INVESTIGATION OF FARM ACCIDENTS IN ADAMAWA, BAUCHI, GOMBE, JIGAWA, BORNO AND YOBE STATES.

BY

ABDULKADIR K. MOHAMMED
MATRIC No. 96/5036EA

DEPARTMENT OF AGRICULTURAL ENGINEERING
FEDERAL UNIVERSITY OF TECHNOLOGY
MINNA.

MARCH, 2002

INVESTIGATION OF FARM ACCIDENTS IN ADAMAWA, BAUCHI, GOMBE, JIGAWA, BORNO AND YOBE STATES.

BY

ABDULKADIR K. MOHAMMED
MATRIC No. 96/5036EA

BEING A FINAL YEAR PROJECT SUBMITTED IN PARTIAL FULFILMENT FOR THE AWARD OF BACHELOR OF ENGINEERING (B.ENG.) AGRICULTURAL ENGINEERING. FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA.

MARCH, 2002.

CERTIFICATION

This is to certify that this project was carried out by Abdulkadir K. Mohammed in the Department of Agricultural Engineering, Federal University of Technology, Minna.

1. ENGR (DR) M.G. YISA
SUPERVISOR — 14/04/2002 DATE

2. ENGR (DR) DONALD ADGIDZI
HEAD OF DEPARTMENT — 25.04.2002 DATE

3. EXTERNAL EXAMINER
Dr. O. J. MUDIARE — 17/4/02 DATE

DEDICATION

I dedicate this project to Almighty Allah and my parents, Alhaji Abdulkadir Gimba and Hajiya As'mau Abdulkadir Gimba.

ACKNOWLEDGEMENT

Praise be to Almighty Allah, the Lord of heaven and earth for making it possible to get to this stage of my academic pursuits.

I appreciate the tireless effort of my supervisor Engr. (Dr) M.G. Yisa inspite of his tight schedule for assisting me to accomplish this project work and the head of department Agricultural Engineering Department. Engr. (Dr) Donald Adgizi.

I also appreciate the effort of the entire staff if Agricultural Engineering department for their moral and academic support during my academic pursuit in the department.

My profound gratitude goes to my Aunt Hajiya Rabi Aliyu for her kind gesture, also my thanks goes to my Siblings Isa Abdulkardir, Tijani, Abdulmalik, Abubakar, Yusuf, mamman, Larai and Asebe.

I want to acknowledge my friends and well wishers which a could not name due to time and space constraints for their support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Research study was carried on farm accident in Adamawa, Bauchi, Gombe, Borno, Jigawa and Yobe States. This was achieved with the aid of questionnaire and oral interview, which data were collected and analyzed. The questionnaire contains two sections. Section A give the background information of establishment visited with total of 15 questions while section B with 29 questions which gives detail description of farm accidents. Findings show that the most common factor associated with nature of accidents is human factors, which is the major cause of farm accidents recorded 32.76 percent of the total accident, exceeding the limit of the equipments recorded 30.89%, while carelessness of operator account for 17.89% terrain factors, environmental factor; exposure to chemicals and equipments mishandling account for 15.93%, 12.53%, 6.40% and 3.79% respectiely. Safety precaution should be observed when operating farm machines and equipment.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

In many parts of the development of crops and livestock is increasing and this as a result of population growth in geometric form while food production is growing in arithmetic form as it was proved by Malthusian theory. Due to this problem, people look for ways of improving for production to sustain the population. This brought the idea about mechanization of farming systems and has proved interesting interms of increase in food production but every technological development has it own side effects. For example, cases of tractor accident during operation such as tractor overturning. This problem of accident needs to be addressed to reduce it to its bearest minimum in the country.

However, investigation of farm accident have started going on in the country before I felt to contribute by investigating farm accident in North-eastern part of the country; Bauchi, Gombe, Adamawa, Borno, Yobe and Jigawa states.

Already, Joshua in 1997 investigated farm accident in Kwara, Niger, Kaduna States and federal capital territory. In 1998 Akin Olusoji investigated farm accident in Ogun, Ondo, Oyo, Osun Ekiti and Lagos states, also in 1999 Onyejiaka H.O investigated farm accident in South eastern part of the country and Abubakar Sadiq Mohammed in 2000 investigated farm accidents in Kebbi, Sokoto, Katsina, Kano, and Zamfara states. At the end of investigation of farm accident in to country as a whole, it will give government insight on the causes of farm accidents and it effects in the country's economy.

At the end of this investigation of farm accident in the country as a whole, it will give government insight on the causes of farm accidents and it effects in the country's economy.

During investigation research, I visited some establishment including both private and government owned in order to have detailed information in farm accidents, These are: -

Bauchi State Agricultural development project, Bauchi State ministry of agriculture and National resources, National Agricultural Land Development Authority Bauchi. Gombe state ministry of Agriculture and natural resources, Gombe State Agricultural Development Authority, Bauchi, local government Agric department, National Agricultural Land Development Authority. Gombe, Gombe local government agric department, Adamawa Agricultural mechanization authority Yola, upper Benue River Basin Development authority

Yola, Savannah Sugar Company Numan, Borno State Agricultural mechanization authority. National Agricultural land development Authority Maiduguri, Yobe State Agricultural mechanization Authority, Damaturu, National Agricultural land development authority, Dutse, Jigawa State Agricultural and rural development Authority Dutse, Jigawa local government Agric department.

1.2 Statement of problem

It has been observed that every technological development usually has its side effects. The use of farm machinery and equipment on small and large-scale mechanized farms has been registering some form of farm accidents like minor or severe injury permanent disability and death. Enormous resources are lost to expenses on medical treatment, lost of properties and the extent of the damage has been subject of discussion in academic and professional circles because it has tremendous effects on the economy of the nation.

1.3 Aims and Objectives

1. To study the nature and causes of farm accident
2. To study the damage done to nation's economy
3. To recommend ways of reducing farm accident to its bearest minimum

1.4 Justification of result

The result obtained from this research study will be justify by helping the machine and equipment operators to be aware of the mistake and look for ways of improving in the corpses which will help in reducing farm accident cases. It will also help machine and equipment owners to know their lapses interms of carrying out repair and servicing and how it affect the machine and equipment. The farmers and equipment users are included interms of benefit, because it will educate them on how to carry out precautionary and safety measures in using machine and equipment, which prevent occurrence of farm accident.

CHAPTER TWO

1.0 LITERATURE REVIEW

2.1 Definition

An accident is anything, which happens by chance, anything occurring unexpectedly and indesignedly. The term accident can be further defined as when something and unfortunate that happens and often leads to discomfort injury or death.

Dictionary of Agricultural and food processing engineering defines an accident as;

1. An unplanned but not, necessarily damaging event, which interrupts the completion of an activity.
2. An injury-requiring medical cares or loses of one half day or more time.

Farm accident is therefore an unexpected situation or even that occurs therefore of the use of operation of farm machinery (tractors, implements, processing machines, tools e.t.c).

However, all accidental occurrences related to agricultural activities such as outbreak of fire (Fire hazard), chemical explosion on the farm or at workshop, snake bites, bees invasion, drowing in water, tractor overturning e.t.c are regarded as farm accidents.

Farm accident may be fatal resulting in death or machinery handlers (operators), passengers or pedestrian or rather minor, or when it is not so serious enough to cause substantial hardship.

2.2 Review of accident cases

It is clearly understood from reports that guide substantial high figures of death Records have been associated with agricultural mechanization activities. From the previous research studies, it was found that falls from trees, fire outbreak and drowing in Farm River have been major sources of farm accidents.

There are no upto date records of farm accident in Nigeria. Farm settlements or agricultural establishments unlike road accident, which could be easily obtained from Federal Road Safety Commission. Most accident occurrences are dreadful, accident resulting from the use of farm machinery to result in killing of operators or being disabled and precious time is wasted in righting the equipment.

Tractors accidents are inform of overturning which mostly occurs on sloppy areas and they are of two types.

1. Loss of stability: - This occurs when tractor losses its center of gravity of stability, and it overturns directly.
2. Loss of control: - This occurs when a tractor runs out of control completely before overturn ing, which is mostly side ways. The most common overturning accident estimated to be about 70% of the total accident due to overturning as reported by Yisa and Terao (1995).

Investigations on farm accident reveals that accidents do occur on farms, during transit, in the workshop and as well in Farm Rivers inform of drowing as explained by Jain and Rai (1981). It is reported that a proportion of victims of farm accidents are young people (between 10 and 30 years) representing a substantial percentage of our country's population and which constitute greater loss to the country's economy (Jain and Rai 1981).

Jain and Rai (1980) also explained that Nigeria give little attention to farming than industrial works. Farm accident prevention would have been greatly reduced if people around farming areas could be made concerned with safety in farm operations.

Another important source of farm accidents is little or no preventive maintenance of farm machinery and implements. The operators and equipment handlers do not give significant attention to maintenance of farm machinery and implement, which have been causing reasonable number of farm accidents.

2.3 Farm safety attitude and accident involvement.

Safety educators have often linked safety attitudes and attitude and safety behaviour. Stresser et al (1964) noted that attitudes helped control human activties and, therefore, determined whether a person would react to a particular set of circumstances in a safe way. Worick (1978) has written has everything we know about accidents leaded to the conclusion that faulty habit and attitudes are the prime accident producers. In addition, in his discussion of human factors and safety education, Wahl (1977) noted that attitudes are the most important factor among knowledge, skill,habit and attitudes.

The safety problems of farmers have also been well documented. Routine chores injure thosands-many seriously each year. Tractors turn over and crush the operators. Farm men, women and children become caught in the moving parts of machine. Kepner et al (1972)

wrote "Technological advances has greatly reduced man's physical burden through the use of machines, but man's mental work had been increased. The man who operates modern farm equipment must make many decisions and perform functions to use the machines properly. The demand for more decisions may result in mistakes that lead to serious accident".

Hazards brought on by nature are intimately interwined with the physical hazards of farming. Delays in tillage, planting and harvesting due to rain, snow and droughts often pressure the farmer into hurriedly completing his work, multiplying the unsafe shortcuts he will attempts. However, the pressures exerted by nature are not the only pressures, which compound the farmers dangerous work environment. There are pressures from our society at large. Jepsen (1976) has noted that society has come to expect a farmer to be tough, self-made, independent and rugged individual. Using safety equipment and following practices goes against the grain of many of these individuals.

2.4 Farm accident characteristic

The characteristics are informed of age of operators, experience of the operators, the level of training and education.

2.4.1 Age

The majority of the tractor accidents were caused by person between the ages of 15years and 19years, followed by those in the (20 – 22)years. They also noted that inexperience or reck lessness or combination of the both were the reasons for the higher risk with young operators and found by Baillie and Grevis James (1970).

Gadala (1962) also carried survey and he discovered from his survey that people of group ages or 20 to 30 had the highest accident rates. In 1067 – 68, analysis were made by Hofmeister and Pfister (1969) accident in Michigan State for farm family members. The result to obtain shows that accident rates for the 5 to 14 years old were high.

2.4.2 Experience

In 1000 tractors accidents deaths, 95% of the operators involved had about a year driving experience, 63% of the fatal accidents were due to poor or ignorance of the danger involved as States by Siggs and Huang (1968).

2.4.3 Training and Education

Most farmers and operators are not educated and trained formally which inturn brings about high risk of accident involvement. Hansen (1966), stated that accidental injuries and fatality rates could be reduced by educating the farm machinery and equipment handlers.

Mcfarland and Moore (1964), compare the safety record of trained drivers and intainned drivers. Based on 1226 accident, which occurred during 300 drives' months, they stated that the untrained drivers had double the number of accidents the trained drivers had in both sexes and in different age group.

2.4.5 Alcohol and drug

The claim that alcohol and drug consumption are related to accidents has an intuitive appeal which is supported by evidence of varying types and quality, In the work place prohibition against the use of alcohol on the job or during work hours is common. Alcoholics have anywhere between two and three times the accident rate of others employees (Pell and D'Alonzo, 1970, 1973, Maxwell, 1959)

Pelz (1976), cifies official national West Germany statistics that represent alcohol as a contribution or major cause of industrial accidents in (7 – 10)% of all cases. Other studies have implicated alcohol in fatal industrial or other work place accidents at a much higher rate echoing mannello and Seaman's report by safety officers that alcohol, as a cause of such injuries is grossly underestimated.

2.5 Report on tractor accident case studies

A case of a tractor accident with front leader, which was used to lift and move a tree trunk, overturned side way, as the tractor was being trune down trill on slope of 8% (50). This happened because of the failure of three trunks to have been lifted centrally on the front loader, but rather balances with its center gravity towards one side as reported by Owen and Hunter (1983).

Joshua (1997) reported that a two-wheel driver tractor driven at night without neither headlights nor trafficator during the operator's journey from farm where they are where head collision between the tractor and on coming 18 wheel truck with fertilizer. She reported that one of the victims died with others seriously injured. She also reported that the accident

occured due to negligence of operator to drive in the night with headlights, which is human factor.

Statistical References of Accidents

Table 1.0 Work accidents: Death and Injuries, 1975 (Death rates representing death per 10,000 workers).

Industry group	Number	Death	Disabling Injuries
Traede	1,200	6	380,000
Manufacturing	1,500	8	450,000
Service	1,800	9	420,000
Government	1,700	12	320,000
Transport and Public utilities	1,600	33	190,000
Agriculture	2,100	58	200,000
Construction	2,200	61	200,000
Mining Quarrying	500	63	40,000
All industries	12,600	250	2,200,000

Source: National safety council facts, USA 1976

In work accident statistic, it is clear that the death rate is small compared to the other forms of accidents. This is achieved due to the fact that safety precautions are obeyed and highly well organize in major companies thus, workers are less exposed risk. from the table above Agriculture ranks the third number of deaths

Table 1.2 Tractor overturning accident according to accident cause.

S/No.	Catergory	Cause		Number	%
1	Tractor related i.e tractor limitation exceed ed	Stability loss			
		i)	Slope exceed the angle	95	17
		ii)	Speed high	56	10
		iii)	Ground rough	34	6
		iv)	Control loss	125	22
2.	Driver related	Drivers misjudgement		145	26
3.	Miscellaneous	Raised cause but including traffic accident (28) and driver less tractor (37)		105	19
	Total			**560**	**100**

Source: Owen and Hunter (1983)

From the above table it is clearly seen that driver misjudgement has the highest number of accident causes.

CHAPTER THREE

3.0 MATERIALS AND METHODS

The method used in collectrion of information presented in this study is called Investigation Survey research approach (ISRA). This includes questionnaire and oral interview. I also made use of information obtained from books, pamphlets and journals.

3.1 Areas visted for investigation

Bauchi State, Bauchi state ministry of Agricultural and Natural resources, Bauchi Sate Agricultural development project (B.A.D.P), National Agricultural Lands Development Authority (NA.L.DA) Bauchi and Bauchi Local Governmennt Agric. Department.

Gombe State, Gombe State Ministry of Agricultural and Natural Resources, Gombe State Agricultural Development project (G.S.A.D.P), National Agricultural Lands Development Authority (NALDA) Gombe.

Adamawa State, Adamawa State Agricultural mechanization Authority (A.A.M.A) Yola, Upper River Benue basin Development Authority Yola, Savannah sugar company Numan.

Yobe State, Yobe state Agricultural Mechanization Authority (YOSSAMA) Damaturu, National Agricultural Lands Development Authority (NALDA) Damaturu and Damaturu Local Government Agric. Department.

Jigawa State, Jigawa State Agricltural and Rural Development Authority, National Agricultural Land Development Authority (NALDA) Dutse, Jigawa State Ministry of Agriculture and Natiional Resources

3.2 Instrumentation

The major instrument used in collecting information and data for this study is questionnaire and oral interview. Other means like interaction with some professional and experiened operators that have their own agricultural machinery/equipment establishment also contributed immensely in providing information.

3.3 Method of data collection

The questionnaire used for the investigative survey research study is, made up of two sections (A and B). The first section (section A) consists of background information of respondents. The preliminary surveys of inventory of agricultural machinery equipment in use in the establishment visiting during the course of administering the questionnaire. This background information include the following.

i) Age of respondent
ii) Education qualification
iii) Sex of respondents
iv) Year of working experience

and that of the estabishment take this form

i) Geographical location
ii) Name of establishment
iii) Major operations of the establishment
iv) Number and types of Tractrors in the establishment
v) Types of other machinery/equipment in the establishment
vi) Establishment ownership

Section B of the questionnaire are questions in detailed description to find the following

i) Nature of farm accidents and their gravity (major or minor)
ii) Cause of such farm accident registered
iii) Level of training of machinery/equipment handlers
iv) Establishment attempt to prevent/minimize occurence of accident
v) The form when the establsihment suffers the consequence of accidents
vi) Frequency of occurence of accident

3.4 Procedure

The total of two hundred and forty (240) questionnair were prepared by the researcjer and distributed out to both government and private agricultural machinery/equipment establishments in six (6) states. The total of one hundred and fifty seven questionnaire were completed and returned for analysis.

The researcher personally administred the questionnaire and as effort was intensified I have the most of the questionnaire returned this gave him the chance of interacting with the respondents and eye witnesses to obtained facts about accidents.

Interview

In order to supplement the questionnaire, oral interview was considered to be of important and will help to get more information from eyewitnesses who could not be given questionnaire. They provide information about how such accident occurs and what was the cause of accident. The interview conducted which provides enough information on farm accident occurence.

3.5 Problems encountered and how they were solved

At the time I administered the questionnaire, feul scarcely had gone to its apex in the North-eastern part of NIgeria. Transport fare has increased drastically because people were travelling for both Edil fitr and Christain festivals. Thus, unreadiness of respondents to give me response led to number of problems. Carelessness of handling of questionnaire by respondents and problem of respondent returning the questionnaire on time made the researcher to spend unecessarily and wasting of precious time in some Areas.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter focuses onm the detailed analysis of data collected from the various establishment visited during the course of the research studies. It also has statistical method i.e (Tables and graphs) as tool to explain the detail of the analysis of farm accident.

The analysis is based on the general characteristics of the farm accidents e.g

(1) Types of farm accidents
(2) Causes of farm accidents
(3) Major or minor damages on done as a result of farm accidents
(4) It also talk about operators working experience

4.1 Farm Accident Statistics

The result obtained from the various establishments visited in the six states are based on the responses given, which depends on the questionnaire and oral interview from the professionals in the field and farmers.

Table 4.1.1 Accidents Within the States

State	Estimate of farm machinery/implement and equipment in use	Total number of farm accidents cases recorded	Total number of people killed	Accidnet rate per death
BAUCHI	635	119	3	40
GOMBE	443	113	2	57
ADAMAWA	1275	244	4	61
BORNO	871	116	2	58
JIGAWA	305	106	4	26
YOBE	525	100	3	34

Table 4.1.1 shows that the highest number of registered farm accidents cases was recordeed in Adamawa State with 244 fata cases and accident rate by death of 61, followed by Borno State with 166, and accident rate per death 58, while Bauchi State recorded 119, and 40 Gombe State has 113 and 57 Jigawa State, with 102, 26 and Yobe State has least with 100 and accident rate per death is 34.

Table 4.1.2 Classification of farm accidents per state

State	Number of fatal accident record	Perce-ntage (%)	Number of severe cases	Perce-ntage (%)	Number of minor cases	Perce-ntage (%)	Number of people kiilled
Bauchi	4	7.78	17	13.93	95	14.73	3
Gombe	9	15.25	12	9.84	62	12.71	2
Adamawa	29	49.15	49	40.16	179	27.75	4
Borno	12	20.34	21	17.21	134	20.78	2
Jigawa	3	5.08	12	9.84	74	11.47	4
Yobe	2	3.39	11	9.02	81	12.56	3
Total	**59**	**100**	**122**	**100**	**645**	**100**	**18**

Table 4.1.3 Age of farm accident victims

Age of Victims (Years)	BAUCHI		GOMBE		ADAMAWA		BORNO		JIGAWA		YOBE	
	No	%	No	%	No	%	No	%	No	%	No	%
Und. 20	31	26.3	16	26.2	14	14.1	17	22.4	5	12	3	5.7
21-30	65	55.1	17	27.9	39	39.4	25	32.9	22	51.2	27	50.9
31-40	13	11.0	24	39.3	32	32.2	27	35.5	15	34.9	21	39.6
Above 40	9	76.3	4	6.6	14	14.1	7	9.2	1	2.3	2	3.8
Total	**118**	**100**	**61**	**100**	**99**	**100**	**76**	**100**	**43**	**100**	**53**	**100**

From the above, the highest number of accidents fatality recorded is Adamawa State with total of 29 cases, followed by Borno state 12, Gombe State 9, Bauchi State 4, Jigawa State 3, and Yobe State has the least 2. This high number of fatality recorded in Adamawa State might due to high use of farm machinery and equipment those establishment in the state like AFCOTT Nigeria limited, Savannah sugar company Numan Upper Benue River Basin Development Authority yola, and Adama State Agricultural mechanization Authority. It means the people are more in to agricultural establishment. This establishment use farm machinery and equipment than other States, which means they are at accident risk than other states.

Table 4.1.5 Farm Accident Mortality Indices

AGE GROUP	10 – 20	21 – 31	31 – 40	Above 40
MORTALITY INDEX	1.85	5.25	1.69	-

Using the mortality index

$$mI = \frac{F_g \times K}{S_g \times T_f}$$

Where, mI = Mortality index

F_g = Total number of fatalities for the age group in question

S_g = Span of the fatalities age group given in years

T_f = Total number number of fatalities

K = A constant = 100

And already from the T = 59

for group A (10 – 20) years

$$mI = \frac{12 \times 100}{11 \times 59} = \frac{1200}{699} = 1.85$$

Group B (21 – 30) years

$$mI = \frac{31 \times 1000}{10 \times 59} = \frac{3100}{590} = 5.25$$

Group c (31 - 40) years

$$MI = \frac{10 \times 100}{10 \times 59} = \frac{1000}{590} = 1.69$$

From table 4.15, the mortality indices of age group 21 - 30 years has the highest farm accident mortality index of 5.25, followed by age group of 10 - 20 years with mortality index of 1.85 and the groupof 31 - 40 has the least, with mortality index of 1.69. The age group of 40 and above is not included because most of them are not all that involved in farm machinery operations.

Table 4.1.7 Types of farm Accidents

Types of accident	Bacuhi		Gombe		Adamawa		Borno		Jigawa		Yobe		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Tractor/equipment failure	1	1.33	-	-	1	0.83	2	2.29	-	-	-	-	4	0.89
Tractor implement failure	-	-	-	-	2	1.65	1	1.149	-	-	2	26.77	5	1.01
Workshop tools and other field machinery	53	70.67	40	68.97	89	73.55	66	75.86	39	57.35	46	61.33	333	67.4
Environmental conditions	21	28.00	18	31.03	39	32.23	18	20.69	29	42.65	27	36.00	152	30.8
TOTAL	75	100	58	100	121	100	87	100	68	100	75	100	494	100

Table 4.1.7 shows the nature accident of farm accident, which is based on fatal cases, severe cases and minor cases. Fatal cases recorded a total of 58 victims with average of 9.67 per state, the total number of victims in severe cases raise up to 122 with average of 20.33 per state and minor recorded the highest among the three with total number of 644 and average of 107.3 per state.

Table 4.1.8 Causes of farm accident

Cause	Bauch	Gombe	Adamawa	Borno	Jigawa	Yobe
Environmental factors (such as rainstorm, windstorm, sunray, flooding cloud) division topography) e.t.c	12	9	21	13	8	11
Terrain factor (such as slippery ground or surface pot holes, bend corners, inadequate signs, poor drainage) e.t.c	38	17	40	21	14	13
Machanic/Vehicle factor (such as overloading beyond capacity, tire burst, blown out rear whell, weak and worn-out fasteners, inadequate routine/ periodic maintenance worn-out threaded tyres)	12	9	32	25	16	14
Human factor (such as drugs, negligence alchol, sleeping fatigue, cutting corner, exceeding the limit, wrong parking signaling poor visibility) e.t.c	13	8	27	17	12	19
Exposure to chemicals, explosive and others	7	4	11	10	5	9
Total	82	47	131	86	55	66

Table 4.1.8 shows that Terrain factors has the highest number of accident cases with total of 143 cases representing 30.6% of the total cases, while machine/vehicle factor has recorded total of 108 cases with 23.1% of the total and human factor recorded 20.6% of the total accident cases. It implies that the total accident cases for it is 96. Environmental factor came fourth with total cases of 74, that is, 15.86% of the accident. And finally exposure to chemicals, exposures and others has a case f 46 representing 9.9% of the total accident.

Table 4.1.9 Analysis of major causes of farm Accident in the six States

Causes	Bauchi		Gombe		Adamawa		Borno		Jigawa		Yobe	
	No	%	No	%	No	%	No	%	No	%	No	%
Human factors	37	23.87	22	21.15	45	18.44	34	24.82	26	32.50	18	39.13
Environmental factor	19	12.26	9	8.65	34	13.93	27	19.71	4	5.00	3	6.52
Exceeding the limitation of the equipment	32	20.65	30	28.85	42	17.21	21	15.33	16	20.00	19	41.30
Terrain factors	24	15.48	17	16.35	40	16.39	19	13.87	13	16.25	9	41.30
Exposure to chemicals	9	5.81	4	3.85	27	11.07	7	5.11	2	2.50	-	-
Carelessness of operator	31	20.00	17	16.35	38	15.57	26	18.98	19	23.73	6	13.04
Total	155	100	104	100	244	100	137	100	80	100	46	100

Table 4.1.9 shows that major causes of farm accidents is human factor with total 182 cases which represent 23.76% of the total major causes, followed by exceeding the limitation of the equipment with total of 160 cases which shows 20.89% and carelessness of operatord, Terrian factor, environmental factors and exposure to chemical have 137, 122, 96 and 17.89%, 15.93, 12.53, 6.40% respectively. Mishandling of equipment show the least the number of accident cases with 29 cases and 3.79%.

4.2 Case Study

Some memorable accidents that occured on some of the areas visited during the research study.

Case (1) one Malla Saidu Suleiman was using tractor to pluogh a farm land in Bauchi Local Government of Bauchi State. In the process the tractor lost control and ran into high tension electric pole, which felt on the tractor and as a result, Mallam Saidu Suleiman died to electric shock.

Cases (2) the Gombe State Agricultural development project was using their bulldozer to clear 9 site for agricultural purpose, in the process of turning the bulldozer ran into parked Toyota Hilux van belonging to the same establishment which the van was completely damaged.

Case (3) in Jigawa Stat, a case of flood was reported to have rendered people in many communities homeless and which it claim 60 lives in this last raining season.

Case (4) Canoe carrying 50 people was crossing river Benue for harvesting of Sugar cane beets in Savanah Sugar Company in Numan Local Government of Adamawa State. The canoe was attacked by Hippopotamus and as a result of the attacked two people was drowned and the hippopotamus killed seven people.

Case (5) Mallam Abubakar Yakubu was working with lathe machines in the workshop of upper Benue river basin development when finger tips mistakenly cut into the deeding part of the lathe machine, his finger tips was completely cut off.

4.2.0 Comparatively Analysis

This is has to do with comparing the results obtained from the Noprth east zone with those results obtained from previous four zone earlier treated. This comparative analysis will aid in showing the nature, types and cause of farm acidents and the impact in this five zones. It will also help in finding out possible measures and propósed ways of reducing farm accident in Nigeria to it bearest minimum.

4.2.1 Comparative anaysis of farm accident in North-east, North-west, South-east, Middle belt and Western zones of this country (Nigeria).

this analysis based on ages of farm accident victims, type, causes and nature of the farm accidents. The results are shown in tables below respectively.

Table 4.2.1 Comparative analysis on Age of victims in the six zones

Age of victimes (years)	Average		Average		Average		Average		Average	
	No	%	No	%	No	%	No	%	No	%
Under 20	81	18.20	226	33.68	10	19.23	2	3.77	-	-
21 -30	195	43.82	260	38.75	21	40.38	24	45.28	-	-
31 - 40	132	29.66	162	24.15	18	38.46	27	50.94	-	-
Above 40	37	8.31	23	3.43	3	5.78	-	-	-	-

Table 4.2.2 Analysis on types of farm accident in the six zones.

Types of Accident	No	Average % total Northeast zone	No	Average % total Northwest west zone	No	Average % total South eath zone	No	Average % total Middle belt zone	No	Average % total western zone
Tractor equipmeny failure	4	0.8	4	0.53	14	3.12	14	30.43	8	17.78
Tractor implement failure	5	1.0	8	1.19	29	6.46	11	23.91	12	26.67
Environmental conditions	333	67.4	677	88.96	243	54.12	1	2.17	2	44.44
Workshop tools and field machinery	152	30.77	72	9.46	163	36.30	20	43.48	23	51.11

Table 4.2.3 Comparative analysis of causes of farm accident

Causes	No	Average % total of North-east zone	No	Average % total of North-west west zone	No	Average % total of South-east zone zone	No	Average % total of middle belt	No	Avareg % total of western zone
Human factors	182	23.48	72	7.96	7	13.21	24	44.44	15	28.30
Carelessness of operator	96	17.68	224	24.78	23	43.40	12	22.22	10	18.87
Environmet factors	96	12.39	224	24.78	21	39.62	17	31.48	21	39.62
Exceeding the limitation of the equipment	160	20.65	224	24.78	2	3.77	1	1.85	4	7.55
Terrian factors	122	15.74	146	16.15	-	-	-	-	-	-
Exposure to chemicals. explosive and agrochemicals	49	6.23	14	1.55	-	-	-	-	-	-
Mishandling fequipment	29	3.74	-	-	-	-	-	-	3	5.66

Table 4.2.1 shows that age group between (21 – 30) recorded the highest number of farm accident victims with 260 cases in North-west zone which represent 38.75% of the total farm accident case recorded in the zone. While North –east zone registered 195 cases, meaning 43,82% of the accident cases in the zone. South-west zone accounted for 45.28% of the total farm accident in the zone and middle belt recorded the least with 21 case and 40.38%.

Subsequently the studies also revealed that the Age group between (31 – 40) recorded 162 cases in the North-west as the highest among the five zones which represent 24.15% of accident case in the zone and the middle belt zone recorded the least reported accident cases with total 18 cases or 38.46% of the total farm accident cases.

Above all, the studies finally revealed from comparative analysis of the five zones that the major causes of farm accident as mentioned in table 4.2.3 is carelessness of the operator with the highest record of 406 cases which represent 22.08% follow by exceeding the limit of equipment with total of 391 cases, 21.26%. Other include Environmental factor, human factors, Terrian factor and exposure to chemicals recorded 379, 300, 268, and with 20.61% 16.31%, 14.57%, 3.43% respectively. Mishandling of equipment registered the least with 32 cases and 1.74%.

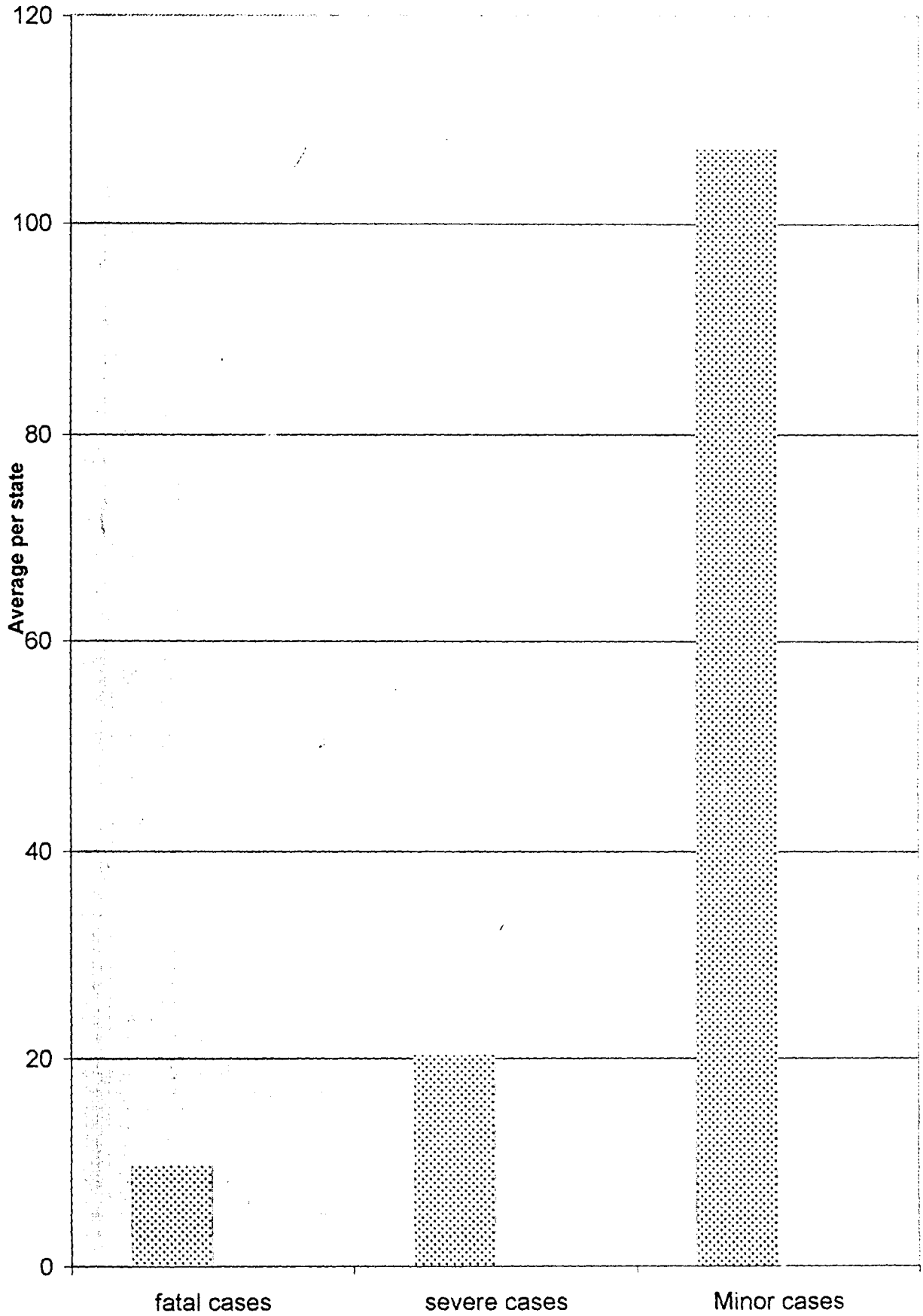

Fig. 1 Nature of farm accident

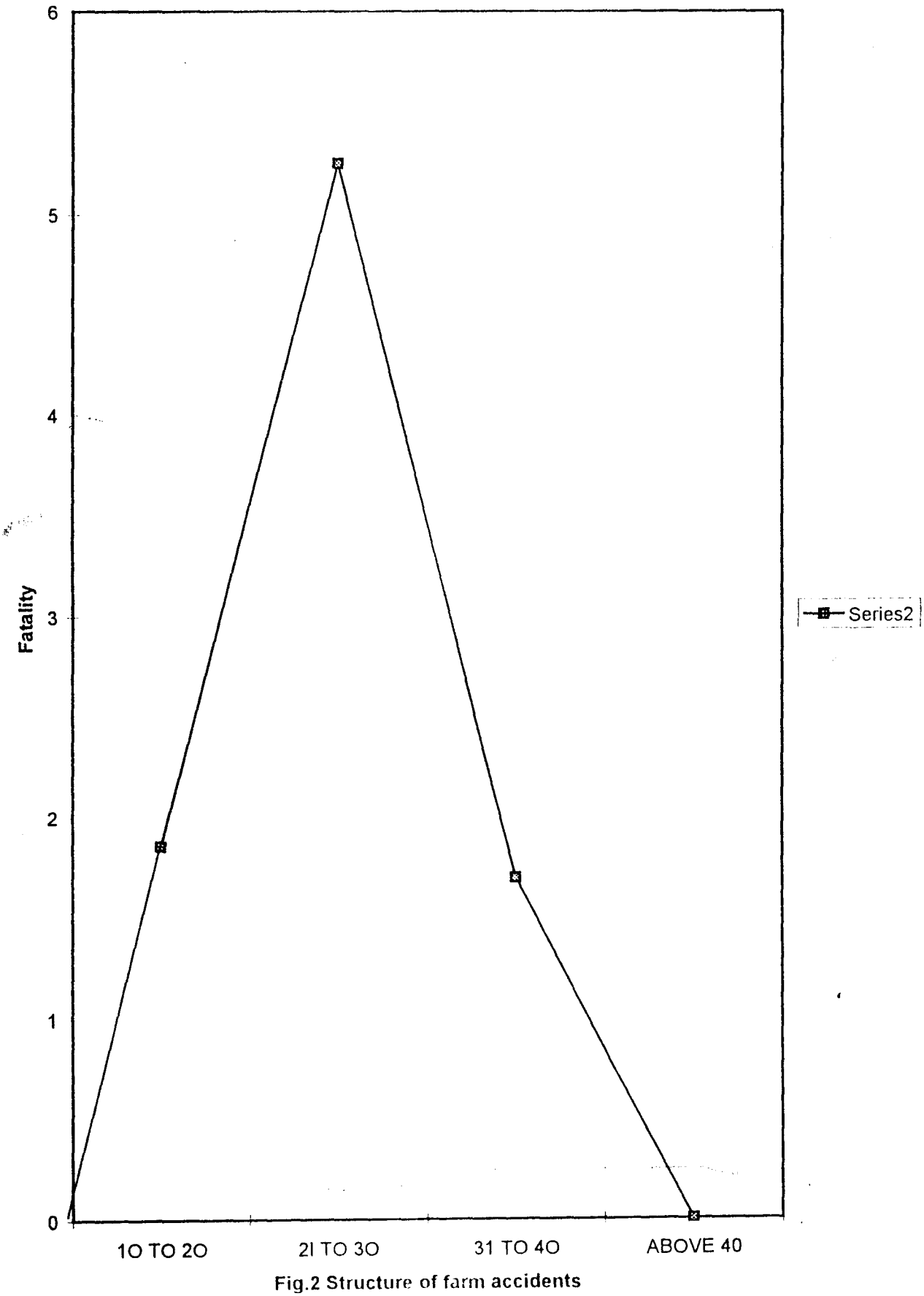

Fig.2 Structure of farm accidents

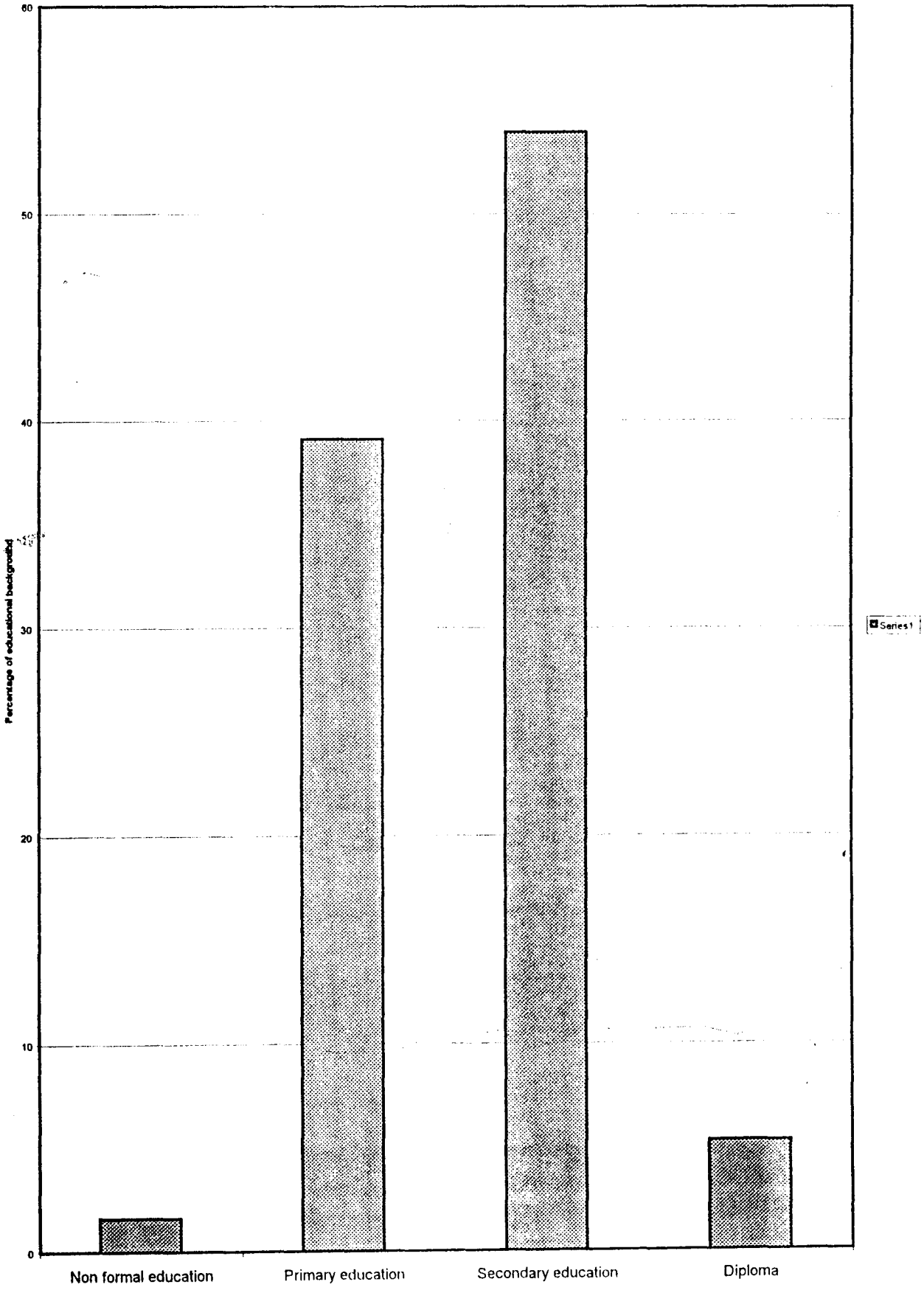

Fig 3 Educational background of operators

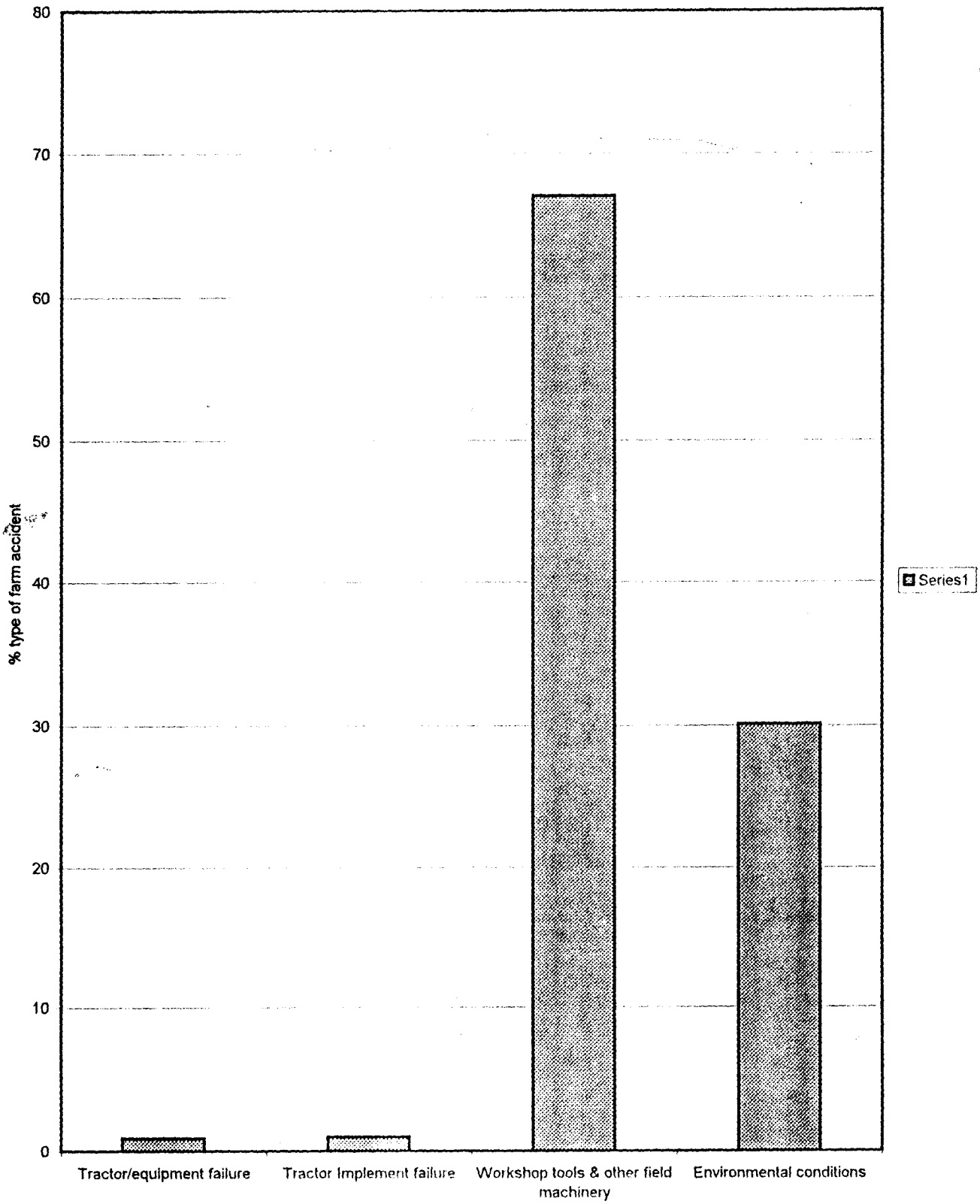

Fig 4 Type of farm accident

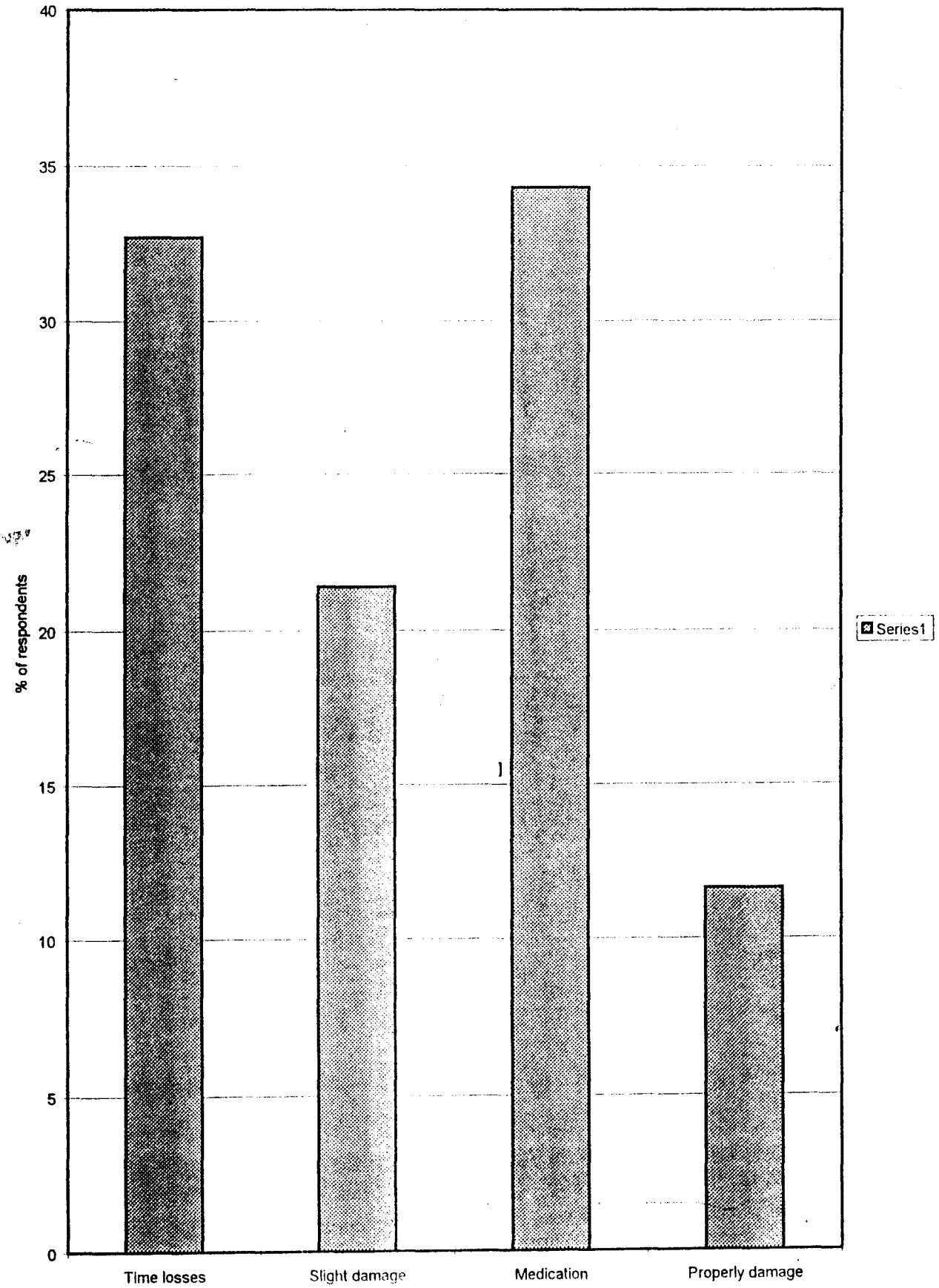

Fig 4 Cost of farm accidents

CHAPTER FIVE
5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

With continuos farm accident occurrence, the mechanization continues to ruin and useful human resources are lost. Farm accident causes, like Human factors, exceeding the limit of the equipment and Carelessness of operator are greatly responsible for major accidents in North – east zone of the country.

However, major findings are summarized here below: -

Adamawa State is noted with highest number of farm machinery and equipment, with highest number of farm accident 29 cases of fatal accident, 49 severe farm accident cases and 179 minor cases. The number of accidents in the other five States is 116, 167, 103, 86 and 94 in Bauchi, Borno, Gombe, Jigawa and Yobe States respectively. The least death figure was registered in Borno and Gombe states. The Age group of (20 - 30) recorded the highest mortality index of 5.25.

From the analysis it show that the major causes of farm accidents is Human factor with highest percentage of 23.76, while Exceeding the limit of the equipment recorded 30.89%, 17.89% for carelessness of operator, Terian factor account for 15.93% and Environmental factor, Exposure to chemicals and Equipment mishandling recorded account for 12.53% 6.40% and 3.79% respectively.

5.2 Recommendation

Safety precaution should be observed when operating farm machine and equipment. Maintenance culture is another area must be looked into, because most of the farm machinery operators lack maintenance habit. I therefore recommend government should establish training schools all over the country fore training the farm machinery and equipment handlers and organizing workshops/seminars for farm machinery operators.

Government should also provide spare parts at affordable price, so that farm machinery and equipment can be properly maintained.

REFERENCES

1. **Abubakar S. M.** (2000), " Investigation of Farm Accidents in Kano, Katsina, Zamfara, Kebbi, and Sokoto. A project in the department of Agricultural Engineering, Federal University of Technology.

2. **Akinbo O. J.** (1999), "Investigation of Farm Accidents in Ogun, Ondo, Ekiti, Oshun and Lagos States. A project in the department of Agricultural Engineering, Federal University of Technology Minna.

3. **Denis J. M.** (1980), "Farm safety attitude and accident involvement," Accident analysis and prevention volume 13, No4 (331 - 332).

4. **Encyclopedia Americana** Volume 1 (76 - 80)

5. **Hunter A.G.M** and Owen **G.M (1983)** "Tractor over turning accidents on slopes. A journal of occupational accidents, " Elsevier science publisher Bv Amisterdam 5, (190 – 212).

6. **Jain S.C.** and **Rai C.R** (1980), "Tractor engine maintenance and repair," Tractor training Testing station Bauchi, Madhya, Rubber Triat Mc Graw Hill publishing company limited (pp 194 - 198).

7. **Jespen Richard L.** (1976), Using the Social Action Process in a Farm Safety Program. Paper presented at the Winter meeting of America Society of Agricultural Engineers, Chicago.

8. **Joshua C. A.** (1997); Investigation of Farm Accident in the middle belt. A project in the department of Agricultural Engineering, Federal University of Technology Minna.

9. **Kepner R. A.., Banier R. and Barger E. L.** (1972), Principles of Farm Machinery. The AVI Publishing Co., Connecticut.

10. **Martin S.** (1981), "Alcohol, drugs and safety, an updated perspective on problems and their management in the workplace". Accident analysis and prevention volume 14 No3 (239 - 246)

11. **Pell S. and D'Alonzo C. A.** (1973), A five year mortality study of alcoholics. J. occupational Med. 15. (120 - 125).

12. **Strasser M. K., Aaron J. E., Bohn R. C. and Eales J. R.** (1964), Fundamentals of Safety Education. Macmillan Company, New York,

13. **Wahl R.** (1977), A safety and Health Guide for Vocational Educators. Vol. 15, N0. 1, Pennsylvania Department of Education, Project No. 24-6074,

14. **Worick W.** (1975), Safety Education: Man, His Machines, and His Environment. Prentice-Hall, New Jersy.

15. **Yisa M.G** and **Tereo H.** (1995), "Dynamics of Tractors implement combination slopes (part 1) state of the art review" J.Fac. Agric Horkaido university volume 66,pt2/240 – 264.

APPENDIX: QUESTIONNAIRE

SECTION A

Background information

1. Geographical location:----------
2. Name of Establishment:----------
3. Sex of respondent:

   Male 1 Female 2
4. Age of respondent:

   Under 20 years 1

   21 – 30 years 2

   31 – 40 years 3

   Over 40 years 4
5. Age of person involved in the accident.

   Secondary school 1

   National Dip 2

   N.C.E 3

   Bachelor's Degree 4

   Master's Degree 5

   Ph.D 6
6. Status/Post of the respondent

   Foreman 1

   Technician 2

   Supervisor 3

   Engineer 4

   Manager 5
7. Years of working experience of respondent

   Less that one year 1

   One to five years 2

   Six to ten years 3

   Over ten years 4
8. Years of the person involved in the accident

   Less than one year 1

   One to five year 2

Six to ten years 3

Over ten years 4

9. Number of victims in a particular accident ----------

10. Number of tractors in the establishment ----------

11. Number of other equipment/machinery ----------

12. Types of available tractors in the establishment ----------

13. Types of other equipment/machinery ----------

14. Establishment ownership

Joint ownership 1

Private ownership 2

Government ownership 3

15. Major operations of the establishment ----------

SECTION B

Description of Farm accident

1. Have the establishment recorded any case of accident?
Yes 1 No 2

2. If yes, in what form dose it occur?
Tractor/equipment failure 1
Tractor/implement failure 2
Implement failure 3
Tools 3
Environmental condition 5

3. Who is involved in the accident?
Operator 1
Any other 2

4. Level of training of thee handler of the equipment
Skilled 1
Unskilled 2

5. Where of such accident occur?
Field Operations 1
Farm transit down the slope 2
Farm stead 3
During transit down the slope 4
During transit up the slope 5

6. At what time of the season?
Rainy season 1
Dry season 2

7. In which part of the tractor/equipment dose failure frequently occurs?

Linkage system 1

Wheels 2

Power take-off (PTO) 3

Drawbar 4

8. Have you as an establishment attempted to minimize farm accident?

Yes 1 No 2

9. How does the establishment prevent/minimize the occurrence of accidents?

Organizing workshop/Lecture safety precaution 1

Giving orientation to newly employed workers 2

Indicating danger zones through symbol and signed 3

None of the above 4

10. Howe many cases of severe accidents have so far been recorded in the establishment ----------

11. When accidents occur, how are they handled?

Human factor Clinic/Hospital 1

First Aid Treatment 2

Send the victim home 3

12. What are the major causes of farm accidents in the establishment?

Exceeding the limitation of the equipment 2

Human factor 3

Environmental factor 4

Mal-functioning of the equipment 5

13. In case of tractor/equipment accident, does the tractor have a roll protective structure (ROPS)

Yes 1 No 2

14. In what way does the establishment suffers the cost of accident?

Properly damage 1

Time losses 2

Medical attention 3

15. Are the other accidents that do not involve equipment?

Yes 1 No 2

16 If yes in what form?

Electrical hazards 1

Mechanical 2

Chemical 3

Fire 4

Snake bite 5

17. What is the frequency of occurance of accident?

Less than 2 time per year 1

3 – times per per year 2

7- 10 times per year 3

Over 10 times per year 4

18. What is the extent of damage caused by minor accidents?

Time losses 1

Slight damage 2

Properly damage 3

Medical attention 4

19. How long does it take the establishment to repair the tractor/equipment?

Within weeks 1

Within months 2

Years 3

20. What is the cost of repair of refurbishing the tractor/equipment ----------

21. Are the Tractor/equipment given off season maintenance?

Yes 1 No 2

22. Are the Tractors/equipment kept outdoors or in shade during off working hours? ----------

23. Do the establishment have disabled people as a result of an accident?

Yes 1 No 2

24. If yes, how are they catered for?

Monthly allowance 1

Compulsory 2

25. Does the establishment attempt effort to prevent Electrical chemical and fire accidents?

Yes 1 No 2

26. If yes in what form?

Provision of fire extinguisher 1

Wearing protective cloths and hand gloves 2

Automatic self switch meter 3

Provision of 1 and 2 4

All of the above 5

27. Were the tools properly return back to their position before closing from workshop?

Yes 1 No 2

28. What suggestion can you offer so as to reduce farm accidents to the bearest minimum? ----------

29. State any other comments as appropriate ----------
