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ANIMAL TRACTION IN MAHALAPYE AREA

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ANIMAL TRACTION IN MAHALAPYE AREA[1]

INTRODUCTION

One of the distinctive features of Botswana farming systems is the extensive use of animal traction. Essentially all farming households rely on animal or more recently, tractor traction for ploughing. Despite the importance of animal traction for a majority of the farmers, data are not commonly available on traction use in a whole-household context, e.g., relative frequencies of traction use for different activities. These data could be useful in diagnosing farming systems' problems and opportunities for improving farm production.

Timely or primary access to draught power, for initial seedbed cultivation, has been observed to be a major problem and limiting factor in the development of many local farming systems not only in Botswana, but in most of Southern Africa. Because animals are either weak or are not readily available at the start of the season, plantings are delayed and seedbeds are inadequately prepared.

ACCESS TO ANIMAL TRACTION AND DRAUGHT EXCHANGES

Even though primary access to traction may differ from one village to the other, the different ways or forms can generally be grouped into 5 to 6 sub-headings. For example,

(a). Baker (1988), in his study on draught arrangement in Shoshong and Makwate, identified five primary ways of gaining access to draught power in these villages: He identified that farmers in these villages, either;

(i) Own
(ii) Borrow
(iii) Cooperate
(iv) Co-own
(v) Hire

This could be simply broken into individual ownership [(i) above] and some form of community sharing [(ii) through (v) above].

(b). Curtis (1972), in a study in the Mahalapye area, identified 6 inter-household arrangements through which a community's cattle and donkey resources are shared among households. Alverson (1979), in his study on the social and economic context of agriculture in Botswana, also identified the same 6 ways. Subsequently, this information has been used by many to categorize ways of sharing animal traction within a community.

[1] Paper presented at workshop sponsored by the Molapo Development Project on the "Effects Of Animal Traction On Crop Production" Maun, 11-13 April, 1989

The six community sharing mechanisms identified are:

(i) Providing labour in return for use of implements or cattle
(ii) Ploughing together, taking turns on each others field (combining resources for a faster rate of work)
(iii) Ploughing for another in return for payment in kind
(iv) Groups of people rotating to each other's field
(v) Ploughing for another in return for use of plough and oxen team
(vi) Hiring for money

EFFECT ACCESS TO DRAUGHT HAS ON CROP PRODUCTION

Thus, there are several ways of gaining access to animal traction, but each is associated with its rights and obligations. The pattern of these rights and obligations exert a major influence on cropping outcomes for different households. For example,

(a). Of the five ways of gaining access to draught, as identified by Baker (1988), draught hiring households have been identified as the most affected relative to the timing of ploughing. In a study made by Baker in 1982-83 season in the Mahalapye area, control over timing by draught owning households was apparent. Seventy percent started ploughing before December, and only two failed to start until January. More than half the borrowing, co-owning and cooperating households also started before December. However, 80 percent of hiring households started and ended ploughing in January. This clearly suggests that hiring households have a small window in which ploughing can be done (Baker, 1988, p. 13).

However, it has been observed over years that draught owning households tend to plough and plant in better moisture days than households dependent on traction owned by other households. This often leads to non-draught owning households due to untimely initial cultivation and planting ending up with inadequate and erratic plant establishment which are some of the key constraints affecting crop production in Botswana.

(b). Control over draught resources also affects the ability for households to implement improved technologies involving multiple tillage planting operations. In ATIP trials, for example, households lacking control over draught resources consistently have had less success implementing trials involving either double ploughing or ploughing and row-planting than have draught owning households (Baker, 1988).

CHANGES IN TRACTION USE IN THE MAHALAPYE AREA

Recently, there have been important shifts in traction use in the Mahalapye area. Primary use of cattle fell from 54 to 16 percent of households between 1980 and 1986. Meanwhile, primary use of tractor increased from 35 to 70 percent of households in the area. Use of donkeys also increased during this period.

Observations made (but not documented) in the Mahalapye region have indicated a shift by a majority of farmers from animal to tractor traction since 1985, mostly due to the introduction of ARAP. Whether this shift is permanent or temporary still remains to be seen. The shift,

however, indicates a loss of traction control and a heavy reliance by a high percentage of farmers on a scarce resource (i.e., very few farmers own tractors in the Mahalapye region). This in turn means an increase in the number of farmers planting late and with poorly prepared seedbeds, thus reducing average production per farm.

However, the advantages of tractor traction very often over weigh those for animal traction like as shown on the table below.

TABLE 1: A COMPARISON BETWEEN ANIMAL AND TRACTOR TRACTION

FEATURES	ANIMAL TRACTION	TRACTOR TRACTION
Cost	Cheaper per unit of traction (draught team)	Much more expensive per unit traction (per tractor)
Labour Requirement	High, up to 3 with a minimum of 2 people per draught team	Lower only one operator needed per tractor
Working Time	Limited to a maximum of 5hrs./ day on a continuous spell	Unlimited depending on the operator
Speed of Operation	Not exceeding 1m/sec. ie., about 3km/hr.and thus slow	Variable depending on the size of the tractor
Power Generated	Limited to about 1/2kw per animal	Variable depending on the size of the tractor but can be up to 80kw per tractor
Ploughing and Planting Depth	Uneven ploughing and planting depth	Can easily achieve defined ploughing and planting depths
Timeliness of Operations	Poor in most cases and dependant on animal condition	Good if properly maintained

Table 1 shows several advantages of using tractor traction over animal traction. However, the biggest disadvantage with tractor traction is the initial purchasing cost which cannot be met by a majority of local farmers. Thus, even though tractor traction offers a great opportunity for higher yield returns, the benefit will only be enjoyed by a minority group within a given community.

EFFECTS OF TRACTION TYPE ON CROP PRODUCTION

The recent trend can be expected to have a significant impact on the productivity and development of the agricultural sector because of the characteristics of different traction types. For example, a survey conducted in 1983 on draught arrangements in the Mahalapye region, reported that donkeys were easier to use and had more stamina than cattle, but were slow and might not be able to plough heavy soils. Cattle were said to be faster than donkeys but were more difficult to use in row-planting, and were often only available for hire late in the season.

Farmers also showed their preference for tractors because they can have their ploughing done faster, taking advantage of limited good soil moisture days. However, the biggest problem with tractors is their expense. Whatever the advantages of tractor over animal traction are e.g., faster rate of work, less labour requirement etc., tractors should not be seen as a substitute for animal traction because the risks of crop failure and lower yields are higher, and more farmers would be affected by the former than the latter option.

Other observed characteristics of cattle and donkey draught can be related to:

(a). Location of animals during most parts of the year i.e., whereas cattle are usually kept at the cattle-post far from lands, donkeys are usually kept either at the lands or village area. This requires a larger lead time for ploughing for households using cattle than those using donkeys.

(b). Management Requirements: Donkeys require less management than cattle. Hobbling, a feature applicable to donkeys only, allows for easier management and requires little labour.

(c). Multiple Uses for Donkeys: (i) carting of water, (ii) firewood-collection, and (iii) transportation. With the potential for multiple uses during and off-season, donkeys can receive constant training so that at the beginning of the cropping season they do not need any re-training. Because of the potential for multiple uses, the expected return to time spent training donkeys will also be higher than for cattle.

(d). Women could sooner use donkey traction than cattle.

(e). The potential for introduction of improved ploughing and planting systems appears related to use of donkey traction (i.e., few farmers in the Mahalapye area using cattle traction have adopted row- planting). Donkey traction would be particularly suited to the use of lighter equipment (i.e., animal draught for rotary injection planter).

(f). Donkeys are less expensive than cattle, with no competing market value (e.g., sale for meat) to protect.

STRATEGIES FOR ARRESTING THE SHIFT AWAY FROM ANIMAL TRACTION

As previously stated, a shift from animals to tractor traction would result in loss of draught control for an increased number of farmers, untimely ploughing and planting, erratic crop stands and consequently lower yields. Some of the strategies which could help arrest such a change, include:

(a). Water Harvesting Techniques: These could provide a bigger window for ploughing and planting under good moisture conditions by lengthening the moisture available days after the rains.

(b). Separate Ploughing and Planting: This would apply where, for instance, ploughing has been done under poor moisture conditions. By separating ploughing and planting, planting could only be done on those days when moisture is good and by so doing good plant emergence and crop establishment could be achieved which might lead to higher crop yields. This strategy might also incorporate techniques such as, gap filling, combination of tractor for ploughing and donkeys for planting, and the use of

the rotary injection planter. However, the latter is likely to increase the labour requirement and thus reduce the returns per unit of labour which is a major limiting factor for a majority of farmers.

EFFICIENCY OF ANIMAL DRAWN IMPLEMENTS AND ITS EFFECT ON FARM PRODUCTION

The condition of animal drawn implements can have an effect on the efficiency of planting and ploughing. Implements not in good condition not only result in poor work done, but also contribute to inefficiency (i.e., poor plant establishments, less work done per unit time, more draught requirement).

Factors which contribute to inefficiencies of animal drawn implements include:

(a). No well trained or experienced local blacksmith or GOB personnel to assist in maintenance and repairs of ploughs and or planters.

(b). No support programmes to go hand in hand with packages on maintenance and repairs, such as those issued by ALDEP.

(c). Improper use, poor quality, lack of maintenance and repairs of yokes and harnesses. Problems with these two items has an indirect effect on crop production by increasing the draught power requirement and thus contributes to inefficiency.

CONCLUSIONS

(a). Access to animal traction very much affects the onset of ploughing/planting as well as the adoption of multi-tillage operations -- a crucial issue under Botswana conditions of unreliable rainfall.

(b). The recent shift from animal to tractor traction, which if it can not be accompanied by an increase in the number of tractors, might result in untimely plantings and poor seedbed preparations and thus have a negative impact on arable crop production.

(c). Use of donkey traction could have a positive impact on the adoption of improved cropping practices.

(d). Inefficiency of animal drawn implements can have a significant, indirect negative impact on farm production, the magnitude of which is difficult to quantify due to a lack of documented data.

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