

A rapid survey of feeding regimes for draught cattle in Niger State, Nigeria

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SUMMARY

DESPITE THE renewed interest in animal traction, problems such as poor nutrition, disease, extensive tree cover and unawareness of the full benefits of the technology continue to limit its use in the Nigerian subhumid zone. However, if more land—particularly in the inland valleys—is to be brought under cultivation and land productivity is to increase, it is vital that animal traction is adopted in the zone on a wider scale.

Draught animals need to be adequately fed during the dry season to be able to do the heavy work at the beginning of the growing season. In areas of the subhumid zone where animal traction is common, farmers use a feeding scheme based on crop residues, concentrates, mineral licks, natural forage and browse to ensure that their animals stay fit. How these feed resources are manipulated to meet the nutritional requirements of animals used for draught is explained in this report.

INTRODUCTION

The continued difficulties in promoting tractor use for agricultural development have led to a renewed interest in animal traction in Nigeria. Credit to purchase work animals and implements can be obtained through various Federal and State Agricultural Development Projects. In addition, the National Centre for Agricultural Mechanisation and other research bodies in the country have been encouraged to develop suitable animal-drawn implements and to popularise their use on farms (FMAWRRD, 1988).

The application of animal traction varies from zone to zone. In the semi-arid zone, for example, it is widely used for ploughing and weed control, while in the subhumid zone, draught animals are seldom used for cultivation, and then mainly by immigrant farmers from the semi-arid zone (M. Saidu, Ministry of Agriculture and Natural Resources, Niger State, Nigeria, personal communication). Several factors appear to limit the spread of animal traction in the subhumid zone, including:

- Diseases, particularly trypanosomiasis and dermatophilosis;
- Hard, compacted soil and thick, ligneous vegetation with widely spread root systems, which impedes the progress of cultivation implements; and
- Unawareness of the technology and/or its benefits.

Besides these constraints, inadequate nutrition during the dry season seriously limits the productivity of draught cattle in the zone (von Kaufmann et al, 1986). Animals grazing sparse natural pasture lose weight and become weak, their physical condition being very poor at the onset of the short rains when they are needed for ploughing. Draught bulls and oxen must be

supplemented if they are to do the work expected of them. Casual observations indicate that this is indeed done; farmers adopt feeding regimes calculated to keep their animals in good physical condition.

An inventory of feeding regimes for draught animals is useful for a better understanding of traditional systems with a traction component. This report is based on a rapid survey of a range of dry-season feeds fed to draught oxen and bulls in parts of the Niger State in Nigeria.

MATERIALS AND METHODS

Twenty villages between Kontagora (10°24' N, 5°28' E) and Tegna (10°05' N, 6°14'E) were visited by an ILCA field assistant during the dry season of 1987/88. In each village, the head of the first household found to use cattle for draught was interviewed. Information was collected on the:

- number, type and age of draught animals,
- type of feed given and its source,
- method of feed storage, and
- time and duration of feeding.

Daily feed rations were weighed using a spring balance. To determine daily feed consumption per animal, the weight of the ration was divided by the number of animals fed and then doubled, because the animals were fed twice daily. Samples of the feed given in each household were collected at the end of the visit. Similar feed materials were composited, dried at 60°C for 48 hours and analysed for nitrogen content at the National Veterinary Research Institute, Vom, Plateau State.

RESULTS

The animals

Thirteen of the farmers visited had only one pair of draught oxen or bulls, five had two pairs and the remaining two had three pairs. The animals were either of the Bunaji (White Fulani) or Sokoto Gudali breed, but the latter were less common (in 26% of the households). According to the farmers' estimates, draught animals were between 5 and 7 years old, and 86% were castrates.

Animals intended to be used for draught are purchased at least 6 to 9 months prior to the time of sowing, thus leaving sufficient time for training. They are grazed on natural pasture in the vicinity of the household, often herded by a FulBe herdsman employed by several farmers. At the end of each day's grazing the animals are returned to the owners' homesteads and fed supplements.

Feed types

Fourteen different types of feed were identified (Table 1). The materials were grouped into six feed classes and their crude protein contents were estimated as shown in Table 2. The six feed classes were:

- Unprocessed crop residues
- Processed crop residues
- Concentrates
- Mineral licks
- Forage hay
- Tree fodder.

Table 1. Dry-season feeds for draught animals, Niger State, Nigeria.

Village	Sorghum straw	Rice straw	Grass hay	Groundnut hay	Cowpea hay	Alysicarpus hay	Sorghum		Cotton seed	<i>Azelia africana</i>	<i>Pterocarpus erinaceus</i>	<i>Daniella oliveri</i>	Common salt	Kanwa
							Bran	Grain						
Ungwar Gabas		x		x	x				x				x	
Uregi	x		x		x	x	x	x			x		x	
Tegina	x	x		x			x	x		x		X	x	
Kanfani Bobi				x		x	x	x		x		X	x	x
Buzana	x			x	x			x		x			x	
Kaswan Garba	x			x	x	x		x	x	x			x	x
Baban Doki	x				x	x	x	x		x			x	x
Ragada	x			x	x			x			x		x	x
Bobi Gari	x					x	x			x			x	x
Kanfani Waya	x			x	x			x				X	x	x
Mariga	x	x		x	x			x					x	
Funa Funa	x		x	x	x	x	x	x		x			x	
Beri	x			x	x		x	x		x		x	x	x
Ukuru	x				x	x	x	x	x	x		x	x	x
Dan Auta	x		x	x			x	x		x			x	x
Tugan Bako	x			x	x		x	x					x	x
Man Gandi	x			x	x	x		x		x			x	x
Rafin Gora				x		x	x			x			x	x
Maigoge					x	x	x	x		x			x	x
Durgu		x				x		x	x	x	x	x	x	x

Unprocessed crop residues (i.e. sorghum stalks, rice straw, groundnut hay and cowpea hay) are cut soon after the grain harvest and sun-dried. After drying, sorghum stalks are stacked in the field to minimise damage by termites, while the other crop residues are usually bundled and stored in racks or on rooftops. Immature sorghum stalks are harvested and stored separately, as they are of a higher quality than stalks cut after the harvest (Table 2).

Table 2. Crude protein content of different feeds, Niger State, Nigeria.

Feed	Crude protein %
Unprocessed crop residues	
Sorghum stalks	
–mature	4.60
–immature	8.95
Rice straw	5.76
Groundnut hay	10.51
Cowpea hay	9.54
Processed crop residues	
Sorghum bran	8.10
Concentrates	
Groundnut cake	28.47
Cottonseed	19.93
Sorghum grain	9.78
Minerals	
Common salt	n.a ¹
<i>Kanwa</i>	7.01
Forage hay	
Grass	4.72
Alysicarpus hay	15.59
Tree fodder	
<i>Azalia africana</i>	12.62
<i>Pterocarpus erinaceus</i>	15.11
<i>Daniella oliveri</i>	19.27

¹n.a. not applicable.

Although maize is cultivated in the area, its residues are seldom used as animal feed. The reason is that because maize matures early and some of it is harvested when the cobs are still green, the stalks left in the field quickly lose their nutritive value and are often infested by termites. Millet stalks left in the field are, however, frequently grazed.

Sorghum bran, which has a protein content of about 8% (Table 2), was the only processed crop residue used. Among concentrates, three are fairly common as dry-season feed supplements, including cotton-seed, sorghum grain and groundnut cake. The first two are usually stored in

earthenware pots or silos, and groundnut cake is purchased from local markets, but its high cost and relative scarcity limit its use. Of the 20 farmers visited, only one fed groundnut cake to his animals.

All feeding regimes include minerals, provided daily in the form of common un-purified salt and/or *kanwa* which is either mined or made by burning various organic materials. Mined *kanwa* is an evaporite and contains many macro- and micronutrients required by animals (Mohamed-Saleem and Otsyina, 1987). The *kanwa* fed by farmers in the study area contained more protein and organic matter than can be found in the evaporite, suggesting that farmers used home-made *kanwa*.

At the end of the rainy season, farmers cut grass and legumes, dry the hay in the field, bundle it and store in racks near the homesteads. The grass hay usually includes *Andropogon gayanus* and *Hyparrhenia* sp., and the legume hay Buffalo clover (*Alysicarpus* sp.). The protein content of the grass does not exceed 5% while that of the legume is over 15%.

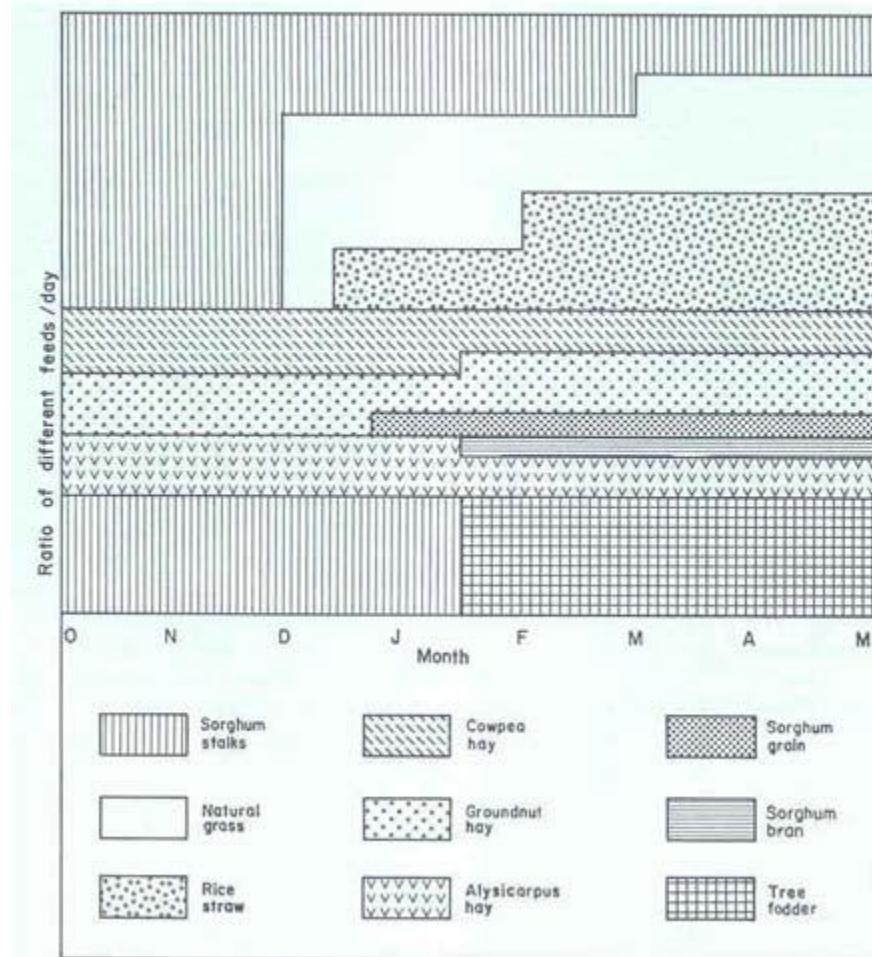
Fodder from tree legumes—mainly *Azelia africana* (in 70% of the households, as shown in Table 1), *Pterocarpus erinaceus* and *Daniella oliveri*)—is also given. Studies elsewhere in the country have shown that, because of the relatively high protein and mineral content of their leaves, these legume trees are important sources of fodder during the dry season (Mohamed-Saleem et al, 1979).

Feeding regimes

During the dry season, natural forage is deficient in protein (Mohamed-Saleem, 1984); and farmers adopt various strategies to overcome this deficiency. One of them is feeding cut and conserved feed on a volume basis twice daily. Each animal is given between 5.5 and 7.5 kg per feeding; leftovers from the previous day are removed before replenishment. Stall-feeding starts in October and continues until May, but where conserved feeds are in short supply, the period of stall-feeding is shorter by 2–3 months (November/December–April).

The feed rations consist of varying proportions of low- and high-quality fodder, depending on the season and the month of the season. In the early dry season, for example, the ratio of sorghum stalks to groundnut or cowpea hay (*harawa*) is 3:1, but later in the season it is 2:1 because part of the sorghum is replaced with rice straw and grass. Bran is also included to increase the quality of the feed. As the dry season progresses, the proportion of sorghum stalks declines and that of forage hay increases (Figure 1).

Figure 1. Ratio of different feeds in the daily dry-season diet of draught animals, Niger State, Nigeria.



Higher-quality feeds include legume hays, cottonseed, groundnut cake and sorghum grains; minerals are supplied daily in the form of either common salt or *kanwa*. Rations fed during the last 3 months of the dry season usually have higher proportions of leguminous browse (Figure 1).

DISCUSSION

Animal traction is well established in the upland areas of the Niger State, where draught animals are commonly used to plough previously cultivated fields. Most farmers own a pair of oxen or bulls and have an access to an EMCOT ridger. Observations of the system suggest that animal traction can be successfully introduced to ecologically similar areas where farmers traditionally keep cattle for fattening, and where suitable feeding strategies can be developed to maintain the condition of working animals during the dry season.

In more intensively farmed areas, forage legumes need to be incorporated into the cropping system to provide high-protein supplements for draught animals. At the present level of feeding, 1.5–2.0 t of conserved feed per animal would be required during the dry season; to preserve this feed, adequate storage facilities would also be necessary.

Because of the availability of residual moisture, the growing season in the inland valleys (*fadamas*) is 30 to 60 days longer than on the surrounding uplands. Critical shortages of labour for land preparation, however, mean that only part of the *fadamas*' potential for cropping can be exploited. Animal traction could substantially contribute to the development of inland valleys, provided that the cultivation implements are adapted for use on *fadama* soil.

Throughout the study area, draught animals are rarely used for transport and secondary farm operations. Lack of diversification in the use of draught power means that farmers are losing economic opportunities that would otherwise be theirs. Moreover, if the animals are underutilised, work efficiency during cultivation is greatly reduced (ILCA, 1981).

CONCLUSION

Farmers in the subhumid zone of Nigeria are willing to invest the effort and resources necessary to maintain the physical condition of draught animals during the dry season. Animal traction is well established in upland agriculture, and seems to be indispensable in developing the great potential of the inland valleys for cropping. Growing additional crops and introducing forages into the system would increase the availability of crop residues and other feeds in the zone. More feed means more draught animals on the farm, but to derive the full benefit from these animals, other uses such as transport and irrigation need to be actively pursued.

REFERENCES

- FMAWRRD (Federal Ministry of Agriculture, Water Resources and Rural Development). 1988. *Agricultural Policy for Nigeria*. Government Printer, Lagos.
- ILCA (International Livestock Centre for Africa). 1981. Animal traction in sub-Saharan Africa. *ILCA Bulletin* 14:2–17.
- von Kaufmann R R, Chater S and Blench R (eds). 1986. *Livestock systems research in Nigeria's subhumid zone*. Proceedings of the Second ILCA/NAPRI Symposium held in Kaduna Nigeria, 29 October–2 November 1984. ILCA, Addis Ababa. 497 pp.
- Mohamed-Saleem M A. 1984. The ecology, vegetation and land use of subhumid Nigeria. In: R R von Kaufmann, S Chater and R Blench (eds), *Livestock systems research in Nigeria's subhumid zone*. Proceedings of the Second ILCA/NAPRI Symposium held in Kaduna, Nigeria, 29 October–2 November 1984. ILCA, Addis Ababa. 497 pp.
- Mohamed-Saleem M A and Otsyina R M. 1987. Effect of the naturally occurring salt *kanwa* as fertilizer on the productivity of *Stylosanthes* in the subhumid zone of Nigeria. *Fertilizer Research* 13:3–11.
- Mohamed-Saleem M A, Oyatogun O O M and Chheda R. 1979. Nutritive value of browse plants in the Sudan savanna of northwest Nigeria, 1. Preliminary survey of Bin Yauri Grazing Reserve. *Nigerian Journal of Animal Production* 6:3–7.