Strategic dry season supplementation of traditionally managed draught animals in Northern Malawi: Current practices and proposed strategies for the future

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Abstract

Agriculture is the main occupation of the population of Malawi, of which about 20% are estate farmers and 80% are smallholder farmers who cultivate about 1 ha. of land (range 0.3 - 2.0 ha.). For the smallholder sector, cultivation by hand, using a hand hoe to till the land, is one of the major cultivation methods. However, the use of draught animal power (DAP), using oxen and donkeys, is quite common in some Agricultural Development Divisions in the country. A case study of the Mzuzu Agricultural Development Division (MZ ADD) in Northern Malawi is presented.

In carrying out their agricultural activities, farmers in MZ ADD aim at improving their incomes and food security by increasing productivity and diversification. However, their efforts to improve agricultural productivity are constrained by declining soil fertility and soil erosion, poor access to production inputs due to low levels of purchasing power, shortage of labour, and land pressure. To alleviate some of these problems, farmers in this part of the country are keeping Malawi Zebu cattle for use as working animals, and for meat, milk and manure, which is applied to their crops. These animals are traditionally managed on natural pastures during the wet season and then on crop residues during the dry season. Crop residues are normally low in crude protein and minerals. Animals, especially those used for power, subsisting on these feed resources lose weight and their general body condition is poor. During the dry season, these animals are given small amounts of maize bran as a supplement in order to improve their body condition. Maize bran is readily available, but its quality is not as high as some of the potential feed resource, such as tree legumes. Leaves, dried as hay, of tree legumes such as Leucaena*,* Sesbania *and* Calliandra*, could be used as supplements and given to draught animals during the dry season. It is proposed that future dry season supplementation of these traditionally managed draught animals should be based on tree legume leaf hays. This is possible because agroforestry technologies are being introduced into the smallholder crop/livestock production systems where multipurpose tree species are being used in alley or relay cropping with crops such as maize. Apart from providing high quality fodder for animal nutrition, tree legumes are also important for improving soil fertility and reducing soil erosion. The crop yields can be high while the condition of the draught animals will be improved, thereby empowering farmers with sustainable animal traction in the twenty-first century.*

Introduction

Malawi is a sub-tropical country situated between latitude 9° and 18°S and longitude 33° and 36°E in South Eastern Africa with a land area over 94 000 km^2, of which approximately 23 000 km^2 is covered by water. Most of the water comprises Lake Malawi, three smaller lakes and numerous rivers including Shire River, which drains off Lake Malawi into the Zambezi River.

Malawi is endowed with a number of renewable natural resources: land, water, fish, wildlife and forests, which provide the basis for the country's sustainable socio-economic development. Agriculture is the mainstay of the economy. It contributes 36% of the Gross Domestic Product (GDP) and employs more than 80% of the total labour force. The agricultural sector accounts for 90% of export earnings, tobacco being the major export earner. It is estimated that 80% of the rural population live below the poverty line; hence, the primary objective of government policy, expressed in Vision 2020, is to improve the livelihoods of rural people through better household food security, improved nutrition and increased cash income.

The human population is currently estimated at 12 million with a growth rate of about 2.2% per annum. The cattle population is close to one million and that of donkeys is approximately 1 700 (Kumwenda, 1991).

The present cultivation methods are hand, animal and tractor depending on the scale and intensity of the farming operation. The majority of farmers (80%) use the hand hoe and animal-drawn implements to produce, food crops, while estate farmers (20%) use tractors to produce cash crops. In carrying out their agricultural activities, the majority of farmers are

aiming to improve their incomes and food security by increasing productivity and diversification. However, the following are constraints to improved agricultural productivity:

- Declining soil fertility and soil erosion;
- Poor access to production inputs due to low levels of purchasing power;
- Shortage of labour;
- Pressure on land.

The country is divided into eight Agricultural Development Divisions (ADDs) for effective implementation of both extension and research programmes in agriculture. This paper outlines the extent of use of draught animals and their traditional system of management with strategic dry season supplementation in Mzuzu Agricultural Development Division (MZ ADD) in Northern Malawi. Future strategies for improving the nutrition of these draught animals are also proposed.

Extent of use of draught animals

MZ ADD is one of the ADDs where animals, mainly Malawi Zebu cattle, are used extensively for work, in addition to providing meat, milk, and manure for crop production. This is because human power by itself is insufficient to make a significant impact on agricultural productivity. Cultivated hectarages and crop yields are limited by the slow pace of hand cultivation.

Malawi Zebu cattle (mainly oxen) using ox-drawn implements are used for ridging, ploughing, weeding, transporting (carting/logging) and planting. However, in MZ ADD, use of animals for weeding and planting is not common because of a lack of suitable equipment.

The advantages of using DAP in Malawi are (Kumwenda, *et. al.*, 1987):

- They are cheaper than tractors;
- They fit into existing farming systems, allow mixed cropping, and involve all members of farming household;
- Animals can appreciate in value by the end of their working life;
- DAP is faster than hand cultivation;
- Draught animals can be used to convert crop residues into manure for crop production, thereby cutting down fertiliser requirements;
- DAP can be hired out and earn the owner extra revenue or extra farm products;
- There is less drudgery with DAP than in hand cultivation only, and at the end of the working period the animals provide meat.

The distribution of draught animals and equipment (Table 1) by ADD clearly indicates that MZ ADD has the highest number of work oxen, ploughs and ridgers.

Table 1: Distribution of draught animals and equipment by Agricultural Development Division (ADD) (Kumwenda, 1987)

ADD	Work oxen	Ploughs	Ridgers	Cultivators
Blantyre	414	118	110	16
Karonga	10075	3581	443	36
Kasungu	13613	2977	4253	81
Lilongwe	15000[1]	1508	1199	156
Machinga	802	317	208	17
Mzuzu	18494	8694	6037	151
Shire Valley	2520	458	189	16
Salima	8500	950	829	82
Malawi	69 718	18 603	13 268	555

[1] Estimated figures

Current practice of supplementation

There are two seasons in Malawi. The wet season that commences with the onset of rains in November of one year until the end of April in the following year and then the dry season which commences in May.

Draught animals are used for ridging in the rains and also for weeding/banking (earthing-up). After that, the animals rest or are used for transport until harvesting is completed, then ploughing begins and sometimes ridging.

During the wet season the animals are grazed together with the rest of the herds on natural pastures without any supplements given to them. During the dry season, the animals subsist mainly on crop residues. Only the animals used for working are supplemented with maize bran. The crop residues are of low quality nutritionally. This is the time when draught animals are being used for heavy work, but very little maize bran is given to the animals used mainly for maintenance. These animals are usually in very poor physical condition. Working animals need to be adequately fed for maintenance and work, but this is not the case. These animals remain in such poor condition until the beginning of the wet season, when they have to continue working. However, with the 'flush' pasture, their condition starts to improve. Although during the wet season, natural pastures are inadequate in many areas of MZ ADD because most of the land is occupied by crops, which can result in poor condition of animals at the start of the dry season.

With this system of traditional management of draught animals, farmers do not bother about the nutritive values of feed resources. As the twenty-first century approaches, farmers should be aiming to achieve better results from the draught animals by feeding them with high quality feed resources. Of all feed resources, crop residues are the worst in terms of nutrient composition.

Table 2 shows the nutrient composition of the various categories of feed resources available in MZ ADD that were sampled in 1995 for determination of composition.

Proposed strategies for future dry season supplementation of traditionally managed draught animals

In order to empower farmers with animal traction in the twenty-first century, there is need to improve the nutrition of the traditionally managed draught animals in MZ ADD in particular, and in the country in general. Farmers should take advantage of the agroforestry technologies that are being introduced into the crop/livestock production systems in the country.

These agroforestry technologies are based on the use of multi-purpose tree legumes such as *Leucaena*, *Sesbania* and *Calliandra*, to mention a few that are grown in alley or relay cropping with crops such as maize. These trees provide high quality fodder that can be used to improve the nutrition of livestock. They also improve soil fertility and curb soil erosion.

Table 2: Mean (± standard deviation) chemical composition of the various categories of locally available feed resources in MZ ADD (% of dry matter)

Feed resource[1]	CP	Ca	P	K
Natural pastures (21)	8.11 ± 4.04	0.48 ± 0.43	0.20 ± 0.12	2.03 ± 1.05
Cultivated pastures (65)	8.07 ± 4.05	0.37 ± 0.15	0.18 ± 0.10	2.11 ± 1.07
Tree legumes (19)	23.28 ± 4.50	0.81 ± 0.55	0.18 ± 0.06	3.21 ± 0.05
Forage legumes (9)	12.83 ± 4.03	0.88 ± 0.56	0.18 ± 0.06	1.68 ± 0.95
Concentrates (*e.g.*, maize bran) (71)	10.70 ± 1.20	0.10 ± 0.04	0.48 ± 0.14	0.83 ± 0.16
Crop residues (41)	5.45 ± 0.48	0.31 ± 0.17	0.13 ± 0.07	3.39 ± 2.70

CP = Crude protein, Ca = Calcium, P = Phosphorus, and K = Potassium. Figures in brackets denote the number of samples analysed.

Dried leaves of tree legumes contain high levels of crude protein, which is an essential nutrient for livestock. The leaves can contain crude protein as high as 23%. These would be important supplements to draught animals fed crop residues during the dry season which contain crude protein values below the critical level of 7% (Hodges *et. al.*, 1983). Table 2 should be used as a reference table to guide farmers in formulating rations for their animals including draught animals.

Conclusion

Malawi is an agricultural country and its agricultural production depends on the smallholder farmers. However, these are the farmers that are most constrained as far as improvement in agricultural productivity is concerned. The use of draught animals will go a long way to improve agricultural productivity, in MZ ADD in particular, and in the country as a whole. Therefore, better strategies should be developed to improve the efficiency of these draught animals. One such strategy is improvement in their welfare, nutrition and management.

While the current use of maize bran as a dry season supplementation of the traditionally managed draught animals subsisting on low quality feed resources seems feasible, the use of tree legume dried leaves could alleviate the nutritional deficiencies of these valuable animals. The future of agriculture in Malawi as the twenty-first century is approaching depends on empowering farmers with animal power, and to do this we need to manage the animals well.

References

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