

Results of the national cattle survey undertaken in South Africa, with emphasis on beef

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Abstract

A South African national livestock survey was conducted in 2003 as part of an FAO initiative. This article presents the results of the survey in respect to cattle, with an emphasis on beef cattle. The survey was weighted towards the emerging sector where information was scanty and unreliable. Cattle farming appeared to be the major enterprise in this sector with extensive cattle farming accounting for 75% of the systems. The head of the households were mainly male and more than 60% were older than 50 years. The average cattle herd size for the communal and emerging sectors were 19, whereas it was 413 in the commercial sector. The primary reason for keeping cattle in the communal sector was for meat and cash (47% of use). Keeping cattle for milk accounted for only 10% of use, and draft power for 4%. Non-descript cattle dominate the emerging sector with the Nguni and Brahman breeds also playing a significant role. The presence of large numbers of non-descript and Brahman cattle poses a threat to the indigenous cattle genetic resources of this sector. Indigenous landrace breeds dominate the seed stock industry, and to a lesser extent, the commercial industry, where British and European breeds are utilized for crossbreeding. Mating seasons were practiced in almost 90% of the commercial sector, whereas its utilization in the communal sector was only 2%. In the commercial sector, performance was found to be three times more important than any other trait determining the choice of bull, while size was the most important factor in the communal sector.

Keywords: Cattle, livestock survey, emerging sector, commercial sector, seed stock sector

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Introduction

The erosion of indigenous livestock breeds in southern Africa is cause for concern as the animals provide a significant contribution to the rich biodiversity of the region. In addition, they have potential as well-adapted, alternative breeds for the farmers of the future, especially in the face of global warming. At the end of the last century it became necessary to assess their status in order to conserve them and to develop their economic potential.

To this end the FAO/UNDP/SADC Project RAF/97/032 was initiated in the SADC region. The aim of the project was to identify, characterize, conserve and improve farm animal resources of the area in order to maintain biological diversity. In addition, socio-cultural information, population demographics and animal health data were collected to create a holistic approach to the design of sustainable livestock systems with the potential to improve food security, rural livelihoods and incomes.

A regional coordinating centre was established in South Africa under the auspices of the South African Department of Agriculture. Each SADC country created a national coordinating centre that formed the basis of a sub-regional network for the management of farm animal genetic resources. The first task of this organisation was to carry out national breed surveys and to establish a regional databank. The ARC was contracted to lead the survey in South Africa with substantial inputs from the Department of Agriculture and the nine Provincial Departments of Agriculture.

The field work of the survey was completed by the end of November 2003. Following a number of delays, sufficient analysis was complete to contribute towards the South African Country Report on Farm Animal Genetic Resources, finalized in 2006. The remaining analysis is underway. This article summarizes

the results of the survey in respect to cattle, with an emphasis on beef cattle. Specific information on dairy cattle will form a separate publication.

Materials and Methods

Questionnaires were designed by the University of Zimbabwe and the International Livestock Research Institute at the request of the FAO. The design of the sample framework was based on the input variables of the different biomes and urban/rural/deep rural enumerator areas. Areas chosen were the enumerator areas used in the South African population census of 1996 and were identified by fusing the census information onto the biomes. Weighting was applied towards the communal areas where available information was scanty and unreliable. A total of 2570 households owning livestock were visited by enumerators as reflected in Table 1.

Table 1 Percentage enumerator areas visited per province

Eastern Cape	Free State	Gauteng	KZN	Mpumalanga	Northern Cape	Limpopo	North West	Western Cape
26%	4%	2%	19%	9%	1%	25%	11%	3%

In addition to the information on individual breeds, the information was also summarized into the following breed categories:

- 1) Sanga and Sanga derived. This category included all the landrace breeds of South Africa. Landrace breeds are defined as indigenous and locally developed breeds closely linked to a country by way of name, local content, breeding programs and origin.
- 2) Zebu and Zebu derived. This category included the Brahman and Brahman composites.
- 3) European breeds
- 4) British breeds

The protocol required that questions such as the reasons for keeping cattle, the mating method and the reasons for choice of bull, should be ranked from 1st, 2nd and 3rd with an (X) if more were applicable. As this complicated the analysis, scores were allocated to the different rankings in order to give an index of importance as seen in Table 2. This was then expressed as a percentage of the total points. The sample size for cattle was 1097, 94 and 90 for the communal, emerging and commercial sectors respectively.

Table 2 Scores allocated to the rankings to obtain the index (total points)

Ranking	1 st	2 nd	3 rd	X
Score	4	3	2	1

Results and Discussion

Population demographics

A comparison of population group numbers with those of the 1996 census showed that the sample was representative. Analysis of the weighted data indicated that 81% of the farms sampled belonged to the communal sector, 12% to the emerging sector and 7% to large scale commercial enterprises. Land ownership was predominantly communal (85.2%) with only 7.8% of the farmers owning their property. A further 5.8% were farm employees.

The head of the household was usually male (80%) with 61.5% falling between the ages of 50 and 70 years. The age and sex of the head of the household was typical of a patriarchal society in which age further confers authority. It also reflects the pattern of rural/urban migration from the former homeland areas. It appears that labour migration strips the rural homelands of young people, particularly men, leaving behind older people, women and children (Cross, 2003).

Cattle farming

As expected in a country where most livestock production is restricted to marginal, natural grazing areas, extensive cattle farming dominated cattle production systems. Extensive cattle farming accounted for 75% of the systems while backyard production stood at 18%. This was echoed by the findings of the Livestock Sector Strategy where 8% of the cattle recorded were dairy cattle and 12% were dual purpose.

Profile of the emerging and communal beef sector

With the exception of the Northern Cape and Western Cape Provinces, beef cattle production was the major livestock production enterprise in the emerging sector. A total of 86% of livestock producers farmed with cattle. Table 3 indicates the herd size and distribution in the communal and emerging cattle sectors per province, compared to the average in the commercial sector. The only available information on herd size in the emerging sector before the national livestock survey was that of a study commissioned by NERPO in 2000. The results of the current survey differ from those of NERPO as the latter was based on NERPO membership while the current survey was based on the population census.

Table 3 Weighted herd sizes per province in the communal and emerging sectors compared to the average for the commercial sector

Province	Sample Size (no)	Herd size (%)					Av herd size (no)
		1 to 25	26 to 50	51 to 100	101 to 150	>150	
Eastern Cape	173	75	8	11	5	1	28
Free State	33	91	3	3	3	0	14
Gauteng	13	54	8	23	15	0	40
KZN	316	93	6	1	0	0	12
Limpopo	398	92	6	2	0	0	13
Mpumalanga	113	74	16	6	2	2	24
Northern Cape	11	9	9	27	18	36	231
North West	120	74	18	5	2	1	22
Western Cape	13	69	23	8	0	0	21
Communal/ emerging	1190						19
Commercial	90						413

Table 4 summarises the reasons for keeping cattle in the communal sector. The primary reason was for cash and meat, which together accounted for 47% of the total usage. Despite a lack of structured markets in many of the rural areas of South Africa, the informal beef market appears to thrive. The cultural and ceremonial aspects were also evident (13.3%). A lack of banking facilities in the rural sector may be an additional reason for the continuing tradition of keeping the cattle as a form of investment (15.4%). The use of oxen for draft power was clearly not popular with a relative importance of only 4.1%. Dairy ranching as an option for milk production in this sector should receive attention, as the keeping of cattle for milk accounted for only 10.2% of the total use.

The results of the national livestock survey listing the most important beef breeds in the emerging and communal sector is given in Table 5. This indicates the breed type of herds, the breed type of bulls used and the source of the herd. In the latter case, the choice was between inherited or acquired. The only information on breed composition available in the emerging sector before the National Livestock Survey was from a study commissioned by NERPO in 2000. According to the NERPO study, the most popular breed types were Nguni (35%), Brahman (32%), Bonsmara (17%) and Afrikaner (8%). The trend was much the same in the current survey if non-descript cattle were excluded.

Table 4 Relative importance of the reasons for keeping cattle in the communal sector

Reason	Cash	Meat	Investment	Milk	Ceremony	Cultural	Dowry	Work	Other
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Index	2844	2394	1709	1128	907	569	564	455	500
%	25.7	21.6	15.4	10.2	8.2	5.1	5.1	4.1	4.5

Table 5 Dominant beef breeds in the communal and emerging sector (listed according to bulls used)

Position	Breed Type	Bulls used (% of total)	% of Herds	% of herds within breed inherited
1	Non-descript/crossbred	35.0	66.4	--
2	Nguni	22.5	14.2	66.5
3	Brahman	18.2	5.2	72.7
4	Afrikaner	9.9	6.5	42.9
5	Bonsmara	5.1	2.2	27.8
6	Drakensberger	2.8	2.2	59.5
7	Simmentaler	2.1	0.7	18.1
8	Hereford	0.8	0.4	14.3
9	Beefmaster	0.6		33.3
10	Angus	0.6		28.9
	Other Zebu derived types	0.8		
	Other European breed types	0.9		
	Other British breed types	0.4		
	Other Sanga types	0.3		

Seed stock industry

The national livestock survey was extended to include the seed stock industry and the commercial beef cattle industry as reflected by the cattle found in commercial feedlots.

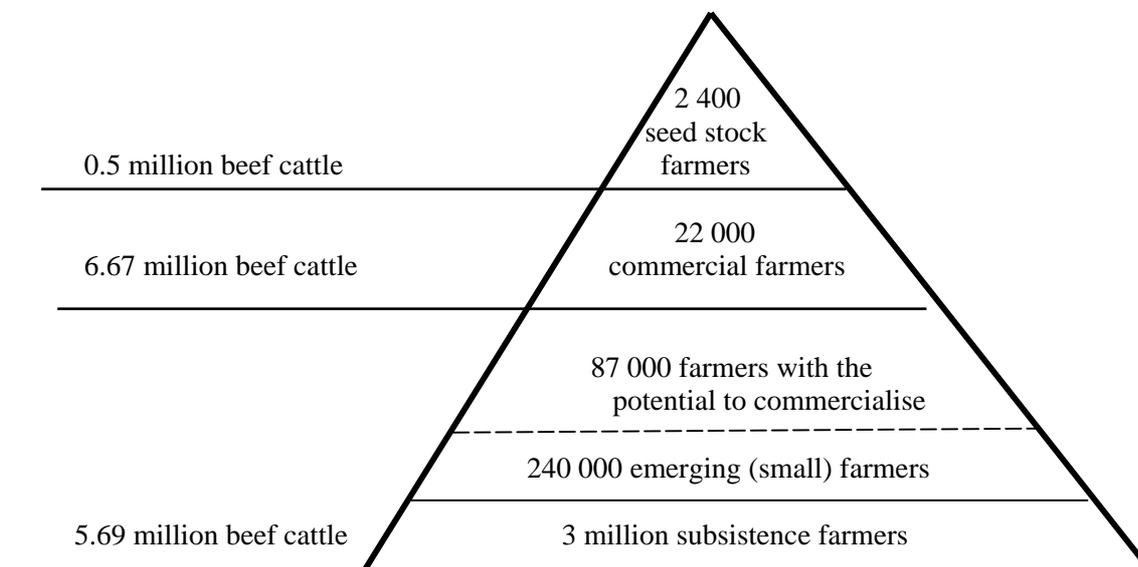


Figure 1 Gene flow pyramid for beef and dual- purpose cattle.

In the case of beef cattle in the emerging sector, it is alarming that many of the bulls used were classified as non-descript (35%) or Brahman types (18.2%). This clearly demonstrates a threat to the indigenous cattle breeds for which communal people have been the traditional custodians for many centuries.

The importance of seed stock in the livestock industry pivots on the principle that the entire South African population benefits from the genetic improvement of seed stock producing herds. This is only possible if the industry participates in recording and improvement schemes on a national basis. The superior genetic material that is bred in these herds is distributed throughout the total animal population according to the gene flow pyramid (Figure 1).

In the case of beef cattle, the 10 most popular breeds were: Bonsmara, Brahman, Nguni, Beefmaster, Simmentaler, Santa Gertrudis, Angus, Simbra, Drakensberger and Afrikaner. Statistics on beef and dual-purpose breeds of stud cattle with more than 1000 registered females older than two years are presented in Table 6. Cattle numbers were supplied by the registering authorities for the different breeds and by the Integrated Registration and Genetic Information System (INTERGIS), the national database of South Africa.

Table 6 Statistics on beef and dual purpose, stud cattle

Breed	No females 2 Years + 1995	No females 2 Years + 2003	% Females in National Recording	Bulls growth tested	Calving% (2002) (*)
Afrikaner	12 341	6 764	87	541	79.7
Beefmaster	8 359	7 169	94	411	78.4
Bonsmara	82 334	50 399	98	5 040	87.7
Brahman	25 259	23 617	10	210	69.6
Braford	---	1 752	85	43	90.1
Brangus	4 464	5 824	72	337	84.9
Braunvieh	2 828	1 188	56	69	83.6
Charolais	3 800	3 402	97	388	86.3
Drakensberger	9 814	6 255	98	575	81.9
Gelbvieh	1 341	1 128	88	61	77.3
Hereford	4 297	4 454	67	219	92.1
Huguenot	---	1 541	8	15	96.9
Limousin	3 192	6 472	62	417	77.8
Nguni	7 363	9 462	46	182	92.3
S A Angus	7 090	7 106	84	600	87.9
Santa Gertrudis	14 884	10 525	73	448	84.1
Simbra	3 635	11 066	30	33	93.2
Simmentaler	25 574	20 198	19	2	73.2
Sussex	5 366	5 458	81	407	85.2
Tuli	718	2 073	62	163	84.9

* - Calculated from calving interval according to Roux and Scholtz (1984).

The contribution of the different beef breed categories to the industry is summarized in Table 7. The Sanga and Sanga-derived breeds in this table are all landrace breeds. It should be noted that beef cattle landrace breeds dominate the seed stock industry.

Commercial beef cattle industry

More than 70% of all beef cattle slaughtered in the formal sector in South Africa originate from commercial feedlots. The results of a feedlot survey on beef cattle conducted in 2003 were therefore used as a reflection of the numbers in the commercial beef cattle sector. The results presented in Table 8 are based on the information from 218 459 animals in 219 commercial feedlots. It is important that a survey of this nature is conducted regularly in order to identify market trends.

Table 7 Contribution of the different beef breed categories to the seed stock industry

Breed Category	% of Total
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Sanga and Sanga derived	47%
Zebu and Zebu derived	30%
European breeds	13%
British breeds	10%

A few aspects are noteworthy in Table 8:

1. The Bonsmara is dominating the feedlot industry, with the Hereford and Simmentaler also playing major roles.
2. A total of 67% of feedlot animals are crossbreds, indicating that crossbreeding is playing a significant role in the commercial industry.
3. Dairy breeds such as the Holstein is playing a role in the feedlot industry.
4. An indigenous breed such as the Nguni is not popular with the feedlot industry or is not available for the feedlots.

Table 8 Results of the feedlot survey on beef cattle listing the 12 most important breeds

Position	Breed type	% of total	Crosses : purebred (#)
1	Bonsmara	15.9	54 : 46 (7.4)
2	Hereford	12.7	93 : 07 (0.9)
3	Simmentaler	12.3	71 : 29 (3.6)
4	Limousin	8.9	78 : 22 (2.0)
5	S A Angus	8.2	70 : 30 (2.5)
6	Beefmaster	6.0	93 : 07 (0.4)
7	Drakensberger	5.3	45 : 55 (2.9)
8	Sussex	4.5	13 : 87 (3.9)
9	Charolais	4.2	52 : 48 (2.0)
10	Holstein	4.1	92 : 08 (0.3)
11	Afrikaner	3.8	24 : 76 (2.6)
12	Santa Gertrudis	3.4	89 ; 11 (0.4)
	Brahman / Simbra / Brangus(*)	5.3	72 : 28
	Other breeds and nondescripts	5.4	81 : 19
	Total	100	67 : 33

- Percentage purebred from the total sample of 218 459 animals.

* - The survey did not distinguish between Brahman crosses and Simbra or Brangus animals. The data of the Brahman is thus confounded by that of the Simbra and Brangus.

The information from the feedlot survey was also grouped into the different breed categories as presented in Table 9.

Mating method and bull choice

Results of the different mating methods namely uncontrolled (no breeding seasons), controlled (breeding season, hand mating or artificial insemination) and artificial insemination (AI) are presented in Table 10. A worrying factor emerging from this table is that 98% of the communal sector still practices uncontrolled mating without a breeding season. Although controlled mating is difficult to practice in this sector, it is one of the areas that should receive attention if the off-take is to be increased. It is also important that the level at which mating seasons is applied in the emerging sector should be increased.

Table 9 The contribution of different breed categories to the feedlot

Breed Category	Total	% of Total
Sanga, Sanga derived and crosses	62 905	28.7
Zebu, Zebu derived and crosses	25 452	11.6
British breeds and crosses	57 586	26.2
European breeds and crosses	57 749	26.8
Dairy breeds, crosses and non-descript	14 767	6.7
Total	218 459	100

Table 10 Distribution of mating methods practiced in the different sectors

Sector	Uncontrolled %	Controlled %	AI %
Communal	98.1	1.9	0.1
Emerging	63.2	36.8	6.3
Commercial	11.4	88.6	21.9

Note: The AI percentage is also included under controlled mating.

It is somewhat disappointing that as much as 11% of the commercial sector is still practicing uncontrolled mating. More positively, as much as 22% of the commercial sector is applying AI in conjunction with natural service, with the emerging sector also beginning to venture into this technique. The AI industry should exploit these potential markets.

The reasons for choosing a bull in the different sectors are presented in Table 11. It is clear that when a bull is selected in the commercial sector, performance plays a role three times more important than any other trait. The second most important trait is conformation, followed by temperament, size and availability (to which affordability may also be linked). In the case of the communal sector, size plays the most significant role in bull choice followed by conformation and performance. Thus this sector still believes "bigger is better". In the communal and emerging sectors the presence and appearance of horns still plays a role but is not favoured in the commercial sector at all.

Table 11 Reasons for choosing a bull by the different sectors.

Reason	Sector	Communal %	Emerging %	Commercial %
Performance		18.9	30.3	33.2
Conformation		22.0	19.3	11.1
Temperament		7.2	9.2	9.8
Size		33.1	23.5	8.8
Availability		11.0	11.5	8.4
Colour		3.2	2.5	5.7
Horns		4.6	3.6	0.4

The survey also indicated that 11% of commercial beef producers are breeding their own bulls.

Discussion

In order to be able to make some comparison between the different sectors, the contribution of the different breed categories in the emerging, commercial and seed stock industries are summarized in Table 12.

Table 12 The contribution of breed categories to the different industries

Breed category	Emerging	Commercial	Seed Stock
Sanga, Sanga derived	41.0%	28.7%	41.8%
Zebu, Zebu derived	19.2%	11.6%	32.9%
British breeds	1.8%	26.2%	9.2%
European breeds	3.0%	26.8%	16.1%
Non-descript, other	35.0%	6.7%	---

Although British and European breeds represent only 25% of the seed stock industry, they dominate the feedlot industry with 53% of cattle in the feedlots originating from these breeds. This demonstrates that these breeds are being used very effectively as sire lines in crosses with Sanga types as dam lines in order to meet the requirements of the commercial sector. The Sanga breeds (mainly the Bonsmara) also play a significant role in the feedlot industry while the Zebu breeds play a much smaller role.

The emerging sector is still dominated by the Sanga types. However, the presence of large numbers of non-descript and Brahman bulls in this sector presents an alarming threat to the indigenous cattle breeds that formed the backbone of beef cattle farming of this sector in the past. The influence of British and European breeds in the emerging sector is very limited.

The large numbers of landrace breeds (41.8%) in the seed stock industry is interesting, since it closely resembles the numbers in the emerging sector. However, more significantly, this indicates that the seed stock industry can fulfil the role of modern custodians of landrace cattle breeds in South Africa. An important prerequisite is, however, that the seed stock industry moves away from artificial breed standards that have the potential to drastically change these breeds genetically. The concept of sustainable utilization acknowledges that, with globalization, many breeds will only survive if they remain, or become, competitive. Thus there is a need to improve them genetically, and it is in this respect that the seed stock industry can play a significant role (Scholtz, 2006). Such selection will not result in the loss of the survival and fitness traits that made these breeds attractive in the first place, providing that this selection is not undertaken out of context, but within the constraints of the actual environment and production system (Kohler-Rollefson, 2004).

It is essential that future surveys of this nature should make provision for the capturing of Global Positioning System (GPS) waypoints. Good quality environmental data describing the production environment already exist through satellite images. With the necessary GIS (geo-referenced information systems), variables on temperature, relative humidity, precipitation (including variation in rainfall), day length and radiation are all available through GIS layers. The recording of GPS waypoints will make it possible to describe the production environment for the different survey points, thereby adding valuable information to any agricultural based survey.

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