

Keeping Draught Animals Fit for Work

The need to maintain well-nourished and healthy draught animals, fit to plough and cultivate land – thereby reducing the drudgery and improving the quality of life for poor farming families, particularly women – is addressed. Advice on rearing and management has been generated from investigations into feed composition and energy requirements of draught animals in West Africa, Morocco and the UK.

Background

In poor countries people and animals provide the main sources of power for agriculture and are likely to do so for the foreseeable future. There are at least 400 million animals worldwide providing draught power on smallholdings. Under-nutrition and disease are major constraints to increasing the supply and efficiency of draught power. Reductions in the work output of individual animals can lead to: reduced crop yields due to poor timeliness or a reduction in the area cultivated; increased demand for the number of draught animals and hence feed to meet farm power needs; and increased demand for human labour to replace failing animal power.

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Draught animals require good care and feeding if they are to perform under arduous work regimes.

Research highlights

Energy requirements of draught oxen working different soil types in West Africa were investigated. Interestingly, the energy used for walking on waterlogged soils can be six to eight times that used for walking on hard ground or roads. Where the work season was short (less than 40 days), trying to keep oxen in good condition over the dry season, when they are not working, was a waste of feed – the better the initial body condition of the oxen, the more weight they lost when working. A more effective strategy was to feed the oxen after the working period began as they rapidly regain body weight through compensatory growth.

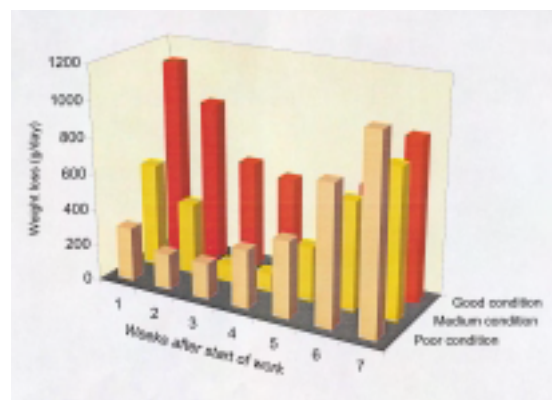
The growing season is short in semi-arid areas and farmers need their draught animals to work hard from the start. Trials showed that the power output of oxen increased as the work season progressed, despite liveweight losses. Farmers would get more work from their oxen at the start of cultivation if they kept them fit throughout the year by, for example,

using the animals for 'carting' during the dry season.

Power output was greatest when air temperature was lowest and, understandably, heat stress inhibited work performance. It was recommended that

farmers work their animals only during the coolest period of the day. If animals are worked during the hot periods, they should be rested after each hour of work for about 10 minutes and offered water to help them cool down. When animals of different sizes are paired, the smaller, lighter animal of the team should walk on the unploughed soil where the energy required can be around 40 per cent of the energy required to walk in the furrow.

Trials showed that donkeys have the lowest energy costs of walking. In ascending order, ponies, horses, cattle and buffalo have higher energy



Oxen starting work in good body condition quickly lose it. Animals starting in poor body condition eat more and so improve. Advice to farmers: do not waste feed getting oxen in good condition prior to work but keep animals fit.

costs. When carrying packs, energy costs can be increased two- or threefold if loads are not balanced across the animal's back.

A nine-point scale for condition-scoring donkeys was also produced, and the following equation for predicting body weight was developed:

$$\text{Body weight} = \frac{\text{heart girth (cm)}^{2.64}}{2188}$$

Thus, a simple measurement of the animal around the withers and chest means that body weight can be established without the need for cumbersome weighing equipment. Knowledge of body weight permits more accurate dosing with veterinary drugs.

Uptake

Considerable effort has been made to promote these findings to the international research community. The main reason is to stimulate interest in draught animals generally – and the need to understand their requirements and management. The donkey in particular has often been overlooked as a draught animal power (DAP) resource both by scientists and those involved in rural development. If poor households have access to DAP, in the majority of cases, it will be provided by the donkey. The project has shown that the donkey cannot be regarded just as a 'small horse'. Fundamental differences in physiology and behaviour mean that greater investment must be made for research on the donkey *per se*.

Linkages

The Livestock Production Programme has simultaneously funded other projects on DAP, including research on the donkey. Project R6166: Response of draught animals to restricted access to grazing in sub-Saharan Africa and R5926: Appropriate tillage implements for donkeys – beasts of burden for the poor have made preliminary investigations into the digestive physiology and behaviour of the donkey and developed tillage implements suitable for the donkey. Draught animal power specialists have met recently to consider where knowledge of feeding, health care and management of donkeys is still lacking.

In the past, DAP research focused on the development of implement design and testing. Whilst this research continues, modifying designs for use by women, for example, recent research has paid greater attention to the draught performance and welfare of the animal itself. It is now accepted that draught animals rarely perform just one function for poor farming families – they can also provide manure and a form of saving, the females can provide milk and offspring, and ultimately all can supply meat. Draught animal research has moved on to consider the use of animals in this multi-functional context.

Relevance to sustainable livelihoods

Livestock are vital to the livelihoods of the rural poor. They provide status, a means of savings, food for human consumption and manure to maintain soil fertility. As work animals they also provide a means to generate income

through their use in transportation and, in crop production, to produce food and cash crops for sale, as well as relieving the drudgery to families of many farm and household tasks. The donkey is often the first form of DAP a poor person can afford to supplement family income. All these functions are best served by healthy and well-nourished animals. This project has provided knowledge to enable farmers and draught animal owners to achieve more productive working animals through better feeding, management and working practices.

Selected project publications

- Pearson, R.A. and Ouassat, M. (1996) Estimation of the live weight and body condition of working donkeys in Morocco. *Veterinary Record* (March 9): 229–233.
- Fall, A. *et al.* (1997) Nutrition of draught oxen in semi-arid West Africa. 1. Energy expenditure by oxen working on soils of different consistencies. 2. Effect of work on intake, apparent digestibility and rate of passage of food through the gastrointestinal tract in draught oxen given crop residues. 3. Effect of body condition prior to work and weight losses during work on food intake and work output. *Animal Science*, **64**: 209–215; 217–225; 227–232.
- Pearson, R.A., Dijkman, J.T., Krecek, R.C. and Wright, P. (1998) Effect of density and weight of load on the energy cost of carrying loads by donkeys and ponies. *Tropical Animal Health and Production*, **30**: 67–78.

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