

AVAILABILITY AND CONDITIONS OF AGRICULTURAL MACHINERY IN BORNO STATE, NIGERIA

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Abstract

A study was carried out on the availability and conditions of agricultural machinery (tractors, tillage implements, combines, planters, sprayers and threshers) in Borno State of Nigeria. A questionnaire was administered to collect information from various agricultural organisations. The state had 16 types of machinery, with a total of 1,377, as at 1998. Out of this number, 75% were functional. The private sector possessed a higher number of agricultural machinery, both total and functional. The total number of machines in the sector was 778, out of which 83% were functional. In the public sector, 599 machines were identified, out of which 64% were functional. Tractors, disc harrows and disc ploughs dominated both the private and public sectors, as tillage was the main operation being mechanised in the state. The distribution of agricultural machinery among the 27 local government areas (*LGAs*) in the state was not even. Machinery was concentrated in Maiduguri, Marte and Biu Local Government Councils: where the major agricultural establishments and private farms were located. There are not enough agricultural machines in the state, not even those required for tillage, and the level of mechanisation is consequently too low. The article suggests ways to improve the availability of functional machinery in Borno State so as to boost its agricultural production.

1. Introduction

Agricultural mechanisation in the developing countries is often considered as a prerequisite for sufficient food and fibre production for the teeming populations of those countries. Their population growth rates are not matched with improvements in agricultural mechanisation, which is a potent force required to give an impetus to sufficient agricultural production.

Agricultural activities in the developing countries are powered by human, animal and mechanical energies. The use of these sources for the benefit of agriculture is constrained by factors such as cost and availability of the power source in question, farm size, availability of farm inputs, etc. An important aspect of agricultural mechanisation is the availability of functional machinery in a particular region at the right time. This availability, as suggested by *EUROCONSULT* (1989), is influenced by several factors such as the age and quality of agricultural machines, the availability of spare parts and repair facilities, and the quality of machinery operators. The higher the number of different types of functional machines in a region, the more likely it is to produce more food than a region with fewer machines. *FAO* (1992) observed that the effectiveness of agricultural mechanisation in developing countries must be improved, given the present status, and the need to increase agricultural productivity. In Nigeria, efforts have been made at various times and under different programmes towards mechanisation of agriculture. Both the public and private sectors have acquired agricultural machinery in an attempt to realise this goal. This led to the creation of tractor hiring units and agricultural development programmes in various states and local government areas (*LGAs*) in the country. The machines of such agricultural organisations are then involved in multifarm use, which is the means by which such machines are used on more than one farm unit (*FAO*, 1985).

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Borno State lies in the semi-arid region of Nigeria and is mainly an agrarian state. The state has a vast arable land area of 5,152,100 ha, of which 1,794,400 ha was under cultivation at the time of the study. There are some major organisations in the public sector that are involved in agricultural mechanisation in the state. These organisations, owned by the federal, state and local governments, possess various types of agricultural machinery. Private participation in agricultural mechanisation in the state is also noteworthy. Large- and medium-scale farmers acquire machinery for deployment on their farms, as well as, for custom operations.

Knowledge of the total number and state of agricultural machinery in a region is required for proper assessment of the level of mechanisation. It also enables proper planning and gives the required guidance to improve areas with major lapses. A comparative analysis of agricultural machinery types and conditions in the public and private sectors hand in hand will shed more light on the complimentary role of the latter in agricultural mechanisation. This will consequently accord the private sector its rightful position in agricultural production. Unfortunately, information on the total population and conditions of agricultural machines available in Borno State is lacking. This has led to improper planning of the need and use of farm machines to boost agriculture. The objective of this study was therefore, to investigate the availability and conditions of agricultural machinery in the state.

2. Materials and methods

The survey was conducted between 1st May and 30th September 1998, in all the 27 *LGAs* of Borno State. A questionnaire was used to collect the information. It was completed by the establishments concerned or by one of the authors during his visits to the establishments. The survey included both the public and private sectors, which employed agricultural machinery for farm operations. The information sought in this study included number, types, sizes, conditions and ownership of various agricultural machines.

3. Results and discussion

The types and conditions of agricultural machinery available in the study area are shown in Table 1. Some 16 types of machinery were identified, with disc ploughs, trailers, disc harrows and tractors ranking high, in increasing order, from the total machines available. This is because agricultural mechanisation in Borno State is mainly dominated by tillage (ploughing and harrowing) and transportation activities. Mechanisation of seedbed preparation features prominently in the state because the operation is labour-intensive and takes too much time to complete manually. However, it should be noted that the total number of tractors (610), ploughs (177) and harrows (291) presently available for tillage operations is not enough if one considers the huge cultivated area of 1,794,400 ha (only 0.34 tractors, 0.16 harrows and 0.10 ploughs per 1000 ha of cultivated land).

Mechanisation of other farm activities, from planting to threshing is very dismal. Such operations are executed manually by majority of farmers in the state. Table 1 shows the types of machinery least available (in decreasing order) were mouldboard ploughs, chisel ploughs, mouldboard ridgers and bailers. The predominant soil type in most parts of Borno State is sandy loam, which does not necessarily require the use of mouldboard and chisel ploughs. Fodder crops are not grown in the state; hence bailing is not done at all. The only bailer found during the study was not functional.

Table 1: Number and conditions of various types of agricultural machinery in Borno State

Type	Number		
	F*	NF	T
Tractor	395	215	610
Disc plough	132	45	177
Mouldboard plough	4	1	5
Chisel plough	3	0	3
Disc harrow	253	38	291
Land leveller	11	0	11
Disc ridger	30	5	35
Mouldboard ridger	2	0	2
Seed planter	9	2	11
Seed drill	3	5	8
Boom sprayer	6	1	7
Cereal thresher	10	1	11
Rotary slasher	5	1	6
Bailer	0	1	1
Combine harvester	22	9	31
Trailer	144	24	168
Total	1029	348	1377
Per cent	75	25	100

*F – Functional. NF – Non-functional. T – Total

With the exception of chisel ploughs, land levellers and mouldboard ridgers, the study has revealed that every other type of machinery had non-functional units. Tractors had the highest number of the non-functional units – 215 (35%) out of the total 610 were not functional. This percentage is higher than both the *FAO* (1992) estimate for some countries (30%) and the finding of another study (31%) for the neighbouring Adamawa State (Umar, 1997). If the proportion of broken down tractors remains this high, it is difficult to foresee any breakthrough in mechanisation in the state.

From the total 1,377 machinery units available, 75% were functional, which is fairly satisfactory. Two possible reasons can be advanced for this situation. Firstly, many types of machinery are not used as widely as tractors, hence their breakdown is correspondingly less frequent. Secondly, smaller and less complex types of field machinery consist of fewer integral units and sub-units than tractors. Thus, their repair, maintenance and replacement of parts are easier and cheaper.

Table 2 presents a breakdown of the numbers of agricultural machinery available in various *LGAs* of Borno State. The machinery is concentrated in only a few *LGAs*. Maiduguri metropolis (Borno State capital) ranked first in the number of machines available (572). Many medium- and large-scale private farmers reside in this city. Also, government-owned agricultural organisations that acquire machinery, such as the Borno State Agricultural Mechanisation Authority and the Borno State Agricultural Development Programme headquarters, are located in the state capital.

Table 2: Availability of agricultural machinery in various LGAs of Borno State

LGAs	Public sector			Private sector		
	F	NF	T	F	NF	T
Abadam	5	1	6	0	0	0
Askira/Uba	8	2	10	33	3	36
Bama	15	8	23	8	3	11
Bayo	2	4	6	0	0	0
Biu	7	14	21	100	38	138
Chibok	3	4	7	7	3	10
Dambo	20	7	27	2	3	5
Dikwa	8	8	16	13	1	14
Gubio	6	2	8	2	3	5
Guzamala	3	3	6	0	0	0
Gwoza	2	14	16	14	2	16
Hawul	2	6	8	1	2	3
Jere	21	9	30	46	0	46
Kaga	8	3	11	0	0	0
Kala/Balge	5	5	10	0	0	0
Konduga	6	11	17	8	1	9
Kukawa	9	1	10	3	0	3
Kwaya Kusar	0	0	0	5	3	8
Mafa	5	6	11	0	0	0
Magumeri	4	3	7	0	0	0
Maiduguri Metropolitan Council	119	20	139	365	68	433
Marte	102	60	162	0	0	0
Mobbar	5	3	8	5	0	5
Monguno	11	2	13	10	3	13
Ngala	8	7	15	14	1	15
Nganzai	1	5	6	0	0	0
Shani	0	6	6	8	0	8
Total	385	214	599	644	134	778
Per cent	64	36	100	83	17	100

Marte and Biu are the second and third LGAs with high numbers of machines available. The former (with 162 machines) houses the Federal Government-owned Chad Basin Development Authority, while the latter (having 159 machines) is the seat of large-scale farms such as the Birma Farms Ltd.

Despite the fact that all LGAs consist of large areas of arable land, some appear to possess very low levels of agricultural mechanisation, with the number of available machinery conspicuously too low. For instance, Abadam, Bayo, Guzamala and Nganzai have only six machines each. Such LGAs have neither agricultural organisations of prominence nor private individuals who own agricultural machinery. For example, all the eight agricultural machines available in Kwaya Kusar LGA were owned by the private sector, while in Abadam, Bayo and Guzamala LGAs, machinery ownership was monopolised by the public sector. Interestingly, the entire private machinery available in four LGAs, namely Jere, Kukawa, Mobbar and Shani was functional at the time of this survey, as shown in Table 2. Conversely, no single LGA had a fully operational fleet of government-owned machinery. The situation

was worse in Shani LGA where the entire government-owned agricultural machinery was not functional at the time of the study. Tables 3 and 4 compare the availability and conditions of different types of private and public agricultural machinery further. Some 83% of the private machines were functional (Table 3) compared to 64% for the public sector (Table 4). The two tables also show that the private sector had more fully functional machines than the public sector. Furthermore, there was no single unusable type of agricultural machinery in this sector. In contrast, the public sector had three types of totally broken down machinery.

Table 3: Availability of agricultural machinery in the private sector

Type of machinery	Number		
	F	NF	T
Tractor	239	79	318
Disc plough	93	20	113
Mouldboard plough	1	1	2
Disc harrow	167	14	181
Land leveller	1	0	1
Disc ridger	13	1	14
Mouldboard ridger	2	0	2
Seed planter	8	2	10
Seed drill	3	4	7
Boom sprayer	6	0	6
Cereal thresher	7	0	7
Rotary slasher	1	0	1
Combine harvester	3	1	4
Trailer	100	12	112
Total	644	134	778
Per cent	83	17	100

Table 4: Availability of agricultural machinery in the public sector

Type of machinery	Number		
	F	NF	T
Tractor	156	136	292
Disc plough	39	25	64
Mouldboard plough	3	0	3
Chisel plough	3	0	3
Disc harrow	86	24	110
Land leveller	10	0	10
Disc ridger	17	4	21
Seed planter	1	0	1
Seed drill	0	1	1
Boom sprayer	0	1	1
Cereal thresher	3	1	4
Rotary slasher	4	1	5
Bailer	0	1	1
Combine harvester	19	8	27
Trailer	44	12	56
Total	385	214	599
Per cent	64	36	100

From the data on functional machinery, it can be asserted that the private sector performed better in terms of machinery repairs and maintenance, in spite of the fact that it lacks workshops and consequently patronises unskilled road-side mechanics. In addition, many private tractors and other agricultural implements were acquired from auctions of old and broken down public sector machinery. As observed by *FAO* (1985), the private sector has been more successful because it is financially more prudent and provides higher quality services to farmers, though at a higher price. The public sector has workshops, but these are usually not well equipped and maintained. Similarly, consumables such as fuels and lubricants and replacement parts are sometimes out of stock when they are needed most.

The contributions of the private sector towards agricultural mechanisation in Borno State can be rated very significant. The sector should therefore be involved in the formulation and execution of agricultural mechanisation policies and programmes, such as provision of credit facilities, training workshops for mechanics and machinery operators, etc. At the same time, the public sector needs to improve its workshop facilities, motivate its staff and operate sound management policies. It is only then that the low mechanisation level in Borno State can be uplifted and the much needed increase in agricultural production realised.

4. Conclusion

A total of 1,377 modern agricultural machines were available in Borno State, 75% of which were functional. Machines for tillage and transportation were those available most. The machinery population in the state is inadequate, considering the vast arable land available, and the level of mechanisation of field activities is correspondingly too low. Acquisition of additional machines, proper and adequate maintenance of existing ones and managerial improvements on the part of the public sector are needed to raise the level of farm mechanisation in the state. Also, the private sector, whose contribution is noteworthy, should be involved in the formulation and execution of agricultural mechanisation policies. It is strongly recommended that this type of study be carried out in all the states of Nigeria to highlight the preparedness of the country in serious agricultural production.

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