Harnessing systems for donkeys in Zimbabwe

by

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Abstract

This paper deals with donkey harnessing systems that are being used in Zimbabwe. Donkey use in Zimbabwe is increasing rapidly, especially in the drier parts of the country. Most farmers in Zimbabwe use the short breast-band or the traditional harness while some are using yokes for donkeys. There is limited research in Zimbabwe on donkeys. However there has been a lot of development of harnesses especially at the Institute of Agricultural Engineering. Currently, courses are being run on how to make the collar and the breast-band harnesses. These include the short breast-band, long breast-band, car tyre collar and wooden collar harnesses. Farmers prefer the breast-band harness and it is not clear why farmers are not adopting the collar harness. Some farmers cite cost as the reason why they are not taking it up.

There is a need to assess the work outputs of different harnesses as there are currently no technical data on the efficiency of the various harnessing and hitching systems. No work has been done to assess the harnesses used on draft animals and being promoted in the smallholder farming systems. Future investigations should focus on measuring work output from different combinations of harnesses in use in Zimbabwe. Farmers' perceptions of the harnesses should also be assessed.

Introduction

More than 85% of communal smallholder farmers in Zimbabwe use animal draft power in tillage operations and for transport. Oxen provide over 75% of this power but use of cows and donkeys seems to be increasing, particularly in agro-ecological regions IV and V (Muchena, 1989).

Draft animals have received negligible attention from researchers and policy-makers when compared with beef and dairy cattle. The limited research on draft animals has tended to concentrate on feeding management of Mashona oxen (Mupeta, Ndlovu and Prasad, 1990; Francis, Ndlovu and Nkuuhe, 1992; Francis and Ndlovu, 1993), with relatively little work on donkeys (Prasad, Marovanidze and Nyathi, 1991; Ellis-Jones, Msara, Nengomasha, and Muvirimi, 1994; Nengomasha and Jele, 1995). This situation can be attributed to the fact that donkeys have a low socio-economic status and research involving donkeys is considered backward and not glamorous by most agricultural scientists.

Although donkeys are suitable for packing and carting tasks, they are also important for cultivation in marginal agro-ecological zones where successive droughts have decimated cattle numbers. Such tasks require the use of a donkey harness to attach the donkey to the implement. Whilst considerable work has been done to develop harnesses in Zimbabwe, there is still a need to modify these harnesses to improve donkey performance and also to find out the efficiency of these harnesses. Starkey (1989) indicated that currently available harnesses might not need further research but only development or modifications. Pearson, Nengomasha and Krecek (1999) also stated that the problem of harnessing is not a technical one, but rather, one of acceptance, education and dissemination.

Although harnesses have been developed over many years, not much work has been carried out to assess the potential work output of donkeys using the different kinds of harnesses available. Farmers are left to make do with the systems that are promoted to them. The Institute of Agricultural Engineering, for instance, has packages that they are recommending for farmers, yet no documented figures are available to say which harness offers the best work output and why. Dibbits (1991) gives a power output of 0.4 kW per donkey but does not indicate whether this was the same with the breast-band collar harnesses that were used. Recommendations from a workshop, conducted at the Institute of Agricultural Engineering in 1997, indicated that there was a need for more work to be done to assess the efficiency of the different types of harnesses that are available for farmers (Ellis Jones et al, 1997).

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However there has been some work on donkeys. Nengomasha and Jele (1995) gave the average live weight of a Zimbabwean donkey as 142 kg. Live weight influences both pulling and packing capacities. Goe (1983) reported that a donkey could pull 16–20% of its live weight at a speed of 2.5–2.8 km/hr for 3–3.5 hours per day. Studies in Zimbabwe have shown that well-fed, well-trained donkeys teamed in fours are capable of sustaining a combined draft force of over 1 kN for a four hour working period. This is sufficient to plow relatively deep soil with a mouldboard plow and complete most other agricultural tasks associated with crop production in an acceptable time.

Photo: Paul Starkey

Photo 1: A (poor) breastband harnessing system made using tyre rubber in Zimbabwe

Factors to be considered include the animal's sex and physical condition, its food consumption and health status, the climate, implement and type of harness used. On the basis of 'per kg body weight', donkeys can potentially produce twice as much work as cattle. A donkey's packing capacity is 25–40% of live weight (Goe, 1983) depending on its body condition, the nature of the land, and the terrain to be covered. With a cart it can carry three times its body weight (Fielding, 1988).

Mueller, Jones and Hintz (1992) looked at the physiological responses of donkeys performing draft work with different harness types. From the work that has been done so far it is not clear as to how much work output we can get from using different kinds of harnesses, especially the harnesses that are being recommended for use by farmers in Zimbabwe.

Types of harnesses commonly used in Zimbabwe

Most farmers in Zimbabwe use the 'traditional' short breast-band harness (Photo 1). Some farmers are using yokes although trainers and extension workers recommend they use donkey harnesses and try to explain the importance of this.

During training courses farmers appear to appreciate all types of harnesses that they are taught. But when they go back their farms they continue to use the short breast-band harnesses which are most readily available to them. It is difficult to understand why farmers are not adopting the wooden collar harness. Zimbabwe brought in collar harnesses from Kenya. However, even in Kenya these have not been widely accepted. Why? Is it the cost alone or the complexity of making it? There is a need to find out more about why there is a poor adoption of these harnesses.

Testing of harness efficiency

It might be difficult to test for work output if the harnesses are made by different manufacturers. The difference between breast-band harnesses of two different manufacturers may be great. Standardisation in harness design would be advisable if one type of harness was found to give better performance. Poor fit may constrict the trachea, thereby hampering breathing, and reduce effective transfer of animal energy. Donkeys can be injured by poor harness designs or systems of utilisation (Photo 1).

A useful harness should be easily constructed and affordable by smallholder farmers and also be appropriate to the donkey's anatomy. While it might be easy to test harnesses on-station it might prove difficult on-farm. If harnesses were standardised, testing them would be easier.

Reasons for farmers not using the collar harness

Farmers always cite the extra cost involved in wooden collar harnesses and maintain that the breast-band type is more easily available on the market. The cost of the short breast-band and car tyre collar harnesses in Zimbabwe varies greatly between Z$ 60 and Z$ 100 (US$ 6–10) This price does not include the cost of eveners and swingles. The long breast-band is rarely used, and farmers say this is because of cost.

Photo: Paul Starkey

Photo 2: Boys plowing with donkeys fitted with 'home-made' collar harnesses in north-east Zimbabwe

Very few farmers make car tyre collar harnesses and they do not make wooden collar harnesses so it is difficult to establish how much they cost. A few farmers make simple collars from ropes or cycle chains wrapped in rags (Photo 2). The car tyre harness requires farmers to spend time looking for old tyres. All the wooden collar harnesses used for disseminating the technology have been given free. Even when they have been given free the farmers have not adopted the collar harnesses. One farmer has however made steel collar harnesses and is using them effectively. It is difficult to understand why some farmers have not copied the technology from him.

Comparison of harnesses available for training

Training courses on donkey harness making are designed to teach how to make collar and breast-band harnesses. The Institute of Agricultural Engineering trains in the use of both the short breast-band harness and the long breast-band. Below is a comparison of different types of harnesses.

Breast-band harness advantages:

- easy to make and can be made from many alternative types of materials
- affordable in public markets especially in the southern provinces and easily available
- easy to use or fit to the animal and to maintain
- multi-use; can be used for more than one operation
- very common type of harness which is easily adopted by many farmers by copying other farmers.

Breast-band harness disadvantages:

- tends to choke the animal if not made and fitted well
- tends to bruise the animal if not provided with adequate padding
- tends to give lower draft because of the above.

Tyre collar harness advantages:

- easy to use or fit to the animal and easy to maintain
- multi-use; can be used for more than one operation
- environmentally good way of using old tyres
- more comfortable because it has larger contact area with the skin.

Tyre collar harness disadvantages:

- not easily available and not common in Zimbabwe
- tends to distort under heavy draft subjecting the bolted or sewn joints to high tension
- tends to bruise the animal if not well padded.

Wooden collar harness advantages:

- comfortable and does not choke the animal
- easy to use and fit to the animal.

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Wooden collar harness disadvantages:

not easy to make and material not easily available

not easy to use or fit to the animal if farmers are not trained

not easy to maintain and has to be taken to the harness maker

tends to bruise the animal if not well padded.

Recommendations and conclusions

Farmers in Zimbabwe have shown that they prefer the breast-band harness. It is difficult to understand why farmers are not adopting the collar harness and why some farmers continue to use yokes. It could be rewarding to investigate the efficiencies of different harnessing methods as there are currently no technical data on the efficiency of the various harnessing and hitching systems. Farmers' perceptions should be assessed.

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