (3,517 to 328,115 acres). In the two areas with scarce wildlife, 15 cattle ranches varying in size from 1,284 to 16,261 hectares (3,171 to 40,165 acres), were studied.

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**Table 1. Estimated 1990 wildlife populations and average trophy values of hunted species in the Midlands study area.**

Species	Scientific name	Number <sup>1</sup>	Trophy fee (US\$) <sup>2</sup>
Leopard	<i>Panthera pardus</i>	185	1,375
Sable	<i>Hippotragus niger</i>	1,618	1,164
Eland	<i>Taurotragus oryx</i>	1,579	683
Waterbuck	<i>Kobus ellipsiprymnus</i>	540	564
Kudu	<i>Tragelaphus strepsiceros</i>	9,024	499
Tsessebe	<i>Damaliscus lunatus</i>	2,042	480
Zebra	<i>Equus burchelli</i>	2,802	427
Wildebbeest	<i>Connochaetes taurinus</i>	3,894	355
Reedbuck	<i>Redunca arundinum</i>	1,484	250
Bushbuck	<i>Tragelaphus scriptus</i>	395	244
Klipspringer	<i>Oreotragus oreotragus</i>	519	158
Oribi	<i>Ourebia ourebi</i>	38	142
Impala	<i>Aepyceros melampus</i>	24,501	96
Warthog	<i>Phacochoerus aethiopicus</i>	12,671	87
Bushpig	<i>Potamochoerus porcus</i>	3,217	80
Steenbok	<i>Raphicerus campestris</i>	3,487	73
Grysbok	<i>Raphicerus melanotis</i>	245	71
Duiker	<i>Sylvicapra grimmia</i>	7,330	71
Baboon	<i>Papio ursinus</i>	9,525	36

<sup>1</sup>Anecdotal information from survey ranchers.

<sup>2</sup>Average values from 1990 survey (hunting fees are always quoted in US\$ to accommodate foreign clients and to minimize the frequency of inflation-related price adjustments).

**Ranch Survey**

A survey questionnaire was developed to gather information about the 1989/90 production season. This was administered in 1990 through on-ranch interviews to obtain physical, managerial and financial data from each selected ranch. Financial profits of cattle and wildlife enterprises were estimated from reported revenues and costs. In cattle enterprises, estimated profits were adjusted for changes in livestock inventory to account for profit or capital transfers. Financial profits were estimated on a per hectare basis



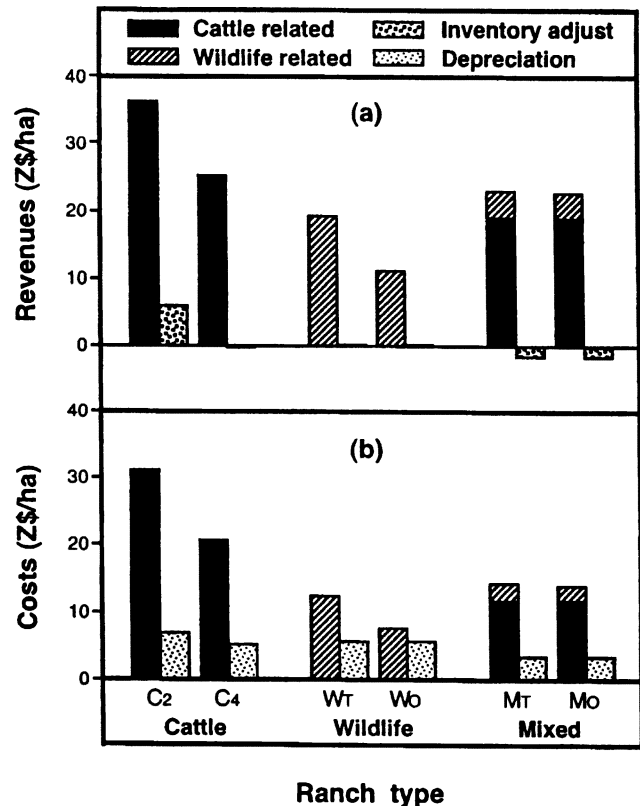
Cattle and zebra in Hyparrhenia grassland.

because, in the short term, ranch area is fixed. Data were analyzed using distribution-free non-parametric statistical techniques.

**Survey Results**

Average revenues, costs, cattle-inventory adjustment, and depreciation associated with cattle, wildlife and mixed ranches are presented in Fig. 2. Cattle ranches produced the greatest revenues and costs per ha, while on-ranch revenues and costs of wildlife ranches were significantly less than those of cattle and mixed ranches. The average live-stock inventory adjustments (side bars in top panel of Fig. 2) were positive for cattle ranches in the two areas with sparse wildlife and slightly negative for mixed ranches. Depreciation costs (side bars in bottom panel of Fig. 2) were similar for all ranch types.

Cattle ranchers derived almost all of their income from the sale of beef cattle (67% Brahman types, 19% other *Bos indicus* types and 14% *Bos taurus*) either to abattoirs (67%), through auctions (18%) or through on-farm sales (14%). Among wildlife enterprises, most income was earned from the sale of hunting and photographic safaris



**Fig. 2.** (a) Average total revenue per hectare and (b) average total cost per hectare of cattle, wildlife and mixed ranches. C<sub>2</sub> and C<sub>4</sub> are cattle ranches in two areas with sparse wildlife and four areas with abundant wildlife, respectively; Wt, Wo, Mt and Mo represent the total operations and on-ranch components of wildlife and mixed ranches, respectively.

(76%), live game sales (18%) and game-meat sales (5%). Hunting clients were mainly from America (49%), Europe (40%), and Australia (6%). Major cost items in cattle enterprises were livestock purchases (29%), feed (21%), hired labor (16%), repairs and maintenance (8%), veterinary (6%), interest and banking (6%), and administration (5%). In wildlife enterprises, major cost items were repairs and maintenance (16%), hired labor (15%), capture and culling (13%), lease fees (10%), fuels (9%), administration (9%), safari consumables (7%), and promotional expenses (5%).

The financial profits per hectare of cattle, wildlife, and mixed ranches are shown in Fig. 3. When depreciation costs were excluded, all ranch types provided positive net revenue per hectare (Fig. 3a: Z\$ is Zimbabwe dollar = about US\$0.40 in 1990;  $C_2$ =Z\$11.18 and  $C_4$ =Z\$4.53 represent cattle ranches in areas with sparse and abundant wildlife, respectively;  $W_T$ =Z\$6.91 and  $W_O$ =Z\$3.79 represent total operation and on-ranch component of wildlife ranches; and  $MT$ =Z\$7.11,  $MO$ =Z\$7.20 represent total operation and on-ranch components of mixed ranches). When depreciation estimates were included (Fig. 3b), cattle ranches in the two areas with sparse wildlife generated the greatest profits (Z\$4.50 per hectare) while, in areas with abundant wildlife, only mixed ranches were profitable (Z\$3.79 per hectare). These results imply that in areas with abundant wildlife, both cattle and wildlife ranchers were, generally, surviving on depreciation. Furthermore, when depreciation was included, wildlife ranches were financially profitable only when off-ranch wildlife outside the Midlands (primarily more lucrative big-game species such as elephant, buffalo and lion) were included in the analysis.



Sable antelope (*Hippotragus niger*) is a key trophy species in Zimbabwe.

The results presented do not account for government policy effects on ranch profits (Kreuter and Workman 1994a) nor do they account for differential stocking pressures on cattle and wildlife ranches on the long-term sustainability of these operations (Kreuter and Workman 1994b).

## Discussion

In Zimbabwe, average inflation-adjusted cattle prices fell 24% between 1982 and 1988 and profit margins shrank sharply (Roth 1991). As a result, cattle numbers decreased by 32% in the Midlands during the 1980's. Conversely, the value of trophy prices increased by an estimated 67% in Z\$ terms between 1984 and 1990, i.e., about 9% per year (Kreuter and Workman, 1996, in press) and during the 1980-84 period, net revenue per unit biomass and returns to investments were found to be greater for wildlife than cattle enterprises in the Midlands (Child 1988). This produced a large increase in land allocated to wildlife during the 1980's.

A shortage of valuable trophy animals appears to be limiting further expansion of the Midlands wildlife industry (Child 1988). In our 1990 survey, access to leopard and sable was found to be particularly important for enhancing profits from wildlife because hunts could be increased from seven to ten days and the daily hunting fees (excluding trophy fee) could be increased from US\$250 to US\$350. (Daily and trophy fees are always quoted in US\$ for the benefit of the foreign hunters.) There has thus been a tendency to disproportionately increase the hunting pressure on leopard and sable.

Despite the apparent high returns to investments in wildlife, neither Child's (1988) nor our studies corroborated claims that when only Midlands wildlife stocks were considered, wildlife ranching is more profitable per unit area than cattle ranching. In our study, the greatest financial profits

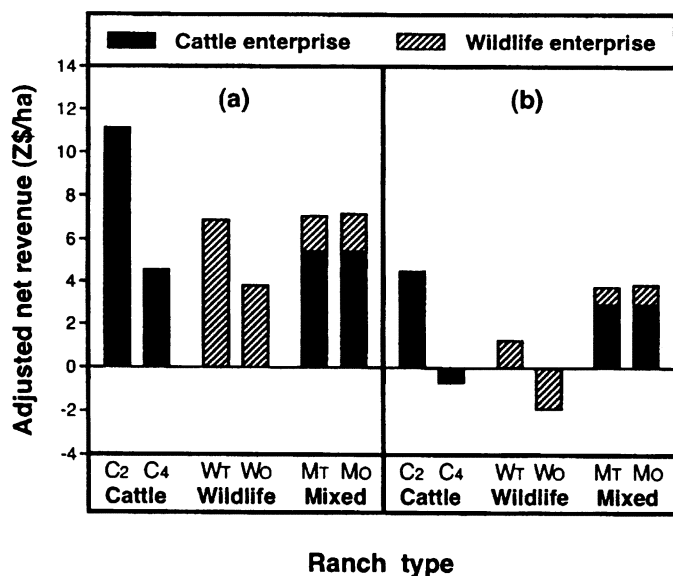


Fig. 3. Adjusted per-ha net revenue of cattle, wildlife and mixed ranches: (a) excluding and (b) including depreciation.  $C_2$  and  $C_4$  are cattle ranches in two areas with sparse wildlife and four areas with abundant wildlife, respectively;  $W_T$ ,  $W_O$ ,  $M_T$  and  $M_O$  represent the total operations and on-ranch components of wildlife and mixed ranches, respectively.



*A permanent safari hunting camp in the Midlands.*

per ha in areas with significant wildlife stocks were generated by mixed operations. This together with the lower capital requirements for wildlife enterprises, foreign currency earning potential of wildlife (at a time when there was a foreign currency shortage), and widespread overstocking of cattle (Kreuter and Workman 1994b), made it economically and ecologically sound for ranchers to reduce their cattle herd sizes and diversify into wildlife, thereby spreading investment risk.

### Proposed Management Strategy

Since land and management needs for cattle and tourist-orientated wildlife operations differ substantially, cattle and wildlife should be managed separately. While cattle can be managed privately by each rancher, landowners should integrate the management of their wildlife resources under a wildlife co-operative with participating land owners as share holders. This would provide a broader resource base for hunting operations by including areas not currently being used and it would increase the area available to species requiring large, unimpeded home ranges. Co-operative wildlife management could also improve the monitoring of wildlife stocks and reduce over-exploitation of the rarer, more valuable game-species. It could also enhance standards of safari operations through employment of professional, tourist-orientated managers.

### Summary

It has been claimed that more efficient resource use and greater profits can result from game ranching than from cattle production in semi-arid African savannas. This paper presents the results of a survey conducted to test this claim in the Zimbabwe Midlands during 1989/90. Cattle enterprises derived revenue primarily from the sale of beef animals

and wildlife enterprises from the sale of plains-game safari hunting opportunities to foreign clients. Cattle ranches in two areas with sparse wildlife produced the greatest financial profits per ha but only mixed ranches were financially profitable in four areas with abundant wildlife. In the woodland savannas of mid-Zimbabwe, this study did not support the claim that wildlife ranching generates greater profits than cattle ranching.

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