



DRAFT ANIMAL POWER UTILIZATION IN TILLAGE OPERATIONS IN BORNO STATE, NIGERIA

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ABSTRACT

The study was conducted in some selected Local Government Areas of Borno state, Nigeria on the use of animal power in tillage operations. Ninety-one per cent of the farmers interviewed (117) owned only a single pair of draft animals, while only 9% had two pairs. All the farmers used bulls for their tillage operations and donkeys for transportation. The study showed that farmers used draft animals for only ridging, weeding and transportation. 75% of the farmers used draft animals for ridging, 20% for weeding and 5% for transportation. The area cultivated by individual farmers varied between 1.5-6 ha. The farmers complained on lack of feed at the beginning of rainy season, poor quality of implements and lack of extension services. The study suggested for the introduction of extension services and the possibility of extending the use of animal power to other farming operations in the study area.

Keywords: draft animal power, utilization, tillage operation, Borno state.

1. INTRODUCTION

Draft animals can offer farmers advantage of low initial investment in farm motive power compared to the purchase of even relatively small tractor. The first operation a farmer has to undertake in growing a crop is to use soil-engaging implement to prepare the land (Anon., 1992). In any crop production system, humans, animals and engines or motors provide the motive power in various proportions for crop production, harvesting, transportation or processing (Rijk, 1989; Pearson, 2005). Out of the cultivated area of 8.75 million hectare, 5.5% is cultivated using draft animal power, 8.5% using tractor power and the remaining 86% by manual labour (FACU, 1996). For all agricultural operations, animal power has been the major source of energy, especially in the Asian countries (Al-Janobi and Al-Suhaibaini, 1998). Animal power for land preparation is largely used due to the slopes of the land which hampers the use of tractors. One advantage of using draft animals as farm power is that their fuel can be generated on-farm.

World-wide, there are an estimated 400 million draft animals being used for agricultural operations (Barwell and Ayre, 1982). A review by Mrema and Mrema (1993) of the utilization of draft animal power in sub-saharan Africa showed that of the 11.3 million draft oxen in use, nearly 80% are found in five countries - Ethiopia (53%), Zimbabwe (7.1%), Kenya (6.2%) and Tanzania and Uganda each with 5.3% (Ellis-Jones and O'Neill, 2000). Starkey (1986) reported that in much of sub-Saharan Africa, systematic attempts to introduce animal traction begun between 1905 and 1945. He further states that about 10-17 million draft animals were employed in Africa, of which about 1 million are cattle and 0.8 million are donkeys and horses were used in west Africa. Animal traction in Nigeria dates as far back as 1920's in Daura, Katsina state (Suleiman, 2000). The first animal draft implement introduced in Nigeria was a wooden plough (Gwani, 1990), but from 1934, these

implements were replaced by the popular Ramsome Emcot ridger (Chaundhury and Musa, 1984). Animal draft implements used by farmers consist of plough and harrows for land preparation, planters or seeders for planting and carts for transportation. The size and shapes of these implements vary from region to region depending on cultural practices, soil type, and animal species used, but Upadhyay (1989) reported that the basic functional structure of the implements are similar, and there are no much differences among the implements meant for similar operation.

Before the introduction of farm tractors in Nigeria, animal power was already famous among farming communities. In Nigeria the use of animal power is mainly restricted to soil tillage and transportation using different types of implements such as ploughs harrows, ridgers and carts operated by oxen. Cattle, horses, mules and donkeys are the most commonly used draft animals (Asota, 1996; Itodo, 2007). Due to their temperament and muscle ability, oxen are mostly preferred for draft works (Asota, 1996). Haque *et al.* (2000) reported that apart from ridgers, no other animal draft implements are used for crop production in Adamawa State of Nigeria. In more arid areas, Starkey (1992) reported that farmers increasingly use cultivation tines for tillage. Also, Starkey (1989) reported that in certain areas, notably Nigeria, ridger is often the only animal traction implement being used for primary cultivation, weeding and earthing-up. Animal drawn mould board plough appears obsolete, but still an important tillage implements that is by far most applied in farm cultivation and seed bed preparations (Kepner *at al.*, 1990). The implement has remained the most resourcefully cheap farm power sources and best substitute for large tractor equipment on small scale farming especially in Savannah region of northern Nigeria (Gbodamosi and Magaji, 2004). Animal draft harrows are mainly used to crush clods and to level a seedbed after ploughing. Because of their design, these implements are



used as a ride-on with the weight of the operator increasing the effectiveness of work (Usman, 2002).

Borno state, located in the north eastern part of Nigeria, is one of the 36 states of the Federation, is dominated by peasant farmers like that of the other states in the country. These farmers are predominantly small scale holders and employ hand-tool technology to cultivate their lands for crop production. Usage of tractors by the peasant farmers is not economical because they are faced with the following constraints: capital, farm sizes and farming practices not amendable to tractorisation. However, the state is enriched with vast number of animals that can be used for agricultural purposes. This study was therefore undertaken to assess the extent of animal power utilization in tillage operations in some L.G.A.s of the state as virtually little work appears to have been undertaken on the subject.

2. MATERIALS AND METHODS

The study was conducted in 2007 and covered seven of the 27 local government areas (LGAs) of Borno state. In each of the LGA's headquarters, 20 farmers who used animal power for agricultural operations were randomly selected for interview. Questionnaires were distributed to collect information that includes farm size, types of animals used for draft work, implements used, operations performed, area of land covered, types of crops grown and problems faced in using animal traction. This information was analyzed using simple statistics.

3. RESULTS AND DISCUSSIONS

3.1 Farm size

Out of the 140 questionnaires distributed, only 117 were collected back and used for the analysis. The study showed that majority (86.3%) of the farmers interviewed operated between 2-5 ha of farm land using the draft animals, while 5.1% maintained less than 2 ha and about 8.6% of the respondents maintained above 5 ha of land (Figure-1). The detailed percentage of the area cultivated per respondent is shown in Table-1. Because of the field sizes maintained by these farmers, motorized power cannot be economical. This can be supported by the study of Yadav (1982) on energy requirements in paddy production systems. He reported that, up to 3 ha of landholding, bullocks' power with appropriate implement is suitable.

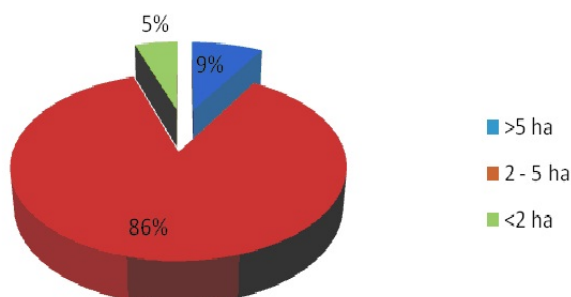


Figure-1. Farm size of respondents in the study area.

Table-1. Area cultivated using draft animals.

Area (ha)	No. of respondents (%)
<2	8.6
2	25.0
3	36.0
4	10.3
5	16.0
>5	5.1

3.2 Animals used for tillage operation

The study showed that bulls were the only animals used for draft power in tillage operations in the study area. While donkeys used in carrying sand for building from the river to their houses. The sand is supplied either on contract or house hold use. Most of the farmers interviewed (91%) said they owned only a single pair of draft animals, while only 9% had two pairs. The farmers use only two breeds of bulls for tillage operations. These are wadara (red bororoji) about 91.5% and bunaji (white Fulani) 8.5% as shown in Figure-2. Availability, strength and endurance to work are the reasons given by the respondents for the use of these breeds. They are also believed to be easily trained and reliable.

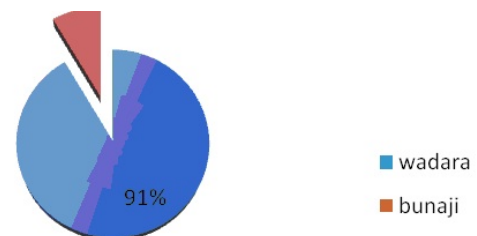


Figure-2. Breeds of draft animals used in the study area.

The study also shows that about 86% of the draft animals involved are between the ages of 2.5 and 5 year (Table-2); none was found to be older than 6 years. The farmers consider productivity as the reason for using the age range. They believed that animals below 2 years are too young to start work and older animals decline in productivity. The older animals are normally disposed off for new younger ones. They are either sold for money or returned to the heard where ever possible.

Table-2. Age of animals used in farm operations.

Age (years)	No. of bulls	Percentage (%)
2.5	24	10.26
3	46	19.66
4	64	27.35
5	72	30.77
6	28	11.97



3.3 Implements used and operations performed

All the farmers involved in this study used same harnessing system (double shoulder yoke) for tillage implements or pulling of carts. This system is mostly preferred because, according to the respondents, it constitutes fewer materials and has virtually no problem if properly coupled. The study also showed that apart from mouldboard ridger and cart, no other animal drawn implements are used in agricultural operations in the study area. This limits the number of activities that the animals can be used for. This could be due to the high emphasis given on land preparation activities. This finding agrees with the report of Starkey (1989) which said that ridger is the only notable animal drawn implement used in Nigeria. There is no other activity carried out using animals. This could be due to lack of awareness by most of the farmers of the presence of other implements such as animal drawn planters, weeders and even harvesters. It would be better, therefore, for the farmers (that can afford) to use different implements for different farming operations.

Only three operations were performed by the draft animals, these are ridging, weeding and transportation (Figure-3). The farmers used mould board ridger for ridging and weeding operations. This is because no specific animal drawn weeding implements are known to the farmers in the area. It was found that, farmers using draft animals power in weed control achieve more timeliness in operations. This study showed that the percentage of animal drawn farmers utilizing animal traction for weeding operations is low. This report agreed with the study of Mgaya *et al.* (1994) on care and management of work oxen in tropics, which said that, only 5% of the animal drawn farmers interviewed in that study used them for weeding.

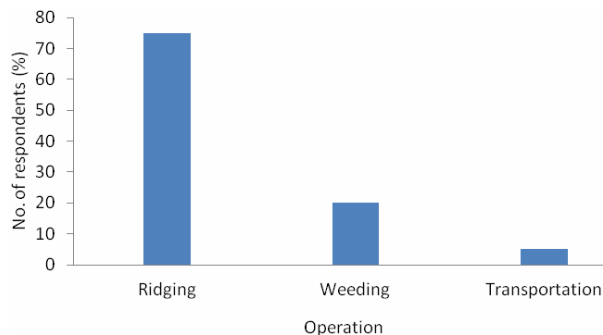


Figure-3. Operations performed by draft animals in the study area.

It was found out from this study that, the percentage of draft animal power farmers that use carts for transportation is only 4% as shown in Figure-3. This value is above the Figure (2.3%) that was reported by Mohammed *et al.* (1996) for farmers in North eastern Nigeria. It could be because of the variation in area covered in the two studies. Out of the number of farmers that use cart, about 30% extend the use of the draft animals in carrying sand, water and other materials on hire

bases. This will earn them extra income especially during off farm season.

3.4 Problems faced by the draft animals' farmers

Majority of the farmers involved in this study (65%) complained of lack of feed supplements. Most of the farmers cannot afford to buy concentrates for work animals. This situation is eminent during the beginning of rainy season when the animals are mostly needed for land preparation. There is the problem of lack of village-level repair services and spare parts. Also there is the problem of non-availability and poor quality of implements and inadequate training of animals. This, according to the respondents, constitutes a major constraint to the draft animal operations.

4. CONCLUSION AND RECOMMENDATIONS

The study showed that bulls constitute a high percentage of draft animals used in agricultural operations with little number of donkeys for transportation. The number of draft animals owned by individual farmers is negligible, mostly (91%) only one pair. Mould board ridgers were the only animal draft implement found to be used in tillage operations in the study area. They are used for both soil tillage and weeding activities. The study also showed that, transportation is one of the operations carried out by the draft animals.

The study suggests that other animal draft implements such as planters, cultivators and even harvesters be introduced in to the study area. The animals must be well trained; fed and cared for. Finally, it suggested that, extension services should be rendered on animal power farming as no where this service was found to be in existence in the study area.

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