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Animal draft power in South Africa: past, present and future

by

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Abstract

The indigenous peoples of South Africa used cattle for riding and packing. The European settlers of the 1600s introduced plows, carts, horses and later donkeys, but early in the 20th century steam and internal combustion engines became the preferred sources of draft power. Animal draft remains, however, often the most profitable and environmentally friendly power source. It is used by possibly 40% of South Africa's 1.3 million functional rural households (including a number of large-scale commercial farmers) and its wide and more efficient adoption could markedly increase farmer incomes and stabilise rural communities. Also, to quote the first basic principle of South Africa's Reconstruction and Development Programme, animal draft power could help to "harness all our resources in a coherent and purposeful effort that can be sustained into the future".

Introduction

Mechanisation does NOT necessarily mean tractorisation, or the use of fossil fuel. Animal draft can also be (and often is) *mechanised*, and on many small (and some large) farms it is by far the most economic and environmentally friendly source of power. However, its advocates, and in fact all those involved with mechanisation, face a fundamental problem.

Especially when we in South Africa discuss small-scale mechanisation, we are addressing a Third World situation which, for the past 50 years, has been bombarded with First World norms and desires. We are a society which, for the past half century, has been orchestrated and manipulated, directly and indirectly, by Hollywood hype and multi-national self-interest. We are a people who have been indoctrinated in the beliefs that big is beautiful and glossy is glamorous; that guns go bang but do not kill; that tractors are prestigious but do not cost money. As a result, even small-scale farmers want tractors and extentionists recommend their use, even when wisdom and logic often suggest they should avail themselves of animal draft power: for example, for a South African rural household cultivating 1–5 ha, the cost per hectare to obtain draft power might be R 1000 (US$1 = Rand 2 in 1994) to buy a tractor or R 80–500 to hire a tractor, but only R 25 to buy oxen or donkeys.

Past use of animal power

The Khoi and other indigenous tribes in South Africa used oxen for packing, riding and war, but it was the European settlers of the mid-1600s who started using oxen to pull wagons and plows. They also brought in horses and donkeys, and much of the tillage and transport in the next two centuries depended on animal traction. From the beginning of the 20th century, however, fossil fuel power became increasingly important for long-distance transport, mining and large-scale farming systems, and it was primarily only among small-scale farmers and for rural transport that the use of animal traction continued to expand.

Early in the 1950s, however, South African officials and farmers started to succumb to the enormous amount of direct and indirect tractorisation propaganda which flooded the country. Animal draft power was old fashioned, inefficient and time-wasting, so the hype went, and for the next 40 years animal traction was at best ignored, and often denigrated, by officials and educators in South Africa. As a result, the introduction and development of animal draft power equipment practically ceased. Moreover, there was increasing government pressure to destock communal areas, sell off 'unproductive' animals (such as mature oxen and donkeys), buy up old tractors and use subsidised tractor pools, and so the use of animal draft power among small-scale farmers declined. This trend was exacerbated by the resettlement policies and droughts of the past four decades.

Present use of animal traction

Today, few commercial farmers use animal draft power, although there are some notable exceptions: some farmers in the Eastern Cape and elsewhere continue to plow with teams of oxen and a number of farmers countrywide use animals for short hauls, especially around the farm. However, for small-scale farmers increased use of animal traction offers many cost-saving opportunities, especially on short hauls of up to 5–10 km, and on light field work such as planting and weeding.

Various estimates have been made of the extent to which small-scale farmers use animal draft power. In the early 1980s, Lea and Stanford (1982) found that 23% of the homestead gardens in Ndeleshane in KwaZulu were prepared using oxen, and 18% using donkeys, compared to 18% by tractor. Steyn (1982) found that almost 100% of rural households in the Amatola Basin in Ciskei plowed with animals. In 1988, 25% of rural households at Peddie and 32% at Alice (both in Ciskei) used animals for plowing, compared to 67% in Biyela (northern KwaZulu) and 71% at Nhlangwini (southern KwaZulu) (Auerbach, 1990). In 1987, 83% of farmers in one area of Transkei plowed with oxen, compared to none in another area (Starkey, 1988).

The 1994 animal traction rapid rural appraisal commissioned by the South African Network of Animal Traction (SANAT) concluded that more than 500,000 oxen and 300,000 horses, donkeys and mules are currently being used by 40–80% of the functional rural households in some areas in South Africa (Starkey, 1995). Draft animals are used for a wide range of operations including harrowing, seeding, weeding, mowing, raking, crop lifting, fertiliser spreading, dam building and logging, but the majority of small-scale farmers use animals for plowing and transport. There are probably 200,000 animal-drawn plows in use today (compared to 330,000 in 1964) with annual sales of 6000–8000 units/year. In addition there are about 90,000 cultivators (annual sales about 6000) and 60,000 planters (annual sales also about 6000) being used in South Africa today.

Roughly 50% of functional rural households own animal draft implements (Auerbach and Gandar, 1994). Sales of animal draft power equipment by the major distributor in the 1993/94 season are shown in Table 1. Very few carts are available commercially.

The future of animal draft power in South Africa

Starkey (1995) concluded that some 500,000 oxen and 300,000 equines were currently being used for animal draft power in South Africa. In contrast, Auerbach and Gandar (1994) estimated that, in 1990, 1.1 million bovines (25% of the total cattle) and 108,000 equines (50% of the total horses, donkeys and mules) were being used for draft power (see Table 2). It must be borne in mind, however, that donkeys have been the targets of extermination campaigns, especially in Bophutatswana, and farmers frequently do not admit to using, and even less to owning, them. The number of tractor units in the homelands (see Table 2) are *best guesses* from information presented at the 1990 Mechanization and Irrigation

Table 1: Animal-drawn equipment sales, SAFIM, 1993/94 season

Implement	*Sales in 1993/94 season (units)*	*Approximate current retail (R)*
Plows (4 types)	12,500	480
Cultivators:5 tine	2,300	550
2 and 3 tine	2,200	365
Planters	5,750	1 500
Harrows: zig zag	4,700	350
triangular	250	250
diamond	310	240

Source:Vetsak Coop Ltd (personal communication, 1995)

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Table 2: Available draft power in the former South African homelands, 1990

			Tractor units	
Homeland	***Cattle (000s)***	***Equines (000s)***	***Public***	***Private***
Gazankulu	44	8	80	150
KaNgwane	32	1.5	40	200
KwaNdebele	8	0.5	200	50
KwaZulu	379	23	131	1733
Lebowa	126	14	316	2147
QwaQwa	4	<0.5	96	144
Transkei	366	41	2225	1507
Bophuthatswana	117	16.5	421	1039
Venda	34	2.5	147	94
Ciskei	31	1.5	431	265
Total	**1141**	**108.5**	**4087**	**7329**

Source: Auerbach and Gandar (1994)

in Developing Areas Symposium, and Auerbach and Gandar (1994) note that the number of privately owned tractors in the homelands could be underestimated by 200%.

Assuming the figures in Table 2 to be correct, however, and ignoring the possible contribution of equines, in 1990 oxen alone could have plowed all of the area estimated to be cultivated by small-scale farmers in the former South African homelands (see Table 3).

Pimental and Pimental (1979) found that a pair of oxen could plow 1 ha in 65 hours; Auerbach, Nichol and Gandar (1991) found that in KwaZulu a team of four oxen took 18 hours. Pimental and Pimental (1979) found that a 38-kW tractor took four hours to plow 1 ha, whereas Auerbach, Nichol and Gandar (1991) found that in KwaZulu this was taking 6.5 hours. It is fair to deduce, therefore, that the un- or under-utilised bovine draft power in the small-scale farming areas of South Africa is at present equivalent to that which could be provided by 18,000–50,000 38-kW tractors, and that assumes that the 300,000 plus equines are not being used at all.

In other words, animal draft power is a major national asset, whose utilisation could markedly increase both employment (in a country with 40–60% unemployment) and profitability (in a sector in the past primarily financed by direct and indirect subsidy); moreover, it uses renewable energy (grass) and has the potential to appreciate (especially where cows or equine females are used) rather than depreciate in value. Replacing this asset with tractors could cost South Africa R 0.5–1.5 billion in foreign exchange, and these tractors would be dependent on non-renewable (and also largely imported and environmentally unfriendly) fossil fuel.

Certainly major constraints exist, notably:

- the time taken to perform operations (however unemployment is currently 40–60%)
- the often poor condition of animals when maximum draft is required (eg, for plowing), a situation Starkey (1995) believes can and is being partially remedied by *complementarity* – tractors performing the heavy task of plowing, and the more available animal draft power being used to perform lighter tasks whose timing is more critical, such as planting and weeding
- the gender issues influencing bovine use; however women are allowed to handle equines, eg, donkeys

Table 3: Areas which could be plowed using available draft power in the former South African Homelands, 1990

Homeland	*Cultivated area (000 ha)*	*Percentage which could be plowed[a] by*	
		Animals	*Tractors*
Gazankulu	119	82	12
KaNgwane	50	142	26
KwaNdebele	35	49	34
KwaZulu	589	143	15
Lebowa	345	81	37
QwaQwa	10	80	150
Transkei	534	152	47
Bophuthatswana	334	78	25
Venda	88	86	18
Ciskei	67	103	70
Total	**2171**	**99.6**	**43**

Source: Auerbach and Gandar (1994)
[a] *Assuming:*
1. 25% of all cattle are used for draft
2. each animal works 50 4-hour days
3. 90 animal hours per hectare plowed
4. operational homeland tractors plow 80 ha/year
5. 46% of homeland tractors could only plow 10 ha/year

the lack of suitable equipment for cartage, but designs do exist in other countries and development of, for example, the 1-t semi-tipping golovan has commenced locally

conservation tillage, but systems are evolving or being developed in other countries, notably Brazil, Zambia and Zimbabwe, and the Grain Crops Institute has started to develop and investigate techniques which could be employed by small-scale farmers in South Africa

the diminishing pool of animal draft power experience and expertise as former practitioners die

the lack of commonly accepted rental systems for animal draft power, such as those which exist for the hire of tractors

the negative image of animal draft power.

However, if these constraints can be countered the following, currently increasing, problems will be reduced markedly:

drain of people and money from urban areas

premature and excessive loss of soil and water from the countryside

pollution of oceans and atmosphere

dependence of farmers on non-renewable fossil fuel

use of South African-generated wealth to bolster multi-national profits and provide employment in other countries.

Therefore, the future of animal draft power, and in many ways the future of South Africa as a whole, depends on the extent and speed with which:

the various Departments of Agriculture can be persuaded to take it seriously

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the experience and expertise of other countries (and our own) are synthesised and used

"new" technologies are developed and introduced

suitable affordable equipment, especially carts and weeders, is made available to small-scale farmers

small-scale farmers are convinced that self-reliance *is* better, and that small *is* beautiful.

Finally we in South Africa are being challenged at this time to give effect to our nation's Reconstruction and Development Programme by, *inter alia*, making better use of our country's natural, labour and capital resources to improve GNP, lessen unemployment, improve personal incomes, stabilise rural communities and eradicate the violence threatening the fabric of society.

The first basic principle of the Reconstruction and Development Programme, as set out by President Nelson Mandela in a recent government White Paper (Mandela, 1994), is "to harness all our resources in a coherent and purposeful effort that can be sustained into the future". In this context, "all our resources" means labour, capital and energy, and sustainable means appreciating and renewable, ie animal traction.

If we can get off the slippery slope induced by foreign hype and hyperbole and adopt the high road of wisdom and logic, animal draft power can be a major factor in creating a happier and more prosperous South Africa for all.

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