



Investigation into Problems of Farm Tractors Repair and Maintenance in Oyo State

Lawal BM¹, Olaoye IO^{1*}, Ibrahim SO¹, Lasisi D², Sansui BA¹, Ashiru AR¹

¹Department of Agricultural and Bio-Environmental Engineering, The Polytechnic Ibadan, Ibadan, Nigeria

²Department of Agricultural and Bio-Environmental Engineering, Oyo State College of Agriculture and Technology, Igbo-ora, Oyo State, Nigeria

Abstract An investigation into the problems of farm tractors repair and maintenance general problems encountered by the tractor's operator and mechanics in some selected local government in Oyo State. The study was carried out by means of structured questionnaires administered to various tractors owner establishment including local governments and by conducting a pre and post visit and personal interview with the tractor owners, operators and mechanics. Observation was also done on the condition of tractors in the visited places and finding of the study revealed the numbers of functioning, serviceable and not functioning tractors of the percentage 53.08%, 18.48 and 28.44% respectively. Based on the finding, the study recommends among other things that regular maintenance culture, qualified staff recruitment, retraining and motivation; upgrading of workshop facilities and establishment or encouraging local fabrication, adequate records and stock should be encouraged.

Keywords

Introduction

Oyo state is an inland state in south-western Nigeria with its capital at Ibadan. It is bounded in the North by Kwara state, South East by Osun state and West partly by Ogun state and Republic of Benin. It covers approximately an area of 28,455 square kilometers and is ranked 14th by size. The climate is equatorial, notably with dry and wet season with relatively high humidity. Agriculture is the main occupation of the state and the climate favours crops like maize, millet, rice, yam, cassava, plantains, cocoa, palm produce, and cashew just to mention a few. There are numbers of government farm settlements in Ipapo, Iloro, Eruwa, Ogbomoso, Iresaadu, Ijaiye, Akufo and Lalupon. Power is useless without means of applying it and machines are useless without power to run them. Therefore, these two closely phrases of agricultural engineering which embody the farm equipment industry, are logically grouped together. Since, human muscles as sources of power in agriculture will not bring appreciable increase in the country's agricultural production, and since the power source is very slow, ineffective and insufficient, there is need for mechanization. The use of motorized machines for farm work started with the advent of steam engine in the early nineteenth century and since then gradual development as lead to use of internal combustion engine. Although tractor being the most expensive implements but prone to tear and wear, it is the prime mover for other implements. As a result of high cost of tractors and implements, equipment ownership is mainly by government through the ministries of agriculture and lately by departments and parastatals whose mandate involves substantial land clearing and development. In order to make the services available to the farming populace who are not economically strong to acquire the equipment, special units were established and referred to as tractor hiring units.



Tractorization forms integral parts of mechanization and it involves the use of tractors to carry out major farm operations like ploughing, harrowing, ridging, planting and the likes. Thus, there is an urgent need to improve the level of tractor utilization by farmers across the state. To achieve this, tractors have an adequate knowledge and skill in tractor operation and maintenance, in order to minimize the frequency of tractor breakdown. More so, tractor itself is a very costly machine that worth millions of naira hence, needs to be operated by trained operators, as tractor operation with different implements requires special knowledge, skill and training. Any country that is unable to skills and knowledge of its people, and utilize them effectively in the national economy would be unable to develop anything else. There are frequent like breakdown, high incidence of un-serviceability, unavailability of spare parts, handling from unskilled operators and technicians, old age of tractors and lack of agricultural workshops and tools and insufficient experts or technicians. Farmers do not really appreciate the prime importance of systematic attention to care and maintenance of their tractors and implements. The tractor must be properly maintained and serviced before it could be assured that its operation will be economical and avoidance of overloading with implements, which could lead to premature wear, reduced life span and accident can all be reduced. All these can be achieved if there is adequate technical-know-how. Owing to the importance of timeliness of operations in obtaining high yields, machinery breakdown especially at busy period such as sowing or harvesting that can lead to large losses of revenue quite apart from the cost of repairing the equipment. If estimates could be made of when equipment is likely to fail, this would assist in planning machine purchases and spare parts inventories and reduce cost

Materials and Methods

Materials

This project was designed to collect qualitative and quantitative data on the problem encountered on the repair and maintenance of farm tractor in some selected local government area in Oyo state. Majority of the respondents are male and above 30years of age. The response received was recorded while data collected from the organization were later analyzed. The following local government area from the Agricultural zones of Oyo state were selected as a case study; Saki West, Ibarapa central, Afijio, Oyo West, Ogbomosho North, Egbeda and Akinyele Local government areas. Personal interview were also conducted on the problems encountered in the repairs and maintenance of farm tractors in Oyo State. Respondents provided the information freely and well presented.

During the visit with the farmers, it was observed that most of the tractors were grounded at their packing area; some of the tractors are serviceable while some are half dismantled and packed under no shed, which will likely be affected by the effect of climatic conditions, such as rain, sunlight and humidity.

The questionnaire was divided into two parts A and B. part A is one the nature of the organization involved while section B is on the various faults, the repair and maintenance problems experienced and their likely causes, how daily and periodic maintenance as scheduled and carried out on each tractor, mode of training given to the operators and mechanics and their educational level and acquired skills.

Methodology

The methods used in the research work include;

- i. Survey of the study is done through the distribution of questionnaire, then conducting a pre and post visit and personal interview with the tractor owners, operators and mechanics.
- ii. Sampling and collection of data which prove to be instrumental for sampling make of tractor, various types of tractor faults experienced, maintenance culture, mode of training and their academic qualifications.
- iii. Data analyzes from the retrieved questionnaire through a descriptive statistics.

To improve the quality of the research work, interview was conducted for the mechanics that directly involve in the repair and maintaining tractors and operators that are operating those tractors. In the area used as a case study area and their response were documented and compared with the information given in the questionnaire. Some of the questions asked include the following; different make of tractors, tractor faults and their likely



causes, how often the maintenance are conducted, mode of training, availability of standard workshops, tractor operator's and technician's technical know-how, availability and cost of spare part
Results obtained from the survey were analyzed using descriptive statistics which will reflect the respondent's frequency of occurrence with cross tabulation of the response. Descriptive statistics was used to analyze the data collected.

Results

Section A of questionnaire shows the economic and social characteristics of the respondents which include name of establishment, location of establishment, academic qualification, tractor ownership, the hectares at which an establishment cultivates yearly, while section B includes the various faults, the repair and maintenance problems experienced and their likely causes, how daily and periodic maintenance are done, mode of training, availability of standard workshop, tractor operators and technicians qualification, availability and cost of spare parts and make of tractors used by an establishment.

The results obtained in this study are as presented in Table 1 to 5.

Table 1: Common faults and their likely causes on farm tractors

Faults location	Common faults	Likely causes	Frequency
Engine system	Water leakage into the sump. Compression loses. Damage to sump crankcase dilution	Burst gasket and bad sleeve rubber. Improper timing and faulty oil pump, low oil, low tractor clearance and rings	Occasionally
Steering system	Stiffness of the steering. Bad. Front hub bearing. Bad front axie spindle	Low fluid and block filters. Rough road and No grease. Inadequate greasing and maladjustment,	Occasionally
Cooling system	Overheating	Blocked fins, damage fan, fan belts Radiator and radiator. Hose blocked, Low level, faulty water pump	Always
Front types	Rapid laceration of tyres. Burst and punctured tyres. Punctured Tubes, Torn tyres	Altered alignment starches, root always and stony soil, badly prepared land, bad and rough roads	Always
Transmission system	Burst or worn clutch, plate and disc. Seized release bearing, clutch disc fingers, faulty clutch assembly	Overloading by pulling load heavier than the engine capacity. Riding on clutch pedal and oil slippage in the system. Inadequate greasing maladjustment and wear of components.	Occasionally
Fuel system	Faulty fuel pump, damage fuel pipes, faulty injector pump and nozzles, Blocked lines and loss of power.	Lack of regular maintenance, uses of contaminated fuel, un-filtered fuel into the tank, inadequate service.	Always
Hydraulic system	Faulty hydraulic ram low pressure in the system, bad hydraulic pump blocked filters fatness of hydraulic kits. Leakage of hydraulic oil.	Overloading of the system, use of wrong oil, leakages, low oil and improper setting, lack of regular maintenance, seizure of pump due to dirt, worn "O" rings, seal or damaged hydraulic pipes.	Occasionally
Brake system	Brake failure	Low brake fluid worn brake disc mal-Adjustments.	Occasionally



Table 2: Comparison between private and government workshop staff strength

	Establishment Numbers of Tractor	Numbers of Operator	Numbers of Mechanics
Government	31	48	29
Private	180	309	89
Total	211	357	118

Table 3: Sources of Spare Parts

Sources	Number of Respondent	Distribution (%)
Accredited Dealer	15	12.9
Unaccredited Dealer	60	51.7
Local parts Dealer	30	25.9
Local fabricator	11	9.5
Total	116	100

Table 4: Training Exposure of Technicians

Numbers of years in service	Number of respondent	Trained	Untrained
0-15	30	10	20
Above 15	75	31	44
Total	105	41	64
Expression (%)	100	39.04	60.95

Table 5: The Status of the Tractors as From 1999 to 2011

Type of tractor	Functioning	Serviceable	Not functioning	Total
Styer	26	8	15	46
Mersey ferguson	34	10	16	60
David brown	12	10	14	36
Fiat	10	6	14	30
New Holland	10	1	--	11
Eicher	2	--	--	2
Mahindra	5	--	--	5
Ursus	13	1	--	14
Universal	--	2	--	2
John deere	--	1	1	2
Total	112	39	60	211
Expression (%)	53.08	18.48	28.44	

Discussions

The maintenance and repair problems of the tractors in the visited areas were analyzed to know causes and their possible solution.

However, from the result, it was deduced that lack of maintenance and lateness in carrying out maintenance paved way for serious tractor breakdown.

The result of the final analysis has prompted me to divide this chapter into various sub-sections. This is categorized according to the topic of the main project under discussion and the result findings according to the response of the people interviewed and questionnaire responded to.

Tractor maintenance

Agricultural tractors are playing crucial roles in mechanization of farms in tropical and sub-tropical country. As a result of this it must be properly maintained with reference to the manufacturer's specification and instruction manual which usually detailed what should be done and the precise interval for any particular make and model.



Regular routine servicing, maintenance and adjustment are essential task in obtaining good performance and long life from a tractor. It is one of the expenses which have to be melt, though the benefits are felt in long rather than short term.

Modern tractors are also fitted with a tachometer which records the number of hours the engine operates. The working hours are used as a basis for determine when attention is necessary, but most tractor in the places visited where not having there tachometer functioning.

General maintenance of Tractors

The daily maintenance is the most important maintenance observes by most of the tractor operators, though they are not thoroughly carried out. These required checking of the crankcase, oil level, radiator and battery level plus the tyres pressures, greasing of certain point under dirty condition and attending to the air cleanse. Some nuts, bolts and hose clips should also be tighten. Only few of this daily maintenance were usually attended to by the operators due to their level of education and ignorance.

Other maintenance jobs of weekly, monthly and periodically were not followed until when there is a sign of possible breakdown or a change in the engine usual noise or when the thickness of the crankcase oil is noticed.

The annual or end of the season maintenance jobs/culture was not carried out as specified by the manufacturers. The tractors in the most places visited were packed openly without shed and may not be attended to, until they are ready for a new cultivation season.

Causes of Improper Maintenance

Saddled with purchase of agricultural equipment is the responsibility to maintain them for the best performance. The frequent breakdown and poor condition of tractors has been caused by a number of factors which include; handling and laziness on the part of operators and mechanics, poor maintenance, inadequate supervision, and attention, lack of routine servicing and maintenance culture, inferior spare part, badly prepared land, over loading of the tractors and due to some contractors that are not trustworthy in the maintenance and repair work done because of the consciousness for the money involved. It was discovered that the afford mentioned factors caused almost 80% on the breakdown on tractors in the places visited.

Lack of Fund and High Cost of Spare Parts

Provision and delay in supply of funds has been one of the most problem affecting adequate maintenance of farm machines in most of the government establishment in the state. Also the rate at which the price of spare parts and other equipment are inflating is too high compared to some years back due to the foreign exchange involved since most agricultural parts and equipment are imported.

Lack of Repair Facilities and Condition of Workshops

Most of the area visited lacked modern repair facilities and standard workshops. Some have class "A" workshops, while others do not have more than what can be regarded as local or tractor shed. The numbers of qualified mechanics and technicians are not enough and so much cannot be achieved as only one mechanic may be attending to eight or more tractors in most cases.

Various special workshop tools are needed to replace obsolete and local ones, some workshops are handicapped by lack of electricity while intermitted current supply hinder work in some places.

Sources and Constrains in Procuring Maintenance and Service Parts.

Sources may be by importation from the other part of the world, through cannibalization and also it may be through innovations. i.e. production of fabricated prototype of the damaged parts for the replacement of worm or damaged parts. Both genuine and fake parts are in circulation in Nigerian markets and this can be both accredited and unaccredited dealers as shown in table 4. A good number of the tractors grounded in most places visited were as a result of difficulties encountered in getting spare parts since some were actually either outdated or out-modeled.



Cannibalization

The removal of one part from the tractor believed to be faulty and expected part procurement to rehabilitate another one, as lead many machines to become un-contaminated and un-repairable that they were usually sold out in scrap in most of the establishment in the state.

Records and Stock Keeping

Record and stock keeping has been the maintenance schedule problem of most of the area visited in the state. Ignorance in record keeping in the private sectors has been attributed to their level of illiteracy and professionalism in the field and in some government establishment where records are kept, they were inadequate as some keep records through their monthly reports.

Some parts stock keeping operated in most sectors were not adequate enough. Most stock are not equipped with not more than 28% genuine part, 35% locally fabricated part and 40% scrap part.

Operators Limited Education, Training and Skills

Some of the operators that employers thought were trained were not, but just self-trained by apprenticeship. In some of the places visited, the operators are well trained but not competent due to their poor level of education, most of them were employed with primary school living certificate and modern three certificates. Some are with craftsman training certificate obtained from mechanization school, Fashola, Oyo.

An operator is expected to be able to read the manufacturer operators instruction book with understanding and have enough technical skills to maintain, handle some repairs and minor adjustment on both the tractor and implement in case of an emergency on the farm (i.e. technical know-how).

Mechanics/Technicians Limited Education, Training and Skills

In order to be able to carry out any maintenance or repairs on many machines, the mechanics or technician must first have experience in identifying faults and the reason for them. The troubleshooting list in addition to test the performance of the system will provide with series of resources of correcting the faults.

However, lack technical know-how, illiteracy, ignorance and inexperience on the part of the mechanic/technician cause serious difficulties in obtaining positive results on the problems as most of them could not comprehend and follow the manuals regarding to operations. Some of the mechanics were technical school product while most were primary school leaving certificate holder and training by apprenticeship.

There is no external training given to most of the mechanics in the government establishment due to lack of fund but some introduced annual in-service training for the mechanics to acquaint them with the problems emanating and how to solve them. Table 5. Shows the training exposure of technicians after their employment.

Contravening of Manufacturer's Recommendations

A good number of places visited do not follow the manufacturer's instruction and the use of ignorance on their side, with percentage proportion of 30% and 70% for those that follow the manufacturer's recommendation and those that did not follow the manufacturer's recommendations respectively.

Most of the hiring sectors are concerned with the revenue generated during the season, forgetting to carry out the periodic maintenance until serious breakdown emanates. Poor supervision and inadequate record keeping also lead to the contravening of manufacturer's recommendation.

Administrative procedures

Prolong administrative procedures is one of the problems associated with most of the places visited. This causes delay in carrying out the maintenance on time.

During the course of the administrative procedures, an increase in the spare part price may be effected that will lead to abandoning of the job and gives room for cannibalization that will definitely turn the tractor to a scrap.



Maintenance, servicing and repair costs

Maintenance cost of any establishment includes some small fixed charges for insurance, housing, utilities and the charges for repairs, spare parts and servicing, which vary with the usage of machine and tend to increase steadily as it grows older.

The accurate estimates of repair costs and revenue generated are not easily obtained from the respondents in fairness to official secret.

The study shows that the cost of charges of the hiring unit depends on the high cost of maintenance and repairs and the labour charges vary from one establishment to another.

The cost of repairing a tractor is not comparable with the revenue generated in most of hiring sectors let alone the private owned sectors. It was gathered that government is highly subsidizing the cost to encourage farmers in the government established hiring unit of the state.

Handling of maintenance culture

Bad handling of maintenance culture causes breakdown of most machines. This is usually due to poor handling of machines by the mechanic. Settled mind and high concentration is needed, so that one would not miss the important things to do which may in turn causes damage.

Damage parts have to be washed or cleaned for clear seen of the places to be repaired. A mark could be given to each part so as to know the procedure of the dismantling when assembling is to be done.

Comparism between the maintenance procedure of private and government establishments.

The maintenance procedures in most of the private establishment keep a proper maintenance of their farm machines/tractors in compare to the government establishments.

The administrative procedure involved in releasing fund for the procurement of the maintenance and servicing parts and the delay in carrying out this maintenance work is not as that of the government sectors, that is why the private sectors have a good numbers of functioning tractors and their revenue generated is much more higher than the government owned establishment in the state.

Most government establishment have high repair and maintenance cost because they usually give out their repair job out as a contract in consciousness for money from such a contract.

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