



Impact Assessment of the Causes and Prevention of Farm Accidents on Mechanized Farms of North Central Zone/States of Nigeria

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Abstract

Accidents occurring on mechanized farms have been a thing of concern to farmers and researchers both within and outside Nigeria. An investigation into the causes and prevention of farm accidents on mechanized farm was carried out in Benue, Federal Capital Territory, Kwara, Nasarawa, Niger and Plateau states that constitute the north central zone/states of Nigeria. The data collection instrument was a questionnaire designed and distributed to all the states mentioned. The questionnaire addressed demographic variables and issues linked directly with the types, causes and prevention of farm accidents. A total of 2283 tractors were available in the mechanized farms surveyed, while a total of 1014 constituted other farm machinery/equipment. Results show that 81.7% of accidents victims are male. About 45.5% of the accident victims were aged between 40years and above. About 33.96% of the minor accidents resulted in slight damage to equipment and machinery. Similarly 43.4% of accidents resulted in substantial loss in time, while about 22.64% of accidents resulted in medical attention. There was no attempt made to quantify the monetary terms of the cost of each accidents, as there was dearth of information. The results obtained in this work are in agreement with the previous studies both outside and inside Nigeria. Also, from this survey work, there was a problem of good record keeping in most of the establishment surveyed. It is therefore, recommended among other things that adequate training and retraining of tractors/machinery operators should be carried out periodically, to intimate operators on recent use of farm equipment due to environmental and human factors

Keywords: Impact assessment, causes, prevention, accident, mechanized, farm and Nigeria

Introduction

Farm accident is defined as any thing unpleasant or damaging which happens unexpectedly or by chance that result in injury, loss of life, property damaged, time loss and tangible loss as a result of operating farm machinery (Yisa 2001, Yohanna 2004 and Adamade 2007). They further stated that farm accident can be referred to as all incidental occurrence related to agricultural activities such as snake bite, bee invasion, fire outbreak, chemical explosion on the farm or workshop, drowning in a farm dam, falls, recreational, immunological disease etc. land communal crises resulting to agricultural land resource damage could be referred also to as farm accidents (Yohanna 2006).

In recent times accidents occurring in the farm have been a major concern to farmers and researchers in the developed world (Yisa and Terao, 1995; Yisa, 1996 and Adamade 2007). To buttress the importance of farm accidents several studies were carried out to determine the sources of frequent injuries in farming communities. It is also noted that there

are more accident deaths on agriculture than in any other major industry, and farm mechanization activities are the source of the majority of accident in farming (Jain and Rai 1992).

Agriculture is the mainstream of any developing nations. In most areas of the developing world especially the Sub-Saharan Africa, agriculture remains the Africa largest sector and dominates the economics of most of the rural areas of the countries. In Nigeria, in order to bring these areas into an economically fit condition for crops and livestock production, varieties of mechanical operation have been performed. It is through this occupational hazard of farm operations that accidents come to exist. This development has brought about an increase in the cases of accidents through the use of farm tools, tractor and other machinery. It is a well known fact that the bulk of agricultural production in the developing countries is in the hands of the small holder farmers whose depend very much on hand tools with

very low mechanical advantages. These peasant farmers with limited capital resources are important clients for new technological development for the purpose of increasing basic food crops. These give rise to the need to survey the extent of farm accidents and their prevention in various means of farm operations (Yohanna 2006, 2007 and 2011).

Anyone who operates mechanized farm equipment must make many decisions and perform many functions to ensure that the machine performs properly. The demand for more decisions may result in mistakes that lead to serious accidents (Kepper *et al.*, 1980). In a typical Nigeria farm, a wide range of accidents is possible as a result of the poor state of infrastructures supporting mechanized farming and the absence of requisite skills in some instances. The accidents range from snake bites, fire disaster, field and workshop accidents (involving machinery), bees attack and poisoning attack from agro-chemicals etc.

The objectives sought in writing this paper are as outlined as follows:

- i) Survey and assess the various forms/source of farm accidents in Nigeria using the north central zone/states as a case study;
- ii) identify the causes of farm accidents in mechanized farms and
- iii) to suggest the safety measures and prevention of farm accidents and its contribution to farming in Nigeria.

Methodology (materials and methods)

Due to the enormity of work and resources required to conduct a research to cover all spheres of farm accidents in Nigeria, this research was limited mainly to accidents occurring on mechanized farms. Similarly due to the size of

the country, the research was conducted in the North Central zone/states of the country. This zone represents a major agricultural region of the country. The study area comprises of Federal Capital Territory, Benue, Kwara, Nasarawa, Niger and Plateau states. The method of obtaining information was through oral interview and questionnaire made of seventeen (17) questions. One hundred and fifty (150) questionnaires were distributed randomly to the study area but one hundred and twenty (120) representing 80% were retrieved for analysis. The oral interview was mainly for those who are not educated. The questions were being read to the respondents, if necessary additional explanation of the questions was given in the local language. Where the physical evidences of accidents exist, they were noted for further analysis.

The data were obtained through the general characteristic of respondents by demographic properties. These socio-economic data include inventory of tractors, genders age and description of farm accidents such as causes, types and costs of accidents. It was analyzed by simple descriptive statistical means, percentages and tables were obtained accordingly.

Results Presentation and Discussion

The results obtained from oral interview and the questionnaire is presented in tables 1 to 7. The data were analyzed through the general characteristics of respondents by demographic properties of interest were the inventory of tractors, gender, age and description of accidents. These include causes, types, cost and prevention of accident and analysis of the extent of damage from 120 questionnaires from the six (6) states.

Table 1: Inventory of tractors and other machinery in the study area

Items	Benue	Nasarawa	Plateau	FCT	Kwara	Niger	Total
Tractors	474	504	405	324	216	360	2283
Other equipment	276	108	72	216	123	219	1014
No. of accidents with tractor	18	06	12	-	08	10	54
Total No of accidents	48	48	42	42	24	31	235

Source: Field survey 2007 – 2011

Table2: Sex distribution of accident victims in percentage

Sex	Benue		Nasarawa		Plateau		FCT		Kwara		Niger		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Male	38	79	48	100	28	58	38	91	36	75	40	87	228	81.7
Female	10	21	-	-	20	42	4	9	12	25	6	13	52	18.3
Total	48	100	48	100	48	100	42	100	48	100	46	100	280	100

Source: Field survey 2007 – 2011

Table3: Age distribution of accident victims in percentage

Age of victim	Benue		Nasarawa		Plateau		FCT		Kwara		Niger		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
15 – 29	18	37	19	40	18	37.5	15	35.7	14	29.2	24	55.8	126	39.2
30 – 39	6	13	4	8	7	14.6	3	7.2	9	18.8	13	30.2	42	15.3
40 and above	24	50	25	52	23	47.9	24	57.1	25	52	6	14	127	45.5
Total	48	100	48	100	48	100	42	100	48	100	43	100	295	100

Source: Field survey 2007 – 2011

Table 4: Distribution of cost of accidents

Effects of accidents	Benue		Nasarawa		Plateau		FCT		Kwara		Niger		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Time loss	30	71.4	36	50	30	62.5	6	25	16	33.33	20	32.26	138	43.4
Property damage	-	-	30	41.7	12	25	12	50	30	62.50	26	41.94	110	33.96
Medical attention	12	28.6	6	8.3	6	12.5	30	35	2	4.17	16	25.8	72	22.64
Total	42	100	72	100	48	100	48	100	48	100	62	100	320	100

Source: Field survey 2007 – 2011

Table5: Causes of farm accidents

Causes of accidents	Benue		Nasarawa		Plateau		FCT		Kwara		Niger		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Tractor failure	18	37.5	24	50	18	37.5	-	-	18	37.5	20	46.5	98	34.83
Implement failure	6	12.5	24	50	24	50	20	45.5	12	25	4	9.3	90	32.05
Others (environmental, human factors, improper operation of equipment)	24	50	-	-	6	12.5	24	54.5	18	37.5	19	44.2	91.5	33.12
Total	48	100	48	100	48	100	44	100	48	100	43	100	219.5	100

Source: Field survey 2007 – 2011

Table 6: Farm accident types

Accident type	Benue		Nasarawa		Plateau		FCT		Kwara		Niger		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Tractor failure	18	30	6	14.3	12	18.2	-	-	18	37.5	12	19.36	66	21.83
Tractor implement system failure	-	-	6	14.3	30	45.5	6	25	10	20.83	8	12.9	60	19.84
Implement failure	6	10	-	-	24	36.3	6	25	2	4.7	16	25.81	54	17.86
Tools failure	18	30	6	14.3	-	-	-	-	-	-	4	6.45	28	9.33
Environmental failure	18	30	24	57.1	-	-	12	50	18	37.5	22	35.48	94	31.15
Total	60	100	42	100	66	100	24	100	48	100	62	100	302	100

Source: Field survey 2007 – 2011

Table 7: Types of farming

Type of farming	Benue		Nasarawa		Plateau		FCT		Kwara		Niger		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial	72	60	36	30	48	40	84	70	56	46.7	76	63.3	372	51.67
Subsistence	36	30	24	20	48	40	24	20	34	28.3	32	26.7	198	27.50
Peasant	12	10	60	50	24	20	12	10	30	25	12	10	150	20.83
Total	120	100	120	100	120	100	120	100	120	100	120	100	720	100

Source: Field survey 2007 – 2011

Table 1 shows the inventory of tractors and equipment and accidents in the studied area. A total of 2283 tractors were available in the mechanized forms surveyed. Other machinery including ploughs, harrows, ridgers, trailers, incl-

uding planters/drills etc were 1014 from the six (6) states surveyed. Of the 235 farm related accidents recorded for the study area, 54 involved tractors showing that tractor

utilization is more pronounced than other equipment (Yisa, 2001 and Yohanna, 2004).

Table 2 shows the sex distribution of victims of farm accidents. Apart from Plateau state, there were more males victims than their female counterpart. On the whole 81.7% of the victims of farm accidents in the study area were male workers which the females workers constituted 18.3%, this agrees with the work of Yisa 2001, that more men are involved in the operation of farm machinery than the women.

Percentage of age distribution of accidents victims are as indicated in table 3. 45% accident victims were aged between 40 years and above which may be due to year and psychological weakness from aged, tireless farming, and about 39.2% of the victims were aged between 15 – 29. This may be from lack of safety consciences and careless handling of farm machinery and tools by the young aged farmers. The 15.3% accident victims were aged between 30-39 years. The low percentage here indicates that this aged group of farmers is self-conscienced of accidents while working on the farms.

The table 3 clearly shows that majority of the farmers involved in accidents are aged at 40years and above followed by the young early age at the onset of introducing themselves with farming activities.

As shown in table 4, it was discovered that the establishments under study never kept records of the cost of accidents in monetary terms. There were problems of how to document this vital aspect of the study. It was then decided that accidents be classified in terms of those resulting in time loss, property damage, medical attention and intangible loss (deaths). Based on this classification, the highest number of accidents (45.75%) resulted in time loss followed by property damage with 33.96% and medical attention with 22.64% in this order as there was no case of death reported.

The percentages of the causes of farm accident by the various farm implements and other factors as outlined in Table 5. 38.83% of the accidents were from tractors failure, 32.05% were from implement failure. 33.12% were from other factors such as environmental, human factors, improper operation of equipment due to ignorance or lack of resources to keep the equipment technically fit for operation. Environmental factors include immunological diseases such as rhinopharyngitis, a typical asthma resulting from inhaling agricultural dust. There are negligible traces of tractor failure in federal capital territory which is in agreement with the work of Yisa 2001 though he stated that this is rather high and unparalleled.

An overview of the nature of the accidents recorded with area under study is as shown in Table 6. Environmental

condition related accidents were present in increasing order of Benue state 30%, Niger state 35.48%, Kwara state 37.5%, FCT 50% and Nasarawa state 57.1% being highest, accounting for 94 (31%) of the 302 accidents recorded. There were negligible environmental related accidents in Plateau state. 22% and 20% of the accidents were due to tractor failure and tractor implement system failure respectively while 18% and 9% were due to implement and tools failures respectively.

The type of farming performed by the farmers on the study area is shown in Table 7. A total of 51.67% of the farmers in the surveyed areas engaged in commercial farming, 27.5% in subsistence farming and 20.83% are peasant farmers. This shows that Nigerians have greatly in farm mechanization as well as use of farm machinery. This also implies that Nigerians famers have been relieved of about 50% from drudgery of using crude tools for farming. Again the Nigeria farmers are not only faming for their immediate family alone but to earn income and supply the entire nation with agricultural products, raw materials for our industries and possibly for export.

Causes of Farm Accidents in Mechanized Farms

In the course of this survey, it was discovered that accidents on the farm arise from different factors such as absence and lack of safety consciousness by operation, environmental factors, in adequate training and education and mechanical failures.

Absences and lack of safety consciousness by operators

Some operators are not safety conscious in handling mechanized equipment, this manifesting in their careless attitude, improper operation of the equipment and exceeding the capability of the equipment. Farm accidents resulting from mechanical failures and environmental conditions may be prevented by the development of safety habits and following the general safety precautions. Operating and equipment or tractor without proper maintenance is yet another explanation of the inadequacy of safety consciousness by operators. Research findings showed 80% of tractor operators experienced hot water scalding on their faces as a result of cooling system problem from sudden opening of an overheated radiator cap while the system is hot (Atanda, 2004). According to the same source, 48% experienced dangerous turning leading to head on collision with incoming vehicle on high ways. Driving a tractor at night without light on is a typical example of how carelessness leads to accidents. Also driving a tractor on 3 wheels even when the front is punctures without vulcanization can lead to accident (Yohanna 2010). Yisa (2001) found that 50% of operators exceed the capability of equipment.

Environmental factors

These factors are topography, rainfall, fire, snake bites etc. and are not directly controlled by man. About 82% accidents are caused by snakes, bees and other harmful insects attack while moving inside the bush for operation, while 88% were reported to have experienced deep cuts on their body (Atanda, 2005).

Lack of training and education

This caused as a result of inadequate training of operators due to low level of education attained. This problem affects most of the tractor operators. Skills, knowledge and attitude must be developed and inculcated on regular basis so that the capacity of the operators does not fall behind requirements or they do not forget safety requirement as the need arise. Regular assessment of the competence level of the operators to perform the tasks involved in making effective use of equipment would bring to the fore gaps that need to be bridged through training. There is also need for quality education in the universities, polytechnics and other institutions so that adequate manpower is developed for the replacement of those who are aged and exiting employment as operators.

Mechanical factors in machine

Brake failure is a common cause of this type of accident and other mechanical faults occur at times when machine have exceeded their recommended span. This also may occur due to shortage of fund to buy spare parts or replace the entire faulty systems.

Hydraulic lift failure in tractors moving on the highways with implement attached could create collision with vehicle among at the rear such as other tractor thereby causing serious accidents.

Mechanical failure in machine can be due to ignorance or lack of resources to keep the equipment technically fit for operation.

Impacts of accidents on mechanized farms

Injuries sustained by field workers have adverse effects on the productivity of the entire agricultural industry (Atanda, 2005). This impact is realized through the curtailment of the injured workers activities, even when slight injuries occurred. In course of this survey, it was discovered that establishments never kept proper records of the impact of accidents in monetary terms, which is a vital aspect that needs to be looked into as it is through collecting and analyzing such information that future occurrence can be prevented. Impacts caused by accidents either on the operators, establishment or on the equipment or tractor are classified in terms of accidents resulting in time loss, property damage medical attention and entangle loss. Entangle loss cannot be quantified as it results into deaths of the person causing damages to the establishment. It is noted

that most accidents occurrences involved males between the ages of 15 – 29 years, which is the prime age for the development of critical mass of the need work force in the agricultural sector (Yisa, 2001). The same source added that about 45% of accidents result in property damage, 30% resulted in time loss, 21% resulted in medical attention and 2.67% deaths.

Prevention of Farm Accidents In Mechanized

Farm accidents can be minimized and/or prevented in mechanized farms by applying the following recommendations.

Safety and occupational hazards education should be included in the curriculum of primary, secondary and tertiary institutions where agriculture is taught as a subject.

Proper inventory and record keeping of tractors, other farm machinery accident cases use of lubricant, hour of walk, tools, spare parts, fuels etc. should be kept by farm managers.

Adequate budgetary allocation for maintenance and purchasing of spare parts, provision of all necessary safety apparels for operators during field operation should be ensured by the farm machinery managers.

Electronic and printed media should create awareness among the public on the immediate and remote benefits of safety and occupational hazard in the farm and accomplish by agricultural extension agents.

Medical insurance scheme at a very high subsidized rate should be introduced in Nigeria to cater for medical treatment of the farmers occupational hazard.

Adequate training, retraining and education of tractors/machinery operators and mechanics should be carried out periodically, to intimate operators on recent use of farm equipment which in turn would reduce the occurrence of accidents on the farms.

Conclusion

Farm accidents are caused and are costly due to inadequacy of training and retraining of operators and mechanics, inadequate knowledge in the use of the equipment, low literacy level, lack of proper maintenance of tractors/implements. If the above prevention measures are duly followed then there will be a drastic reduction in accidents cases on mechanized farms. Safety cannot be compromised for the vain pursuit of economic gains. The management of mechanized farms and the workers therefore must not because of the quest to earn more money from the use of this equipment ignore the requirements as demanded by makers for safety.

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