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Agricultural Tractor Ownership and Off-season Utilization in Ogun State, South Western Nigeria

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Abstract: This study examines the concept of Agricultural tractor ownership and off-season utilization in Ogun State. Data were collected on fifty-three (53) randomly selected tractors from twelve out of the twenty local government areas in the state, through the administration of a structured questionnaire. The result of the study showed that 32.08% of the respondent had tertiary education, 22.64% had secondary education, 26.42 and 9.43% had primary and professional qualifications respectively. Forty-five percent of them were between age range 41-50 years, 24.52% between 31-40 years, 16.98% between 51 years and above and 13.2% between 21-30 years. The tractors largely, Massey Fergusson, Styr and Fiat were used mainly for ploughing. The average capacity utilization for ploughing by each tractor was 289 ha/year and they were hardly used during the off-season. Majority of the tractors were poorly serviced and maintained, while service records for tractors were either non-existent or insufficient and their current owners had overhauled 89% of the tractors. Tractors experience frequent problems with hydraulic and transmission systems. Other problems such as engine oil leakage, front wheel bearings failure, steering and accessories were observed. Tractor owners were reluctant to use their tractors for non-ploughing activities like slashing, generator, etc. They were not vigorously used during off season in order not to risk damage. Regarding farming as a profitable business, farmers could engage their tractors in all year activities such as threshing, towing of vehicle and transportation. These show potential for making ownership cost effective, but it is advisable to do cost analysis of farm operations for farmers to realize profit while issues of maintenance should be given serious attention.

Key words: Tractor ownership · Off- season utilization · Survey · Ploughing

INTRODUCTION

Nigeria's Agriculture has been dominated by human power for many years. According to [1], spears, arrows, cutlasses, hoes etc, were the early tools in agriculture and some of these especially hoe and cutlasses are still widely used in Nigeria.

In an attempt to bring more agricultural land under cultivation and to remove the drudgery associated with the use of hand tools, advanced technology was introduced in Nigeria. This started with the introduction of animal draught technology which involves the use of animals like oxen and camel for tillage operations [2, 3].

However in recent years, tractor power has emerged to rival the use of animal draught. Tractors were introduced into Nigeria in the 1950's through farm settlement scheme in the western region of the country before spreading to other parts of the nation. [4, 2] reported that farm tractors are being under-utilized in Nigeria, this was attributed to limited seasonal application of farm tractors and lack of technical and managerial competence to handle, use and maintain farm machinery [5].

However, the high cost of purchasing and maintenance of tractor makes it difficult for an average Nigerian farmer to privately own a tractor. As a result of these, tractors were mainly owned by government through the ministries of Agriculture and lately by departments and parastatals whose mandate involves substantial land clearing and development [6].

Ogun State was created in 1976 with Abeokuta as the State Capital, located in the South-Western Nigeria

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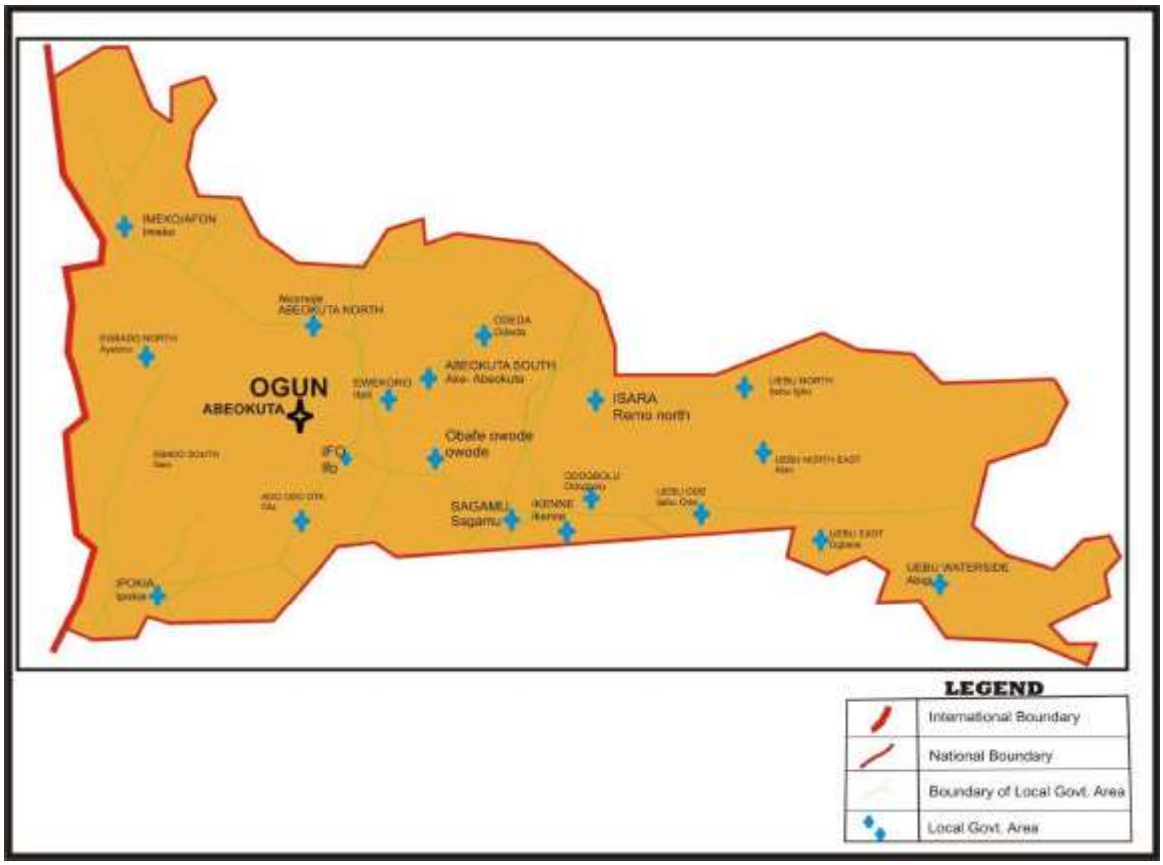

Fig. 1: Map of Ogun State Showing the Local Government Areas (L.G.A.)
Map Scale: 1:500,000

between latitude 7°01' N and 7°18'N and longitude 2°45'E and 3°55' E. It boarders Lagos to the south, Oyo and Osun States to the East and republic of Benin to the West (Fig. 1). It is covered predominantly by tropical rain forest and located about 100 km Northwest of Lagos State [7]. The State which is endowed with both natural and human resources has about 70% of the people engaged in agriculture and agricultural related businesses as their primary occupation [7]. Crops like yam, cassava, maize, rice, cocoa, cola-nut and sugarcane are being produced in abundance. Ogun State is one of the States where usage of tractor is on the increase, though tractor operations are seasonal and two major planting seasons were identified. These are early planting and late planting seasons [8].

Early planting seasons starts in March and ends by June every year. This season is subject to change as it is determined by rainfall distribution pattern for that year. Late planting season starts by August and ends by September, which is usually very short and uncertain. As a result most farmers do not want to risk planting during this period.

Early and late planting seasons are referred to as peak period and the rest months are referred to as off-peak or off season period for tractor utilization. The profitability of tractor use therefore was linked to the extent of utilization during the peak period. This situation prompted the study of Agricultural tractor ownership and utilization at off season in Ogun State in order to determine the average hours of tractor usage per year, to identify activities other than ploughing and offer possible suggestion that may further enhance effective and profitable tractor utilization in Ogun State.

MATERIALS AND METHODS

Questionnaire was developed to ask farmers that owned and operated tractors on their use, operation, serviceability and maintenance costs. Other information asked was personal information that could help the researchers understand the ability of the farmer to effectively operate the tractor and keep records [9]. The questionnaire was distributed randomly in 12 local

government areas in the state during the 2007 dry season. The data for the study area were collected both from the primary and secondary sources. The primary data were obtained from structured questionnaire, personal contact, interview and physical observation. The use of secondary sources also played vital role in this study. It was through this method that relevant information was obtained from Agricultural documents such as Bulletins, proceeding, workshop/seminar and past research works. The farmers interviewed were the owners/caretakers who knew or had information on the performance of their tractors. In cases where a farmer owned more than one tractor, each tractor was treated as a separate unit and information about its use was collected independently.

RESULTS AND DISCUSSION

Results and findings of this study are hereby presented and discussed.

Profile of the Tractor Owners/caretakers (Respondents): The profiles of respondents which include age, educational status and professional status are hereby presented. Table 1 shows that majority of the respondents which made up of 45.3% were found within age range 41-50 years, 24.52% were in the range of 31-40 years, 16.98% where in the range 51 years and above while the rest 13.2% fall within 21-30years. This finding is contrary to what was obtained by [9] in Kgatleng district of Botswana where majority (42%) of the tractor owners are over 60 years old and 41% were between 41 and 60 years old. This indicates that youth involvement in mechanized agriculture is still very low this might be attributed to rural-urban drift in search of better means of livelihood and white collar jobs.

Table 2 shows that 32.08% of the respondent had degree certificates, 26.42%, had primary education, 22.64% had secondary education and the rest 9.43% had OND/NCE and professional education such as trade test. These findings demonstrate the ability of the respondent to give valid information on the tractor uses. However all the respondents found with degree certificates were in the public sector.

Information about Tractor Type, Uses and Service: Table 3 presents the information about tractor type, uses and services. It shows that out of 53 tractors, 18 were Massey Ferguson (MF), 15 were Fiat, 14 were Steyr, 2 were Ford, while John Deere, Europard and Valet has 1 each. Massey Ferguson having the highest percentage may be because it is an old model of tractor, while the high usage of Fiat and Steyr of 28 and 26% each may be due to the presence of assembly plants in Nigeria as earlier asserted by [10].

Table 1: Age distribution of the respondents

Age (years)	Frequency	Percentage (%)
20-below	-	-
21-30	7	13.20
31-40	13	24.52
41-50	24	45.30
51-above	9	16.98

Table 2: Educational level of respondents

Educational status	Frequency	Percentage (%)
Primary	14	26.42
Secondary	12	22.64
OND/NCE	5	9.43
Degree	17	32.08
Professional (Trade test and co)	5	9.43

It also shows that year of manufacture for most of the tractors under study were not available, but for the twelve which were available, 9 were above 18 years old and 3 were below 18 years old, 49% of the tractors were bought over 10 years ago, 36% were between 5 to 10 years and 15% were below 5 years old. Most of the tractors were bought as fairly used equipment, except those from the public sectors which were purchased as new ones but got old due to long time of usage and lack of good maintenance culture.

Service records were not available, but it could be deduced that the tractor owned by private individuals were bought in poor condition and those in the public sector were not well maintained as 89% had been overhauled. Even with overhauling, some tractors experienced frequent problems such as hydraulic system failure, engine oil leakage, front wheel bearings failure, transmission system ineffectiveness and steering system failure. The respondents had incomplete record of how frequent these problems occurred and the cost of repair. Thus it was impossible to accurately perform any cost analysis for the tractor.

Table 3 also shows that the tractors were bought mostly for ploughing and hiring for general farm duties. Specifically in public sector, the tractors are hired out for ploughing and transportation, but the private owners use them for all farm activities. The private owners mostly hire out their tractors for these activities because of the small size of their farms. Under this condition, the tractors

Table 3: Information about tractor Type, uses and service.

S no.	Tractor model	Year of manufacture	Year of purchase	Engine over hauling	Purpose of buying	Hectares per year	Other activities	Frequent problem	Location of service provider	Type of organization
1	Steyr 8120	N.A	1985	Yes	Ploughing	450	Transporting	Front support bearings Gear	T and E Lagos	Public
2	Fiat 666	N.A	1986	Yes	Ploughing	N.A	Transporting of farm produce	Gear	Ogun and Lagos	Private
3	Fiat 780	N.A	1987	Yes	Ploughing	250	None	Hydraulic injector and cable	Local	Public
4	Valment	N.A	1992	Yes	Hiring	150	Transporting of farm produce	Front support Gear and Hydraulic	Local	Public
5	MF 240	N.A	N.A	Yes	Hiring	450	Transporting and fertilizer application	Front support	Lagos	Public
6	MF 265	N.A	N.A	Yes	Hiring	350	Transporting of farm produce	Hydraulic and front support	Local	private
7	John Deere	N.A	N.A	Yes	Ploughing and hire	350	Transporting of farm produce	Spindle and bushing	Local	private
8	MF 290	N.A	N.A	Yes	Ploughing and hire	350	Transporting of farm produce	Front axle and hydraulic	Local	private
9	MF 290	N.A	N.A	Yes	Ploughing and hire	350	Transporting of farm produce	Front axle and hydraulic	Local	private
10	MF 265	N.A	N.A	Yes	Ploughing	350	Transporting of farm produce	Front axle and hydraulic	Local	private
11	MF 265	N.A	1992	Yes	Farming activities	250	Transporting of farm produce	Front axle and hydraulic Ram	Local	private
12	Fiat Europard	N.A	2004	No hire	Ploughing,	450	Transporting of farm produce	Damper, bearing and spindle	Local	private
13	Fiat New Holland	N.A	2003	No hire	Ploughing,	450	Transporting of farm produce	Oil bath and Hydraulic system	Local	private
14	Steyr 768	N.A	1985	Yes	Hiring	250	Transport and slashing	Over heating	T and E Lagos	Public
15	Steyr 8120	N.A	N.A	Yes	Hiring	600	Transporting of farm produce	None	Local	Public
16	MF 375	N.A	1992	Yes	Hiring	450	Transporting of farm produce	Bearing and front support	T and E, Lagos	Public
17	MF 375	N.A	1992	Yes	Ploughing and hire	450	As generator and transporting	Front support spindle bearing and front arm	Local	Public
18	Steyr 768	N.A	1998	Yes	Ploughing	400	Transporting of farm produce fertilizer application	Piston sleeve	Lord mat Lagos	Public
19	David Brown	N.A	2001	Yes	Ploughing and hire	240	Transporting of farm produce	Hydraulic pump and Injector	Local	Private
20	MF 185	1962	1976	Yes	Ploughing	450	Planting and of herbicide spray	Tyre	Local	Private
21	Steyr 768	1975	1982	Yes	Ploughing and hire	480	Transporting of farm produce, planting and spray of herbicide	Tyre	Local	Private
22	Ford	1975	2005	Yes	Ploughing	150	Transporting of farm produce, slashing.	Engine and tyre	Local	Private

Table 3: Continued

23	Steyr Ursus 4512	N.A	N.A	Yes	Ploughing	250	Transporting of farm produce	Front arm	Local	Public
24	MF 165	N.A	2005	Yes	Ploughing transporting	250	None	Front arm	Local	Public
25	MF 265	N.A	1982	Yes	Ploughing	250	Farm duties, transport of farm produce	Front arm	Local / self	Private
26	Steyr 5312	N.A	2004	No	Ploughing and hire	350	Transport of farm produce and slashing	External parts	Local	Public
27	MF375E	1988	1990	Yes	Ploughing and hire	100	Slashing	Engine and tyre	Local	Private
28	Fiat 780	1972	2003	Yes	Farm duties	150	None	Engine and tyre	Local	Private
29	Europard	2006	2007	No	Farm duties	100	None	Engine and tyre	Local	Private
30	Fiat 666	1978	1980	Yes	Farm duties	140	Slashing	Engine and tyre	Local	Private
31	MF 375E	1988	1990	Yes	Ploughing	100	Transport slashing	Engine and tyre	Local	Private
32	Ford	N.A	N.A	Yes	Ploughing	250	Transport of farm produce	Overheating and hydraulic	Local	Public
33	Steyr 768	N.A	1985	Yes	Ploughing	250	Transport of farm produce	Overheating and hydraulic	Local	Public
34	New Holland	N.A	1999	Yes	Ploughing	250	Spraying slashing and transporting	Damper, lower link and transmission	Local	Public
35	MF 375	N.A	1999	Yes	Ploughing	150	Transport of farm produce and slashing	Oil leaks and tyres	Local	Public
36	Steyr 768	1985	1990	Yes	Farm duties	150	Fertilizer application and transport of farm produce	Tyre	Local	Private
37	Fiat 640	1990	1995	Yes	Ploughing	100	Transport of farm produce	Tyre and injector	Local	Private
38	Fiat 666	1986	1990	Yes	Ploughing	150	Transport of farm produce, hiring	Tyre	Local	Private
39	Steyr Ursus 8075	N.A	N.A	Yes	Ploughing	400	Transport of farm produce	Over heating	T and E, Lagos	Public
40	Steyr 768	N.A	1985	Yes	Hire and ploughing	150	Transport of farm produce and slashing	Over heating	Local	Private
41	Steyr Ursus 8075	N.A	1999	Yes	Hire	200	Transport of farm produce and slashing	Steering	Local	Private
42	MF 375	N.A	1999	Yes	Hire and ploughing	150	Transport and fertilizer application	Tyre	Local	Private
43	New Holland	N.A	1999	Yes	Hire and ploughing	150	Transport of farm produce	Steering and lower link	Local	Public
44	Fiat 8066	N.A	2001	Yes	Hire and ploughing	400	None	Front axle and tyre	Local	Private
45	New Holland	N.A	1998	Yes	Hire and ploughing	200	None	Front axle, tyre injector	Local	Public
46	New Holland	N.A	1998	Yes	Hire and ploughing	250	Transport of farm produce	Front axle, tyre	Self	Public
47	Steyr 5312	1966	2002	Yes	Hire and ploughing	300	Transport of farm produce shelling	Front axle and hydraulic	Self	public
48	New Holland	N.A	1998	Yes	Ploughing and Hire	300	None	Tyre, injector and front axle	Self	public

Table 3: Continued

49	MF 375E	N.A	1995	Yes	Ploughing and Hire	250	Transport of farm produce	Tyre and oil leak	Local	public
50	MF 435	N.A	N. A	Yes	Ploughing and Hire	450	Transport farm duties	Hydraulic pump	T and E Lagos	public
51	Steyr 4512	N.A	N.A	Yes	Hire	400	Farm duties	External parts	T and E Lagos	public
52	Fiat 666	N.A	1985	Yes	Hire	400	Farm duties	Hydraulic pump	Lord mat, Lagos	public
53	Fiat 640	N.A	1985	Yes	Hire	300	Farm duties	Hydraulic pump	Lord Mat, Lagos	public

ploughed about 289 ha/year. Taking an average operation speed of 4 km/hr and a plough width of 1.8m, this comes to 400 hrs per year. A number of factors could have contributed to this low capacity utilization. The main factor being the idle-time of the tractors as it takes some time for the tractor to get repaired once they were unserviceable. Also genuine parts were expensive and not easily available. Sometimes the mechanics used were inexperienced and unreliable, while where expert mechanics were involved; it takes time before responding to customers due to high demand of their services. Also, since the fields were relatively small, it takes time for some of the tractors to move from one field to another in order to plough a sizeable area in a day. Rainfall also contributed to the low output of the tractors, although the level at which this affects their performance cannot be ascertained because records on tractor utilization rate during the rainy season were not kept separately from that of the dry season.

[11], observed that, the cost of operation is high when tractor use is less than 500 hours annually, but reduce very rapidly with usage up to 1000 hours. It is important, therefore, to ensure that tractors were used for about 1000 hours annually. It also shows that most tractors owned by private owners were serviced locally by local mechanics or owners who might have gained experience with time. In the public sector, servicing is done by the owners or experts from Tractor and Equipment or Lordmat, both in Lagos. It shows that the tractor owners from the public sector can afford experts services while those by private owners cannot. Among the 53 tractors surveyed, 24 were owned by private individuals and 29 were owned by people working in the public sectors. Most of the tractors owned by the private individuals were purchased as scraps from the public sector and refurbished. Out of the 22 farms visited, 5 were owned by people from the public sector and the rest 17 were owned by individuals in the private sector. However, more tractors (27) were owned by people working in the public sector than those owned by the private sector, which shows that the public/government has capacity to purchase more tractors at a time than its private counterpart. Although the tractor in the public institution were not well managed since people see it as government property, while the few in the private firm received proper attention and care since the owner(s) are actively involved in the maintenance activities.

Owners Knowledge on Off-season: 70% of the respondents reported that during off-season, income realization is always very low, while 30% said that income is always fluctuating during this season. MF 435 was more suggested for both seasons, although prescribing a certain tractor for a farmer is not as easy as that since ownership depends on the purchasing capability of the individual. The cost of these tractors cannot be actually given, since cost depends on the mode of procurement-whether New, refurbished, second hand or scrap.

CONCLUSION

The study which surveyed the use of tractors and their maintenance as well as the characteristics of the tractor owners revealed that the use of tractor by farmers in Ogun State has grown over the years. Presently farmers have no means of knowing if it is cost effective to own and operate a tractor or not. This is because farm accounts are mixed with other activities such that it is impossible to know the contribution of each entity.

It was found that tractors were old, not well maintained and not fully utilized especially during off-season. Tractor ownership was found to be very low among the youth, also all respondent with degree certificate were found to be managers in the public sector.

It is imperative that the appropriate tractor is selected to suit particular farm size and operational requirement. This option is not available for the private tractor owners in the state; they often buy whatever tractor is available and affordable at that time. And for the public sectors, proper records are not kept and tractors are not properly maintained, even with good finance.

Recommendation: Tractor ownership and utilization at off-season in Ogun State has been examined and assessed. To achieve optimal use of tractors, the following are suggested:

- Encouragement of all year round cultivation with provision of good irrigation system.
- Adequate training of staff involved in maintenance.
- Provision of spare parts and necessary implements, so that tractor can be used for off-season activities.
- Encouragement of youth involvement in agricultural business.
- Encouragement of farm machinery/equipment evaluation and testing center that help with documentation of tractor condition at the time of purchase. The center would evaluate and run test on tractors at farmer's request and give its report for farmers to make informed decisions.
- Establishment of monitoring bodies in the public sector.
- Massey Fergusson (MF 435), was the most suggested model for both season, but where farmer could not afford this, good maintenance of other tractors is recommended.
- Future Agricultural tractor procurement should be based largely on appropriate indigenous demand.
- Encouragement of local manufacturing of spare parts by our research Institutions and local blacksmith.
- Provision of well-equipped workshops.
- Provision of necessary infrastructure such as good roads, dams, electricity to facilitate large scale production.
- Proper records keeping in both private and public organizations.
- Transparently and accountability in the conduct of people involved in tractor business.
- Research aimed at optimal use of the tractors should be stepped up in the state.

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