Nigerian Journal of Technology (NIJOTECH)
Vol. 32, No. 1, March, 2013, pp. 123–128.
 ISSN 1115-8443

A SURVEY OF FARM TRACTOR MANAGEMENT IN ZAMFARA STATE

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Abstract

Maintenance is a key element in the management of any machinery firm. This study addresses the problem of Farm Tractors maintenance in Zamfara State. A survey was carried out to determine the level of agricultural machinery management. Information used was obtained from the State Ministry of Agriculture, State Tractor Hiring and Sales Agency (ZSTHSA), and through personal visits to the 14 Local Government Areas of the State. Data were also obtained from answers to a structured questionnaire, personal contact and oral interviews with the management staff, technical staff, tractor operators and some randomly selected farmers within the State. The obtained data was analyzed using relevant statistical tools. Simple descriptive statistical tools such as averages, percentages were used. The result revealed that the State owned 77 functional farm tractors (60.2% of the total owned farm tractors). Spare parts are not available, owned tractors do not reach their economic life, there is no single fully equipped tractor maintenance workshop in the State, maintenance records are not kept, there is lack of technical knowledge of operating and maintaining tractors, and frequent changes of the managerial staff due to some political reasons and non-adherence to the established government policies. Finally, recommendations were giving that will help improve the machinery maintenance.

Keywords: farm tractor, maintenance, management, mechanization, survey study

1. Introduction

Nigeria is one of the largest countries in Africa. Agriculture is the dominant sector of the nations' economy. 70% of its population are engaged in agriculture directly or indirectly and providing nearly 88% of non-oil foreign exchange earnings. Despite Nigeria's rich agricultural resources endowment, agricultural sector has been growing at a very low rate. Less than 50% of the country's land is under cultivation. According to Odigboh [1] power intensity of 0.4 kW/ha is required nowadays for acceptable levels of agricultural production anywhere. In the developed countries like the USA, they have already reached a level of 0.783kW/ha. As a result of high human power demand for agricultural operations, there is an ever increasing aversion of the youths to the drudgery, indigence and indignity of the old fashioned, muscle-power subsistence agricultures. This led to a continuous decline in agricultural production with an average annual growth rate of 2.5% as against a progressive increase in population which is growing at an average annual rate of 3%, creating an imbalance that continues to widen.

The landscape of agricultural establishments and farmers' homes in Nigeria is 'polluted' by abandoned and broken down agricultural tractors, machinery and tools. The situation is progressively getting worse. The Federal Government, States and other International Donor Agencies continue to import large number of tractors of different types, makes or models in an effort to boost Nigerian agriculture and alleviate the drudgery involved in the hand-tool and draught animal technology. However, a large number of the machines and equipment are lying idle, rusting away as a result of poor management.

Zamfara State has an estimated population of about 3,602,356 people. The state is known to be a wholly agrarian state with more than 90% of the people dominantly engaged in farming activities. "Farming Is Our Pride" is the states slogan. A lot of beautiful programs are being designed with good intention of improving

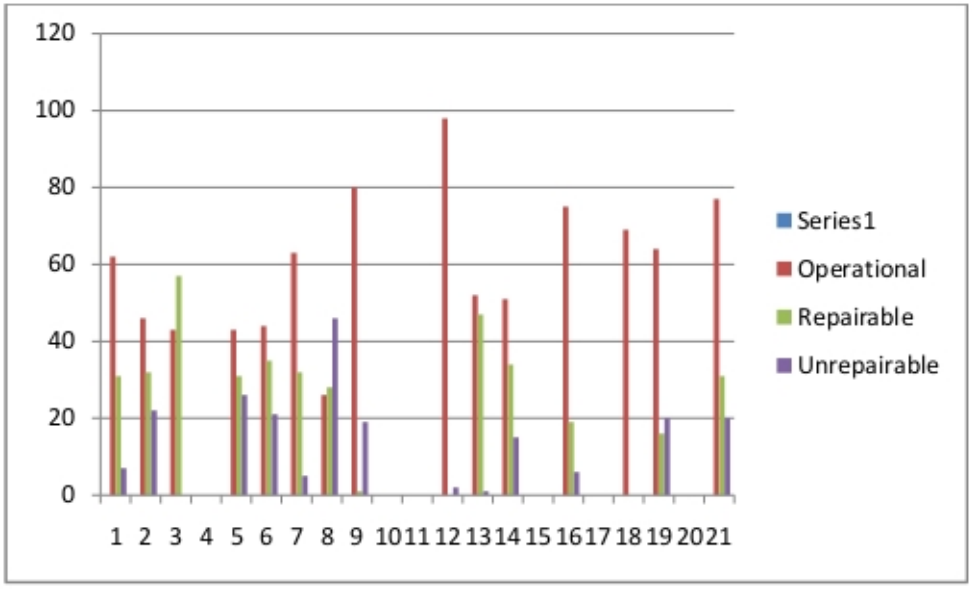

Figure 1: State of four wheel farm tractors in different states of Nigeria.

agricultural production in the State. These include mass importation of different makes and models of tractors and other machinery. However, the State like many other States in the country is seriously facing poor agricultural machinery management. Therefore, urgent action needs to be taken to save a lot of resources and improve agriculture in the State in particular and the country in general. The primary focus of this study is to improve upon the agricultural machinery management and in Zamfara State which will positively enhance the available farm power. Specifically, the objectives of the study are to determine the farm tractor management in Zamfara state and suggest possible ways of improving it.

1.1. Maintenance management

In agriculture, like many sectors of industry, maintenance has been regarded as a necessary evil and often has been carried out in an unplanned and reactive way. Modern management practice regards maintenance as an integral function in achieving efficient and productive operations [2]. Ikiriko, et al [3] defined farm machinery maintenance management as the application of maintenance management principles in agricultural mechanization. Farm tractor is an important source of farm energy and power for mechanization of farm operations [4]. According to Chukwu [5], an agricultural tractor is precision machinery in which a large amount of money is invested. It is capable of working long hours under adverse conditions if certain precautions are taken. These precautions are often referred to as preventive maintenance. The effective use of farm tractor and equipment largely depend on the quality of maintenance and repair.

1.2. Objectives of maintenance

The need for maintenance of tractors and its power units in agricultural mechanization is self evident. Without maintenance the tractors and equipment used will not survive over the required life of the system without degradation or failure. The design and operation of a maintenance system must usually meet one of two objectives.

- Minimize the chance of failure where much a failure would have undesirable consequences (e.g. reduced safety or environmental damage).
- Minimize overall cost or maximize overall profit of an operation. This requires striking a balance between the cost of setting up and running the maintenance operation and savings generated by increased efficiency, prevention of downtime, etc.

1.3. Potential benefits of planned maintenance

- Reduced maintenance costs in the long term,
- Reduces machinery and equipment failures,
- Significantly reduces downtime caused by failure,
- Increases life of machinery and equipment,
- Improves the performance of machinery and equipment,
- Improves utilization of people,
- May meet legal requirement (for example, health and safety) [6].

1.4. Maintenance of agricultural machinery in Nigeria

Maintainability of any farm machinery or equipment is a parameter that minimizes the down time of such machinery or equipment. Maintenance is often influenced by the skill of the operator, repair expertise and the comprehensiveness of the repair and maintenance outfit [7]. Machinery breakdown in Nigeria was said to be very high and that with the high cost of maintenance, no repair is carried out promptly once the tractor or machine breakdown [8]. Most of the machinery in Nigeria becomes malfunctioned in the first one or two years of operation. The result of this poor maintenance yielded high percentage of about (90%) of tractors breakdown yearly in some states. The repair and maintenance constitutes 47.7% of the total operating cost [8]. The gravious influence of high breakdown on the general agricultural production systems is a common knowledge [9]. A national survey study was carried out for the Federal Department of Agriculture (FDA) in an effort to assess the condition of agricultural machines with a view to initiating a rehabilitation program. The result yielded a scaring result as can be seen in Table 1. Poor field condition is identified to be the principal cause of breakdown of machinery in five states of Nigeria (comprising of Abia, Imo, Rivers, and Bayelsa). In Ogun State the principal cause of farm tractors and equipment breakdown is associated with poor adjustment and operation. The graph in figure 1 shown below indicates the state of four wheel drive farm tractors in different states of Nigeria. The numbers 1 to 21 on the y-axis refer to the states as shown in table 1.

Table 1: State of four wheel tractors in different states in Nigeria.

S/No	State	Percentage by Condition		
		Operational	Repairable	Unrepairable
1.	Anambra	62	31	7
2.	Bauchi	46	32	22
3.	Bendel	43	57	0
4.	Benue	-	-	-
5.	Bornu	43	31	26
6.	Cross River	44	35	21
7.	Gongola	63	32	5
8.	Imo	26	28	46
9.	Kaduna	80	1	19
10.	Kano	-	-	-
11.	Kwara	-	-	-
12.	Lagos	98	0	2
13.	Niger	52	47	1
14.	Ogun	51	34	15
15.	Ondo	-	-	-
16.	Oyo	75	19	6
17.	Plateau	-	-	-
18.	Rivers	69	-	
19.	Sokoto	64	16	20
20.	FCT	-	-	-
21.	Zamfara	77*	31*	20*
	Average	58	28	14

- Data not available. Source: [9].

2. Materials and Method

A survey work was adopted in this study to determine the agricultural machinery management level in Zamfara State. The main sources of information for this research were obtained from the State Ministry of Agriculture, State Tractor Hiring and Sales Agency (ZSTHSA), and through personal visits to the 14 Local Government Areas of the State. Further data were obtained from answers to a structured questionnaire, personal contact and oral interviews with the management staff, technical staff, tractor operators and some randomly selected farmers within the State. The data collected was analyzed with relevant statistical tools. Simple descriptive statistical tools such as means, percentages were used in analyzing the data obtained.

3. Results and Discussion

Results shown in Table 2 is the summary of data obtained in the study.

From the result obtained in Table 2 above, 76% of the respondents agreed that the tractors available in the State (government owned) were suitable to the environment. Physical survey found out that there were different makes and models of tractors available in the state, this makes maintenance difficult. State of the available farm tractors in the state are shown on figure 2 below. Availability of spare parts for proper maintenance of the available tractors is of paramount important so that reliability, efficiency and long life of the tractors can be achieved. The study conducted revealed that such spare parts were not available on the ground. Standard equipped workshops for the maintenance of tractors and other machinery are not available. This makes carrying out of maintenance activities impossible. A good way to ensure that all maintenance operations for the tractors are performed on schedule is by keeping records. It was found that such maintenance records were not available or kept.

4. Conclusion and Recommendations

4.1. Conclusion

In conclusion the following were found out: Despite the fact that the State is an agrarian state with over 90 per cent of the total populations in Zamfara State being farmers, yet the Agricultural Mechanization level is very low. The State has a reasonable number of government owned functional tractors, yet it

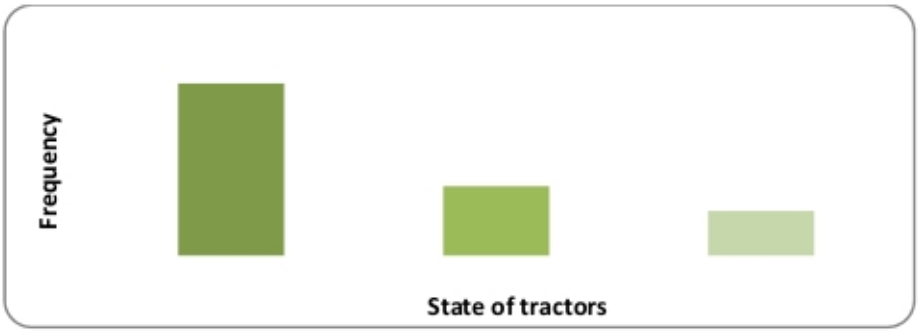

Figure 2: States of available tractors in the state.

was proved that there is low level of Agricultural Tractors and Machinery Management with lack of proper Record Keeping for the maintenance operations, lack of equipped standard workshops and qualified personnel to operate and maintain the tractors and machinery as major hindrances.

4.2. Recommendations

Based on the findings and conclusion of the study, the following recommendations are made:

1. Due to high cost of tractors, and other agricultural machinery, it is highly recommended that effort should consciously be made to see that such expensive machinery are properly managed.
2. Government should establish a reasonable number of well equipped standard workshops with qualified trained personnel to handle the tractors and other owned machinery maintenance at different locations in the State.
3. Tractor Operators should be updated in the operation and maintenance of the new makes and models of the purchased tractors in the State.
4. The record keeping for activities relating to tractor and other machinery operation and maintenance should be computerized to overcome the drudgery involved in the manual way of using logbooks or service board.

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Table 2: Summary of Data on Tractor and Machinery Management in Zamfara State.

S/No.	CHARACTERISTICS	FREQUENCY	PERCENTAGE (%)
1	Tractors available in the state(Public)		
	Functional tractors	77	60.2
	Non functional but repairable	31	24.2
	Scrap	20	15.6
		128	100.0
2	Tractors Suitability to the environment		
	Suitable	76	76.0
	Not Suitable	24	24.0
		100	100.0
3	Equipment Suitability to the environment		
	Suitable	25	25.0
	Not Suitable	75	75.0
		100	100.0
4	Availability of Spare parts		
	Available	7	07.0
	Not Available	92	92.0
		100	100.0
5	Offering of After-sales Services by dealers		
	Yes they offer	0	0.0
	No they dont offer	100	100.0
		100	100.0
6	Tractors Reaching Economic life span of 10-15years		
	Yes tractors reach economic life span	0	0.0
	No they don't Reach their economic life span	100	100.0
		100	100.0
7	Equipped standard Workshop for Tractors' Maintenance		
	Available	0	0.0
	Not Available	100	100.0
		100	100.0
8	Adherence to the Maintenance schedule		
	Adhere to	0	0.0
	Not adhere to	100	100.0
		100	100.0
9	Tractor Maintenance is carried out by		
	Company Mechanics	0	0.0
	Contractors/Roadside mechanics	100	100.0
		100	100.0
10	Keeping of Tractors' Maintenance Records		
	Records are kept	0	0.0
	Records are not kept	100	100.0
		100	100.0
11	Preparing of Tractors and for storage at end of day's job		
	Tractors are Prepared	0	0.0
	Tractors are not Prepared	100	100.0
		100	100.0
12	Preparing of Tractors and for storage at end of Season		
	Tractors are Prepared	0.0	0.0
	Tractors are not Prepared	100	100.0
		100	100.0

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S/No.	CHARACTERISTICS	FREQUENCY	PERCENTAGE (%)
13	Availability of Adequate Shade for Tractors' storage		
	There is Available Shade	0	0.0
	Adequate Shade not Available	100	100.0
		100	100.0
14	Possible Cause(s) of Tractors' Early breakdown		
	Lack of Proper Maintenance	0	0.0
	Technical-Know-how	0	0.0
	Operators' Carelessness	0	0.0
	Unfavourable Weather	0	0.0
		100	100.0
15	Staff Motivation Through:		
	Promotion/Salary Increase	0	0.0
	Staff Training	0	0.0
	Allowances/Bonuses/Gifts	0	0.0
		100	100.0
16	Attending Professional Training by Staff		
	Staff Attend Training	83	83.0
	Staff do not Attend Training	17	17.0
		100	100.0
17	Type(s) of Training given to Staff		
	Formal (School)	0	0.0
	Informal (Apprentice, Workshops, Seminars etc.)	0	0.0
		100	100.0
18	Frequency of attending Training		
	Once a year	0	0.0
	Twice a year	0	0.0
		100	100.0
19	Educational Qualification		
	1st Degree, its Equivalent and above	10	10.0
	Diploma/NCE	17	17.0
	Certificates	6	6.0
	GCE and its Equivalent	8	8.0
	Trade test	15	15.0
	Primary Leaving Certificate	20	20.5
	Adult Education	24	24.0
	None	0	0.0
		100	100.0