

ISSUES IN MECHANISED FARMING IN NIGERIA

BY

**CONSULTANCY, RESEARCH & INFORMATION TECHNOLOGY
DEPARTMENT (CRIT)**

**INDUSTRIAL TRAINING FUND (ITF)
HEADQUARTERS, JOS**

APRIL, 2012

DECLARATION

We, hereby declare that this work is the product of our research efforts at the Industrial Training Fund and has not been presented elsewhere. All sources have been duly cited and appropriately acknowledged, thus, all other expressed views and opinions are those of the Researchers.

RESEARCH TEAM

1. S. Ayo Alabi
2. Solesi A. O.
3. Niemogha G. I.
4. Alakija K. S.
5. Arinze G. A. (Dr.) (Mrs.)
6. Goyol J. S. A (Mrs.)
7. Akinsipe A. O. (Mrs.)
8. Dung R. C. (Mrs.)
9. Awodele O. O.
10. Shogunle A. D.

ACKNOWLEDGEMENT

With profound gratitude to God Almighty, we wish to acknowledge the inestimable contributions and assistance of various personalities during the course of this work. They were strong pillars of support in different ways and we remain indebted to all.

Firstly, we wish to express sincere and heart-felt gratitude to the Director General of the Industrial Training Fund, Professor Longmas S. Wapmuk, and the Director Consultancy, Research and Information Technology Department, S. Ayo Alabi for their invaluable contributions, patience, understanding and constructive criticisms, which facilitated completion of the work.

We, especially thank the Head, Consultancy Services Division (CSD), Abdul Ganger, the Head, Information and Communication Technology Division (ICTD), D. C. Onuoha and other Staff of CRIT Department of the ITF who, at various stages, made constructive criticisms and suggestions which contributed to the successful completion of this work.

We are, indeed, grateful to all Research Schedule Officers in the Area Offices of the ITF and respondents who participated in the Study.

Our heart-felt gratitude also goes to our colleagues, family members and friends who showed great understanding and gave unalloyed support during the period of the Study. We wish to also thank the various authors and publishers of the works cited for permission to use their materials.

Solesi, Abiodun O.

Head, Research and Development Division,

Consultancy Research and Information Technology Department,

Industrial Training Fund,

Jos.

2012.

DEDICATION

To our very dear nation, Nigeria. We believe this work will positively impact the nation's Human Resource.

TABLE OF CONTENT

CONTENT	PAGE
Title Page	i
Declaration	ii
Research Team	ii
Acknowledgement	iii
Dedication	iv
Table of Contents	v
List of Tables	ix
List of Figures	xi
Acronyms and Abbreviations	x
Abstract	xi

PART ONE: INTRODUCTION

1.1	Background of the Study...	1
1.2	Statement of Problem	4
1.3	Purpose of the Study... .. .	6
1.4	Research Questions	6
1.5	Significance of the Study... .. .	7
1.6	Scope of the Study... .. .	7
1.7	Operational Definition of Terms... .. .	8

PART TWO: METHODOLOGY

2.1	Introduction	...	...	...	...	...	...	9
2.2	Study Design	...	...	...	...	...	...	9
2.3	Population of the Study	...	...	...	...	...	...	9
2.4	Sample and Sampling Techniques...	...	...	...	...	...	...	10
2.5	Instruments for Data Collection	...	...	...	...	...	...	11
2.6.	Methods of Data Analysis and Interpretation...	...	...	...	...	...	...	12
2.7	Research Ethics	...	...	...	...	...	...	13

PART THREE: RESULT

3.1	Introduction	...	...	...	...	...	...	15
3.2	Assessing Availability of Machinery and Farm Implements in Mechanized Farming	...	...	...	...	...	...	15
3.3	Appraising Competencies of Agricultural Mechanics and Tractor Operators in Mechanised Farms	...	...	...	...	...	...	16
3.4	Establishing Linkage Activities among Stakeholders in Mechanised Farming	...	...	...	...	...	...	19
	3.4.1 Linkage Activities among Farmers	...	...	...	...	...	...	19
	3.4.2 Linkage Activities among Agricultural Service Providers (ASPs)	...	...	...	...	...	...	20
	3.4.3 Linkage Activities between Agricultural Service Providers (ASPs) and Farmers	...	...	...	...	...	...	22
3.5	Issues Arising from Linkage Activities among Stakeholders in Mechanised Farming	...	...	...	...	...	...	23
3.6	Availability of Training Policy	...	...	...	...	...	...	24

3.7	Perception on Mechanised Farming ...	...	...	...	...	25
3.8	Challenges that Impede Achievement of Objectives of Mechanized Farming in Nigeria	...	...	...	...	26

PART FOUR: SUMMARY, CONCLUSION AND RECOMMENDATIONS

4.1	Summary of the Study	...	...	...	...	28
4.2	Major Findings of the Study	...	...	...	...	29
4.2.1	Availability of Farm machinery, implements and infrastructure in Mechanised Farming	...	...	...	...	29
4.2.2	Competencies of Agricultural Mechanics and Tractor Operators	...	...	...	...	29
4.2.3	Linkage Activities among Stakeholders in Mechanised Farming	...	...	...	...	29
4.2.4	Issues arising from such Linkage Activities	...	...	...	...	30
4.2.5	Availability of Training Policy	...	...	...	...	30
4.2.6	Perception of Farm Managers, Engineers and Agricultural Service Providers on mechanised farming	...	...	...	...	30
4.2.7	Challenges that impede Mechanised Farms	...	...	...	...	31
4.3	Conclusion	...	...	...	...	31
4.4	Recommendation	...	...	...	...	32
4.5	Suggestion for Further Studies...	...	...	...	...	33
	References...	...	...	...	...	34

Appendices

Appendix A	Questionnaires for Farm Manager	...	...	...	36
Appendix B	Questionnaires for Farm Engineer	...	...	...	40
Appendix C	Questionnaires for Service Provider	...	...	...	43
Appendix D	Letter of Introduction (Farm Manager)	...	...	...	46
Appendix D	Letter of Introduction (Service Provider)	...	...	...	47

TABLES

Table 1: Rating Scale and its Interpretation	...	...	...	...	...	13
Table 2: Basic Operational Skills of Agricultural Mechanics				...	...	17
Table 3: Basic Operational Skills of Tractor Operators			...	...	...	18
Table 4: Issues from Linkage Activities	...	...	...	...	...	23
Table 5: Perception on Mechanised Farming in Nigeria			...	...	...	25
Table 6: Challenges of Mechanized Farming	...	...	...	...	...	26

FIGURES

Figure 1: Distribution of Population by Category and Number	...	...	...	...	10
Figure 2: Distribution of Sample by Category and Number			...	...	11
Figure 3: Availability of Tractors, Implements and Infrastructure				...	15
Figure 4: Existence of Linkage Activities among Farmers	...	...	...	...	19
Figure 5: Linkage Activities among Farmers	...	...	...	...	20
Figure 6: Linkage activities among ASPs	...	...	...	...	21
Figure 7: Linkage Activities among Agricultural Service Providers (ASPs)					21
Figure 8: Linkage Activities between ASPs and Farmers	...	...	...	...	22
Figure 9: Availability of Training Policy	...	...	...	...	24

ACRONYMS AND ABBREVIATIONS

ITF	-	Industrial Training Fund
GDP	-	Gross Domestic Product
NAFPP	-	National Accelerated Food Production Programme
ADP	-	Agricultural Development Project
IITA	-	International Institute of Tropical Agriculture
AMOTRAC	-	Agricultural Machinery Operator Training Centres
NCAM	-	National Centre for Agricultural Mechanisation
FGN	-	Federal Government of Nigeria
CBN	-	Central Bank of Nigeria
SPSS	-	Statistical Product and Service Solutions
ASP	-	Agricultural Service Provider
OFN	-	Operation Feed the Nation
GR	-	Green Revolution
RBA	-	River Basin Authority
DFRRI	-	Directorate of Food, Roads and Rural Infrastructures
PMB	-	Produce Marketing Board

Abstract

The purpose of the Study was to identify Issues in Mechanised Farming in Nigeria. To facilitate generation of data, the Study explored the following: availability of farm machinery, implements and infrastructure in mechanised farms, appraisal of the competencies of tractor operators and technicians or agricultural mechanics, Existence of linkage activities among stakeholders in mechanised farming, Identification of issues arising from such linkage activities, ascertaining the availability of Training Policy in mechanised farms, assessment of the perception of Farm Managers, Engineers and Agricultural Service Providers on mechanised farming and challenges that impede the achievement of objectives of mechanised farming. From these, seven Research Questions were posed. Target population of the Study consisted of Farm Managers, Farm Engineers and Agricultural Service Providers. Nine Hundred and Seventy (970) respondents, drawn from various categories of the population were used as Sample for the Study. The Study adopted a Cross-Sectional Survey Design. Three sets of questionnaires were employed for the study. These instruments were designed, developed and validated. Data gathered were analysed using percentages and mean statistics. Major findings show that 57% of the farms surveyed have tractors and farm implements while 43% do not. Agricultural mechanics or technicians and tractor operators are competent and had no skill gap. Results also revealed that, linkage among Stakeholders is highest in the area of "Input Sourcing" and lowest in the area of "Credit provision in cash or kind". Furthermore, Issues arising from Linkage Activities among stakeholders of Mechanised Farming were highlighted and recommendations suggested. Finally, the Study emphasised importance funding of relevant Government agencies as this will enable them overhaul broken down tractors and implements as well as monitoring closely, those deployed to farmers in the grass-root.

PART ONE

1.1 INTRODUCTION

Agriculture plays a significant role in the Nigerian economy and accounts for a substantial proportion of its total economic activity, with over 70% of her population depending on it directly or indirectly as a means of livelihood. Affirming this notion, Fruitful Gleans (2011) points out that the Agricultural Sector is one of the potentially viable sectors particularly in terms of its employment generation potentials as well as its contribution to Gross Domestic Product (GDP). In fact, between 2003 and 2007 the average share of Agriculture's contribution to national real GDP was 41.5%, out of which, crop, livestock, fishery and forestry sub-sectors contributed 90%, 6%, 3% and 1% respectively. Thus, the crop production sub-sector is the key source of agricultural growth in Nigeria (FGN, 2010). In 2008 and 2009, the contribution of Agriculture to national real Gross Domestic Product (GDP) was 42.07% and 41.84% respectively thus, underscoring its importance in the economy of Nigeria.

The vital role of Agriculture in the Nigerian economy makes it necessary for the Sector to be reinvigorated in order to achieve food security. This will lead to improved quantity and quality of food per person as well as the well-being of farmers and all citizens of Nigeria. Increasing productivity through Mechanised Farming is fundamental to food security as seen in countries like China (Li, 2005) and Oman (Ampratwum et al., 2004). In the United States of America, mechanisation contributed in transforming Agriculture from a situation where one farmer fed 5 people in 1880 to that where one farmer could feed 80 people in 1982 (Ani and Onwualu, 2002).

Mechanised farming is the use of machinery and equipment to make farm work easier and faster in order to increase farm productivity. In modern times, powered machinery has replaced many jobs formerly carried out by men or animals such as oxen, horses and mules. The level, appropriate choice and subsequent proper use of farm machinery and equipment in agriculture has a direct and significant effect on achievable levels of land productivity, labour productivity, profitability of farming, the environment and the quality of life of people engaged in agriculture (McNeil, 1990).

Fortunately, various administrations in Nigeria have recognised the strategic role of Agriculture in supporting and boosting the economy in spite of the huge revenue receipts from crude oil. However, with declining prospects of revenues from crude oil, Government at various levels are taking proactive measures in the development of the Agricultural Sector in order to diversify the nation's resource base. Some of the measures taken include introduction of Schemes such as: Farm Settlement; National Accelerated Food Production Programme (NAFPP), launched in 1972, Operation Feed the Nation, launched in 1976; River Basin and Rural Development Authorities, established in 1976; Green Revolution Programme, inaugurated in 1980; and the World Bank-funded Agricultural Development Projects (ADPs) now established in each State of the country and the Federal Capital, Abuja. Several Agricultural Research Institutes and extension research liaison services were also established. These include Agricultural Extension and Research Stock Production and Fisheries Production in Nigeria Liaison Service (AERLS) at the Ahmadu Bello University, Zaria; the International Institute of Tropical Agriculture (IITA), in Ibadan and the Agricultural Machinery Operator Training Centres (AMOTRAC) in Ondo and Bauchi States respectively.

In 1988, a National Policy on Agriculture was formulated and reviewed in 2001. As part of measures for promoting mechanised Farming, the National Centre for Agricultural Mechanisation (NCAM) was established to fabricate agricultural machinery and implements for Nigerian farmers. Other Schemes have also been initiated such as Agriculture Credit Guarantee Scheme, Interest Draw-back Scheme and Agriculture Credit Support Scheme in providing concessionary funding for Agriculture. Recently, the Federal Government of Nigeria (FGN) in collaboration with the Central Bank of Nigeria (CBN) introduced the Commercial Agriculture Credit Scheme, which involves the establishment of a 200 Billion Naira Bond to complement other Schemes. Recently, President Goodluck Jonathan's administration made efforts to diversify Nigeria's economy from dependency on revenues from crude oil to include the development of the Agricultural Sector through Mechanised Farming.

Despite these efforts and measures, mechanised farming in Nigeria is still at a low level. Affirming this view, (Nwoko, 1990) noted that mechanisation plan has not been formulated based on a well-designed, reliable and thorough analysis. Engineer Ozumber Chinedu of the National Centre for Agricultural Mechanisation (NCAM), Ilorin, also pointed out that, a major problem of agricultural mechanisation in Nigeria is that farmers do not easily adapt to new technologies. This is in spite of the fact that, the Centre has been able to develop an array of technologies that is able to reduce drudgery, increase production and the quality of products but farmers are yet to take maximum advantage of it (Daily Trust, 16th October, 2009). Similarly, Corporate Nigeria (2010/2011) asserted that, much of Nigeria's agriculture is carried out according to traditional methods, with mechanisation relatively rare.

It is therefore, sad to note that, self-sufficiency in food is still a mirage as agriculture is still practiced largely at a subsistence level. According to Onwualu and Pawa (2004), 90% of Nigeria's agricultural work is done with hand tools, 7% with animal-drawn tools and only 3% with engine powered technology. This accounts for the retarded growth in the sector and threat of hunger, disease and poverty in the country with 70% of the population living on less than N150 (US \$1) per day. It is also the reason why government's efforts since the late 1970s to revitalize agriculture to make Nigeria self-sufficient in food production and increase export of agricultural products have produced only modest results.

This revelation calls for serious concern. For a nation with an expanse of rich arable land of about 84million hectares, highly diversified agro-ecological conditions, teeming human capital, increasing access to technology and aspiring to ensure food security by being self-sufficient in food production, improving agriculture should be brought to the front burner in all Plans for National Development Plan. In order to mitigate hunger, starvation, prevalence of diseases, dependence on foreign sources for raw materials and food importation, reinvigorating agriculture should be a priority. A need therefore, arises to identify issues in Mechanised Farming in Nigeria, to determine factors that are preventing Nigeria from attaining food security. This is the crux of the Study.

1.2 STATEMENT OF PROBLEM

In spite of Nigeria's teeming population of about 167 million (National Population Commission, 2011), its diverse agro-ecological conditions and rich agricultural resource endowment, there has been a gradual decline in the contributions of agriculture to the nation's economy over the years. In the 1960s, agriculture

accounted for 65-70% of total exports; but fell to about 40% in the 1970s, and crashed to less than 2% in the late 1990s (Fruitfulgleans, 2010). In spite of the fact that, the contribution of Agriculture to the GDP rose slightly risen to 41.84% in 2009, it is on record that, of the 84 million hectares of Nigeria's arable land, only 40 per cent is cultivated and of this, not more than 10 per cent is optimally cultivated (FGN, 2013). This implies that agriculture has great potentials for supporting the economy if well harnessed over the years.

Governments at various levels have taken various measures toward improving the Agricultural Sector but it appears that the objectives of increasing farm output and maximising cultivable land through mechanised farming have not yet been realised. Onwualu and Pawa (2004) found that 90% of farmers in Nigeria use rudimentary technology (hand tools), 7% animal-drawn tools and only 3% use engine powered technology. It is also noted that poor access to modern inputs and credit facilities, poor infrastructure, inadequate access to markets, land and environmental degradation, inadequate research and extension services retard growth in the sector.

For a country richly endowed with good climatic conditions, land and human resources and where Agriculture is one of the major contributor to its real national Gross Domestic Product (GDP), there is no justifiable reason not to have a strong and highly productive Agricultural Sector. Besides, as a developing nation that aspires to meet her Millennium Development Goal of eradicating extreme poverty and hunger, there is need to identify why rapid development of the Agricultural Sector has eluded the nation. The Study therefore, was conducted to identify issues in Mechanised Farming in Nigeria.

1.3 PURPOSE OF THE STUDY

The purpose of the Study was to identify Issues in Mechanised Farming in Nigeria.

The specific objectives of the Study are to:

- a. Assess availability of farm machinery, implements and infrastructure in mechanised farms.
- b. Appraise the competencies of tractor operators and technicians or agricultural mechanics.
- c. Establish linkage activities among stakeholders in mechanised farming.
- d. Identify issues arising from such linkage activities.
- e. Ascertain availability of Training Policy in mechanised farms.
- f. Assess perception of Farm Managers, Engineers and Agricultural Service Providers in mechanised farming.
- g. Identify challenges that impede the achievement of objectives of mechanised farming.
- h. Recommend strategies for addressing identified Challenges.

1.4 RESEARCH QUESTIONS

- a. What farm machinery, implements and infrastructure are available in Mechanized Farming?
- b. What are the competencies of tractor operators and technicians or agricultural mechanics?
- c. What are the linkage activities among stakeholders in Mechanised Farming?

- d. What are the issues arising from such linkage activities?
- e. Do Mechanized Farms have Training policy?
- f. What is the perception of Farm Managers, Engineers and Agricultural Service Providers on mechanised farming?
- g. What are the challenges that impede Mechanised Farms?

1.5 Significance of the Study

Considering the importance of food security, it is vital to have adequate number and mix of skilled manpower for efficient functioning of Mechanised Farms. It is expected that findings of this Study will raise issues that will be of immense benefit to Policy Formulators and Implementers, Stakeholders, Trainers and Educators.

The findings are likely to provide relevant data required by stakeholders involved in skill development of Agricultural Mechanics, Tractor Operators as well as end users on issues and challenges associated with Human Capital Development in Mechanised Farms. It will also highlight issues emanating from linkage activities among different stakeholders in Mechanised Farming.

Results from the Study would also assist to enhance collaboration among Government agencies, service providers and farmers especially on input sourcing as well as extension services.

The outcome of the Study will facilitate the realization of Government's Transformation Agenda on food security and job creation. This will enhance the development and adoption of new initiatives to meet the needs of the Stakeholders involved in Mechanised Farming.

1.6 Scope of the Study

The scope of the Study was to identify Issues in Mechanised Farming in Nigeria. However, to ensure and guarantee effectiveness of control and management, the study was confined to only Farms that use tractors and farm implements as well as the Agricultural Service Providers. Many issues were left out because it was believed that incorporating them would make the Study too wide in scope and a digression from its initial focus.

1.7 Operational Definition of Terms

This sub-section contains definitions of some key terms used in the Study. This is for operational purposes only, as Researchers are aware that there are existing definitions for these terms.

Mechanised Farming: is the use of machinery and equipment to make work easier and faster in order to increase farm productivity.

Mechanised Farm: is a farm that uses modern machinery and equipment.

Farm Manager: is the person who oversees day-to-day activities on the farm.

Agricultural Service Provider: Organization, business or individual which offers agricultural service(s) to others in exchange for payment.

Linkage Activity: an event that establishes symbiotic relationship among agricultural stakeholders.

PART TWO

METHODOLOGY

2.1 Introduction

This Part deals with methods employed in carrying out the Study. It is discussed under the following Sub-headings: Research Design, Population of the Study, Sample and Sampling Techniques, Instruments for Data Collection, Methods of Data Analysis and Research Ethics.

2.2 Research Design

A Cross-Sectional Survey Design was used. This is a design that involves collection and analysis of data from a target group that is considered to be representative of the entire Population. Generalization of findings from this group is then made on the entire Population.

The design also requires that data be collected within a set time-frame from the sample. The design was employed because it constitutes an appropriate way of obtaining facts and figures needed to Study a large population.

2.3 Population of the Study

The target population of the Study comprised Mechanised Farms registered with the Industrial Training Fund and Agricultural Service Providers in Nigeria. These include the following:

- Farm Managers.
- Farm Engineers.
- Agricultural Service Providers.

The Distribution of the Population is presented in Figure1

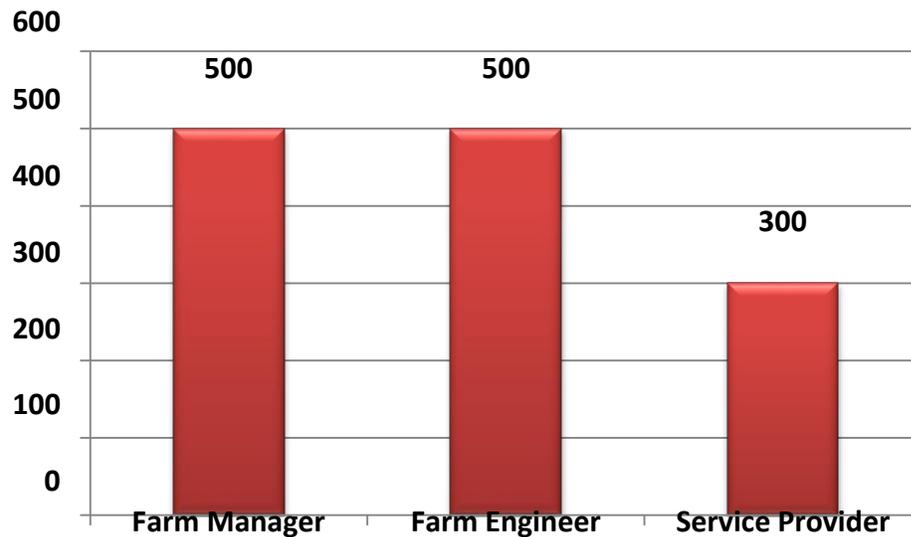


Figure 1: Distribution of Population by Category and Number

2.4 Sample and Sampling Techniques

Sample for the Study was drawn from all categories of respondents using Simple Random Sampling Technique. This is a technique in which every member of the population has equal chance of being selected. The sample for the various categories was drawn using RANDBETWEEN() command on Excel Sheet. The list of Farm Managers, Farm Engineers in Mechanised Farms registered with the Industrial Training Fund and Agricultural Service Providers in Nigeria constituted the sampling frame.

The distribution of the Sample is presented in Figure 2.

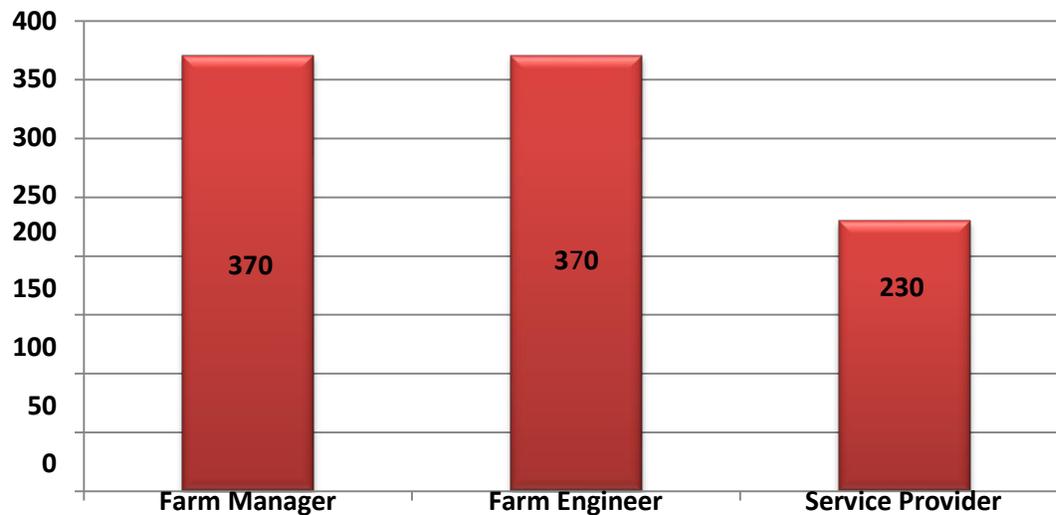


Figure 2: Distribution of Sample by Category and Number

2.5 Instruments for Data Collection

The instrument used in gathering data for the Study was the Questionnaire. There were three sets of Questionnaires for the different categories of respondents. They are titled as follows:

1. Questionnaire on Emerging Issues in Mechanised Farms in Nigeria for Farm Manager (QEIMFNFM).
2. Questionnaire on Emerging Issues in Mechanised Farms in Nigeria for Farm Engineer/Technician (QEIMFNFE/T).
3. Questionnaire on Emerging Issues in Mechanised Farms in Nigeria for Agricultural Services Provider (QEIMFNASP).

(Please see Appendices A, B & C)

The Questionnaires had the following layout:

Section A: This contained background information of the respondents.

Section B: This contained questions on training, relationship(s) and issues arising from such relationship(s).

Section C: This contained questions on Equipment, Implements and Infrastructure.

Section D: This contained questions on Perception and Challenges of Mechanised Farms.

2.6 Methods of Data Analysis and Interpretation

Data analysis was based on Research questions. Data collected were in raw form. These were compiled, tallied and coded on computer sheets. All completed questionnaires were also manually edited to detect skips, check for errors and accuracy of data entry.

Questions on Training, Equipment, Implements and Infrastructure, Perception and Challenges of Mechanised Farms which provided quantitative data in the questionnaires were coded using Micro-Soft Excel Spreadsheet and Statistical Product and Service Solutions (SPSS). Similarly, questions on relationships and issues arising from such relationships which provided qualitative data were subjected to content analysis.

Simple Means and Percentages were used to analyse data collected. Justification and suitability of the statistical tools include the following:

- Mean scores facilitate comparison of data summaries and are the best representative index of measuring group scores. Awotunde and Ugodulunwa (1998), recommend the use of mean scores in data analysis because it has advantages over other measures of central tendency, take

into consideration all the scores in a distribution and are more accurate estimate of population parameter.

- Mean scores can easily be compared.
- The statistical tool can easily be interpreted by the average person.

The interpretation of results was based on a Five (5) Point Likert rating scale as shown in Table 1.

Table 1: Rating Scale and its Interpretation

Range of Mean Score	Interpretation
0.00 – 1.49	Very Low
1.50 – 2.49	Low
2.50 – 3.49	Average
3.50 – 4.49	High
4.50 – 5.00	Very High

2.7 Research Ethics

The Researchers established the content validity of the instruments before employing them for the Study. This was considered necessary to enable the Researchers determine the extent to which items of the instruments were relevant, appropriate and related to the aim of the Study and Research Questions. In validating the instrument, subject matter experts from University of Jos were consulted. After corrections had been effected, each of the instruments was subjected to expert scrutiny of two Tests and Measurement specialists of the ITF, Jos.

In order to further strengthen the validity of the instruments, they were administered in a Pilot Study. The Pilot Study was carried out on a small sample of

respondents who did not participate in the main Study. This was done in order to discover:

- How the respondents would react to items in the questionnaire.
- Whether the questions were clear enough and could easily be understood.
- Whether there was need to include more questions in certain areas.
- Whether there were some personal questions which they would not like to respond to and
- To determine the appropriateness of the proposed methods of data analysis for the Study.

After the Pilot Study, the instruments were further refined and made easier for comprehension by the respondents.

With the instruments ready for use, the Researchers left in two batches, at different times, to the Study Areas bearing letters of introduction from the Industrial Training Fund (ITF). In addition, Research Schedule Officers in the ITF Area Offices within the Area of Study were trained and deployed as Research Assistants. They were briefed on the Purpose of the Study, reasons why the areas were selected, how to administer questionnaires and conduct interview. The Researchers and their Assistants then went to selected Mechanised Farms, met with the Staff in Charge and briefed them on the Study.

Questionnaires were administered through face-to-face direct delivery to Respondents by Research Officers and Research Assistants. The method entailed handing questionnaires to respondents and being physically present as the Questionnaires were completed. This method was preferred since it afforded the Research Officers a higher percentage return of properly completed questionnaires. At the end of the exercise, the Researchers expressed appreciation to the Respondents for their cooperation.

PART THREE

RESULTS

3.1 Introduction

This part presents and discusses findings from data collected for the Study. These results are discussed under the following sub-topics: Availability of Machinery and Farm Implements, Competences of Agricultural Mechanics and Tractor Operators, Linkage activities, Training Policy, Perception and Challenges in Mechanised Farming.

3.2 Assessing Availability of Machinery and Farm implements in Mechanized Farming

This section presents and discusses data obtained in the Study on Assessment of Availability of Farm Machinery, Implements and Infrastructure in Mechanised Farms. Analysis of data and discussion of results are presented in Figure 3.

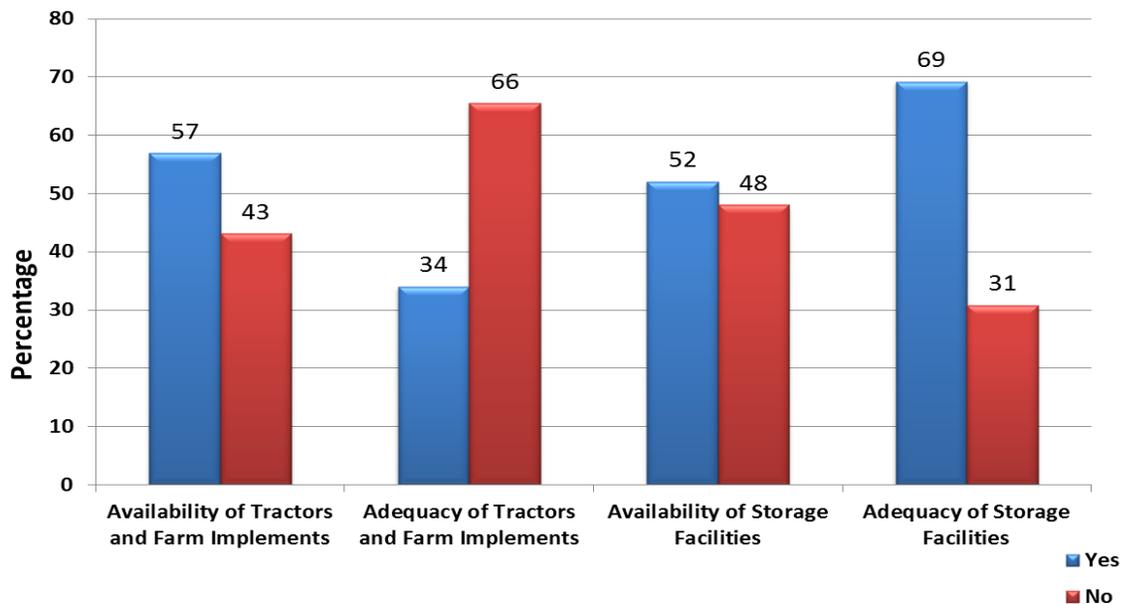


Figure3: Availability of Tractors, Implements and Infrastructure

Results in Figure 3 shows that, 57% of the farms surveyed have tractors while 43% do not. Further enquiry, shows that, out of the 57% of the farms that have tractors, only 34% indicated that they are adequate while 66% showed that the numbers of tractors they possess are not.

It is encouraging that more than half of the farms surveyed have Tractors but disheartening that only 34% of those that have Tractors acknowledge their adequacy. It is therefore, not surprising that issues of food sufficiency and security in Nigeria are a challenge to the nation.

This result is in line with the findings of Akinoso and Mijinyawa 2001 in Ladeinde 2009 which established that, the high cost of ownership of farm tractors in Nigeria militates against the use of tractors by majority of the farmers and has resulted in Nigeria's low food production.

With regards to availability and adequacy of storage facilities, 52% of the farmers affirmed that they have storage facilities while 48% do not. It is heart-warming that, out of the 52% of the farmers that have storage facilities, 69% agreed that the storage facilities they have are adequate.

However, when one considers the 48% that do not have storage facilities with the percentage of those whose storage facilities are not adequate, it is obvious that there is still a problem in storage of farm produce in Nigeria. This result tends to imply that farmers may be underutilising their tractors so as to avoid losses arising from spoilage of farm produce.

3.3 Appraising Competencies of Agricultural Mechanics and Tractor Operators in Mechanised Farms

This section presents and discusses data obtained on competencies of Agricultural Mechanics and Tractor Operators in Mechanised Farms. Results are presented in Tables 2 and 3.

Table 2: Basic Operational Skills of Agricultural Mechanics

S/N	SKILLS Ability to:	MEAN SCORE (̄)	INTERPRETATION
1	Examine and listen to the sound of equipment.	3.61	High
2	Maintain farm machinery and vehicles.	3.67	High
3	Repair farm machinery and vehicles.	3.62	High
4	Reassemble machines and equipment following repair, test operation and make adjustments as necessary.	3.59	High
5	Repair or replace defective parts.	3.59	High
6	Overhaul farm machinery and vehicles.	3.52	High
7	Test and replace electrical components and wiring, using test meters, soldering equipment and hand tools.	2.83	Average
8	Dismantle defective machines for repair, using hand tools.	3.77	High
9	Record details of repairs made and parts used.	3.39	Average

A close observation of results in Table 2 shows that there is no Skill gap amongst the Agricultural Mechanics. This is based on the levels of rating by Farm Engineers with Mean Scores ranging from 2.83 – 3.77. It is evident from the Table that, seven of the nine Skills are possessed at high level. The remaining two skills namely; *“Test and replace electrical components and wiring, using test meters, soldering equipment and hand tools”* (2.83) and *“Record details of repairs made and parts used”* (3.39) are possessed at an average level.

Even though the results did not indicate any gap in the listed skills, the fact that, *recording details of repairs made and parts used* is on average, makes it difficult

to ensure cost effective tractor maintenance and repairs. Similarly, for *testing and replacing electrical components and wiring, using test meters, soldering equipment and hand tools* which are also at average level, implies that, there may be frequent breakdown of equipment.

S/N	SKILLS Ability to:	MEAN SCORE (\bar{x})	INTERPRETATIO N
1	Interpret and follow operating manuals, maintenance manuals and service charts.	3.17	Average
2	Identify and interpret manufacturer's instruction for proper use of all controls for safe operation of tractor and all attachments.	3.11	Average
3	Perform safety inspections and comply with safety codes standards.	3.52	High
4	Operate several sets of controls for tractor and attachments according to industry standards.	3.42	Average
5	Connect/disconnect all attachments with mechanical drive shafts and hydraulic lines.	3.85	High
6	Possession of basic knowledge of soil types and mineral content.	2.56	Average
7	Identifying Characteristics of soil types under various terrain and weather conditions.	2.83	Average
8	Follow oral and written instructions from supervisor.	3.61	High
9	Operate tractor on rolling hills, flat terrain, along roadways within confined and congested areas.	3.44	Average
10	Interpret and comply with safety codes and standards.	3.60	High
11	Recognize and troubleshoot mechanical problems with tractor and all attachments.	3.71	High
12	Use attachments to rough grade soil and landscaping materials.	3.39	Average
13	Instruct others in routine and preventive maintenance of tractors and attachments.	3.67	High
14	Instruct others in the safe operation of tractors and attachments.	3.64	High
15	Assist in the training and development of employees who possess the desire and aptitude to operate tractors	3.45	Average

	and attachments.		
--	------------------	--	--

Table3: Basic Operational Skills of Tractor Operators

Results in Table 3 shows that, there is no Skill gap amongst Tractor Operators. This is based on the levels of rating by Farm Engineers with Mean Scores ranging from 2.56 – 3.85. It is evident from the Table that, eight of the fifteen Skills are possessed at high level while seven skills are possessed at an average level.

Even though the results did not indicate any gap in the listed skills, the fact that, *“Possession of basic knowledge of soil types and mineral content”* (2.56), *“Identifying Characteristics of soil types under various terrain and weather conditions”* (2.83) and *“Identifying and interpreting manufacturer’s instruction for proper use of all controls for safe operation of tractor and all attachments”* (3.11) are on average levels, implies that, there may be frequent breakdown of Tractors.

3.4 Establishing Linkage Activities among Stakeholders in Mechanised Farming

This Section discusses linkage activities that exist among various stakeholders in mechanised farming. Results are presented under the following sub-headings: Linkage Activities among Farmers; Linkage Activities among Agricultural Service Providers (ASPs) and Linkage Activities between Agricultural Service Providers (ASPs) and Farmers.

3.4.1 Linkage Activities among Farmers

This sub-section presents and discusses results obtained on linkage activities existing among various Farmers. Results are as presented in Figures 4 and 5

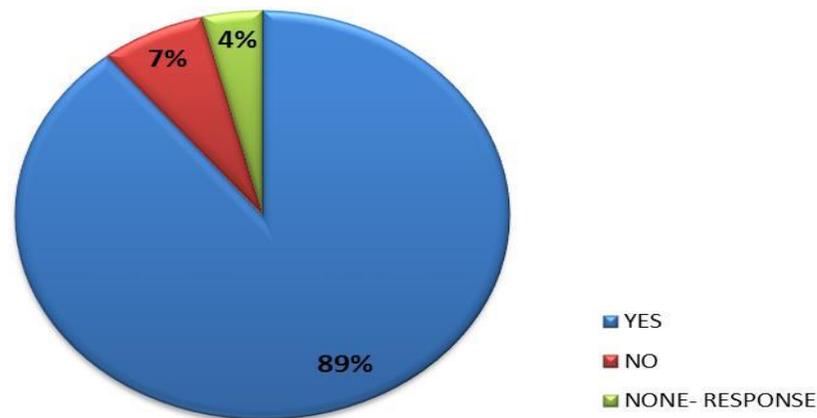
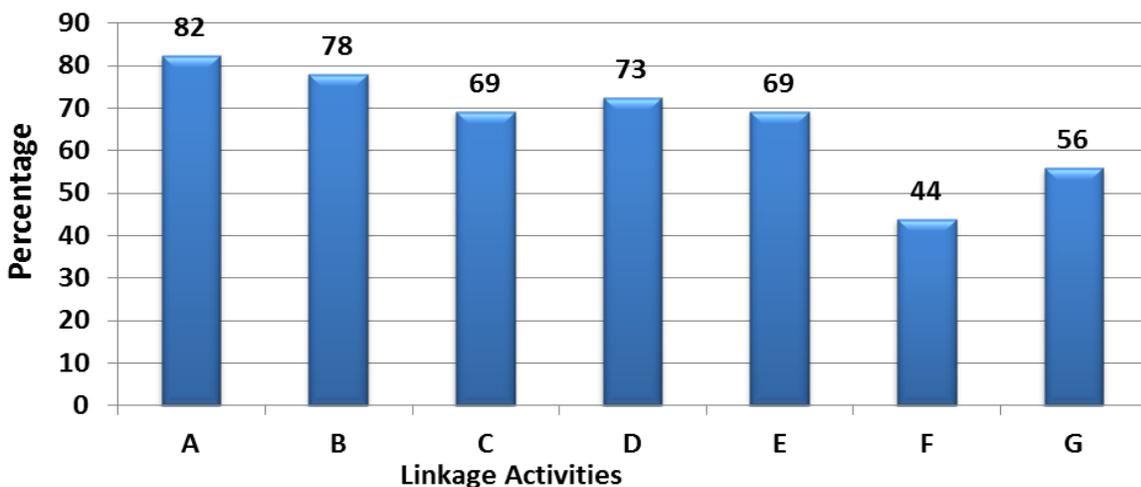


Figure 4: Existence of Linkage Activities among Farmers

Figure 4 indicates that 89% of Farmers acknowledged that linkages exist among them. They further specified the Linkage activities that exist and results are as presented in Figure 5.



- A - Input sourcing
- B - Agricultural extension advice
- C - Marketing advice/market source
- D - Improved technology
- E - Training on good agricultural practices
- F - Credit provision in cash or kind
- G - Crops and support services

Figure 5: Linkage Activities among Farmers

Figure 5 shows Linkage activities that exist among various Farmers. The Linkage is at the highest in the area of “Input Sourcing” with 82% of the respondents

attesting so. In other words, they liaise with each other in obtaining Fertilizers, Seedlings, Herbicides and Pesticides among others. The Figure further reveals that, Linkage is at the lowest in the area of “Credit provision in cash or kind” with 44% of respondents indicating so. This buttresses the fact that, accessing Credit facilities is a difficult endeavour.

3.4.2 Linkage Activities among Agricultural Service Providers (ASPs)

This sub-section presents and discusses results obtained on linkage activities existing among various Agricultural Service Providers (ASPs). Results are as presented in Figures 6 and 7

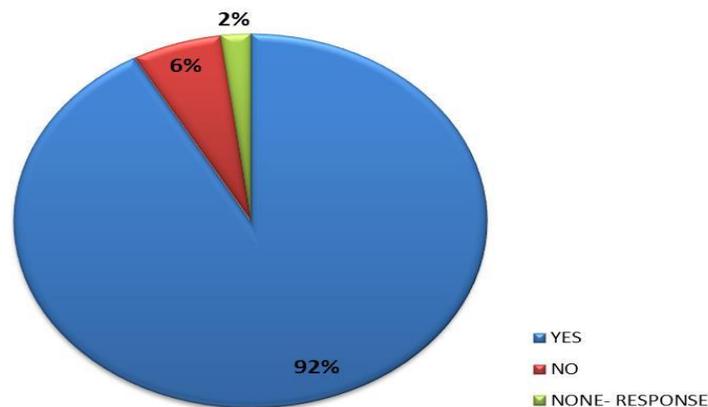


Figure 6: Linkage activities among ASPs

Figure ... indicates that 92% of the Service Providers acknowledged that linkages exist among them. They further specified the Linkage activities that exist and results are as presented in Figure 7.

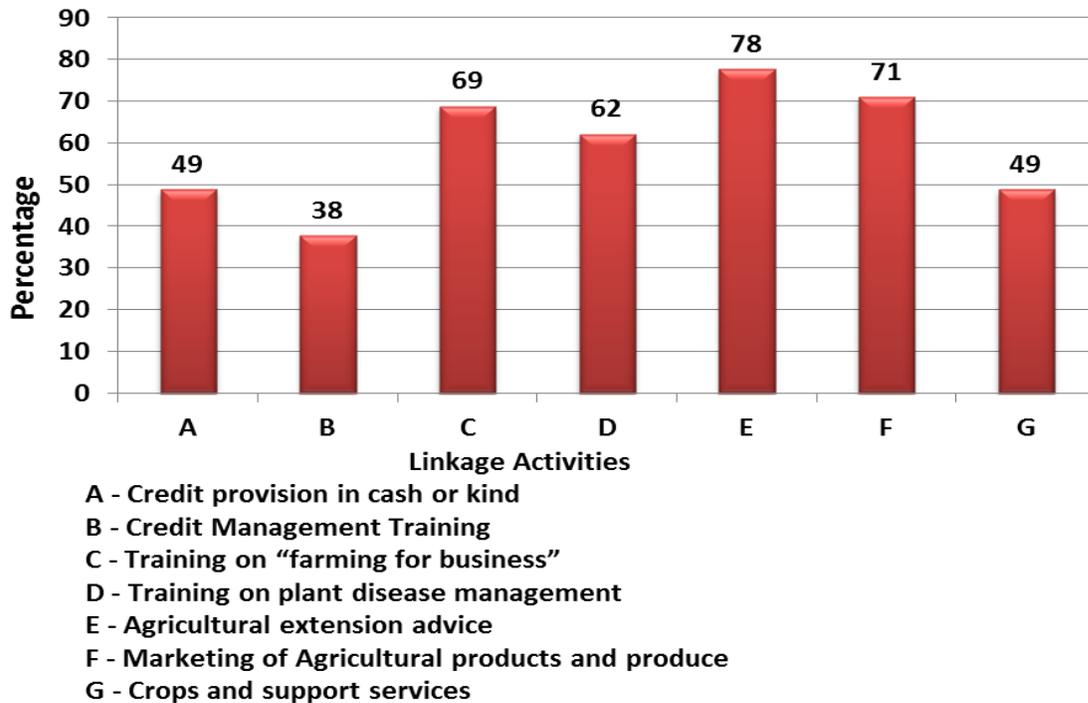


Figure 7: Linkage Activities among Agricultural Service Providers (ASPs)

Figure 7 shows Linkage activities that exist among ASPs. The Linkage is at the highest in the area of "Agricultural extension advice" with 78% of the respondents attesting so. This implies that they liaise with each other in development and implementation of pilot activities on relevant local technology, sourcing for financial support and collection, accumulation, modification and provision of information among others. The Figure further reveals that, Linkage is at the lowest in the area of "Credit Management Training" with 38% of respondents indicating so. With few Service Providers implementing Credit Management Training, it is not surprising that farmers lack abilities to manage credit obtained. This emphasises the place of training for growth and development in every area of human endeavour.

3.4.3 Linkage Activities between Agricultural Service Providers (ASPs) and Farmers

This sub-section presents and discusses results obtained on linkage activities between Agricultural Service Providers and Farmers. Results are as presented in Figure 8

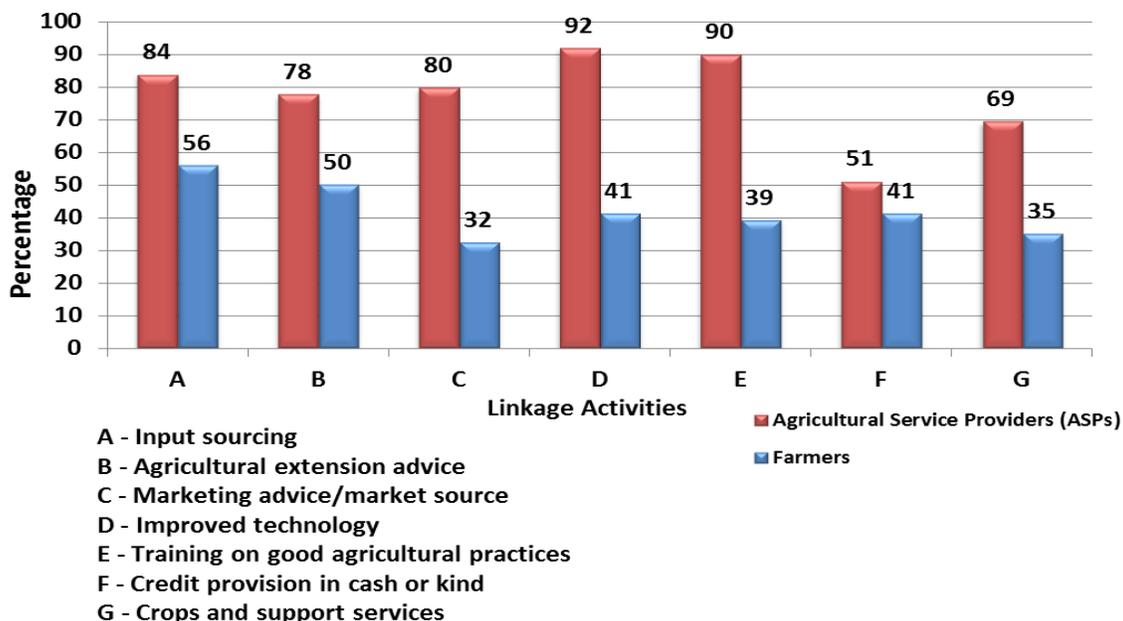


Figure 8: Linkage Activities between ASPs and Farmers

Figure 8 shows the views of ASPs and Farmers on linkage activities in Mechanised Farming. Close observation of results shows a disparity between the views of the two groups of respondents. Percentage scores from ASPs are relatively higher than those of the Farmers on all linkage activities. However, it was observed that, percentage scores of Farmers were at the lowest on “Marketing advice/market source” (32%). This may be attributed to limited number of manpower required by the ASPs to attend adequately to the large number of farmers in Nigeria.

3.5 Issues Arising from Linkage Activities among Stakeholders in Mechanised Farming

This Section discusses issues arising from linkage activities that exist among stakeholders in mechanised farming. Results are as presented in Table 4.

Table 4: Issues from Linkage Activities

S/N	LINKAGE ACTIVITY	ISSUES
1.	Input Sourcing	<ul style="list-style-type: none"> Inadequate Farm Inputs for distribution to farmers when needed. E.g. Fertilizer, Farm machinery and equipment.

		<ul style="list-style-type: none"> • High cost of acquiring Inputs e.g. Hybrid seeds, Fertilizer, Farm machinery and equipment.
2.	Agricultural Extension Advice	<ul style="list-style-type: none"> • Low ratio of Agriculture Extension Workers to farmers. • It difficult in adopting new innovations and technology by some Farmers. • Inadequate Funding by Government.
3.	Marketing Advice and Market Sourcing	<ul style="list-style-type: none"> • Negative activities of middle men as disincentive for expansion. • Difficulties in transporting farm produce to markets resulting from bad and poor road network, insufficient number of vehicles among other factors. • Inadequate capacity building on marketing for Farmers by Extension Workers. • Poor Quality Control of production and packaging of Farm Produce. • Lack of Price Control Mechanism for Farm produce. • Inadequate processing facilities.
4.	Improved Technology	<ul style="list-style-type: none"> • Reluctance of Farmers to adopt modern technology. • High cost of adopting modern technology. • Limited access to improved technology.
5.	Training on good agricultural practices	<ul style="list-style-type: none"> • Inadequate training facilities. • Illiteracy among farmers. • Wrong use of pesticides and other agro chemicals by Farmers. • Inadequate training on the use of modern technology. • Inadequate training of farmers on credit facilities and management. • Inadequate training on “Farming for Business”. • Inadequate training on Environmental Management.
6.	Credit Facilities	<ul style="list-style-type: none"> • Difficulty in accessing loans and farm inputs from Financial Institutions and other Service Providers. • Incidences of default by farmers in loan repayment.
7.	Crops and support services	<ul style="list-style-type: none"> • Inadequate storage facilities. • Poor quality seeds.

3.6 Availability of Training Policy

This section presents and discusses data obtained on availability of Training Policy in Mechanised Farms. Results are presented in Figure 9.

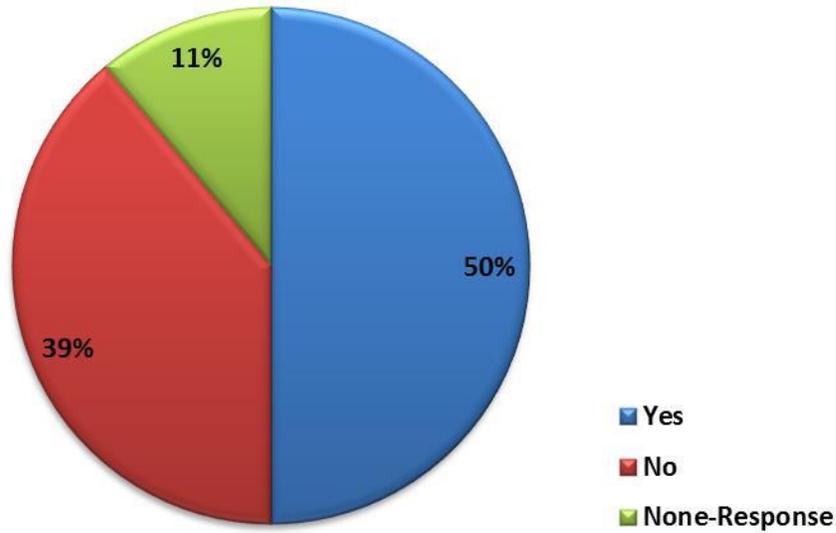


Figure 9: Availability of Training Policy

From Figure 9, it is evident that 50% of the Farms surveyed have Training Policy while 39% do not. This result is disturbing especially when it is noted that 11% of Farm Managers did not respond to this question. This may also imply that they do not have a Training Policy.

The Study probed further to discover if those Farms with Training Policy also have Training Plans and Programmes. The result is presented in Figure 10.

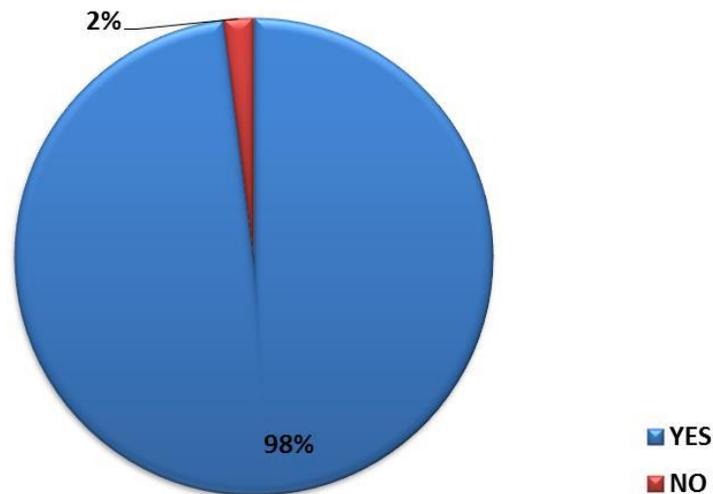


Figure 10: Training Plans and Programmes

Result from Figure 10 shows that 98% of the Farms with Training Policy also have Training Plans and Programmes while only 2 % do not have.

3.7 Perception on Mechanised Farming

This section presents and discusses results obtained on perception of Farm Managers, Service Providers and Farm Engineers on Mechanised Farming in Nigeria. Results are as presented on Table 5.

Table 5: Perception on Mechanised Farming in Nigeria

Key Result Areas	Farm Manager (̄)	Service Provider (̄)	Farm Engineer (̄)	Mean of Means (̄)	Interpretation
Attainment of food security	2.64	3.22	3.11	2.99	Average
Increased production of agricultural raw materials	2.75	3.45	3.48	3.23	Average
Processing of export crops	2.40	2.58	2.94	2.64	Average
Employment generation	2.70	3.25	3.24	3.06	Average
Utilisation of agricultural resources	2.53	3.44	3.62	3.20	Average
Preservation of Agricultural land resources from drought, soil erosion, flood and desert encroachment	2.54	2.62	2.88	2.68	Average
Promotion of increased application of modern technology to agriculture	2.74	3.50	3.37	3.20	Average

Results from Table 5 indicate that, perceptions of all categories of respondents on all the key result areas are on the average. This is going by general mean scores in the range of 2.64 – 3.23. These result are sources of great concern for a nation like Nigeria in view of the series of programmes rolled out since 1977 such as Operation Feed the Nation (OFN), Green Revolution (GR) and Agencies created such as Agricultural Development Programme (ADP) River Basin Authority (RBA), Directorate of Food, Roads and Rural Infrastructures (DFRRI) among others.

3.8 Challenges that Impede Achievement of Objectives of Mechanized Farming in Nigeria

This section presents and discusses results on Challenges of Mechanised Farming in Nigeria. Results are as presented in Table 6.

Table 6: Challenges of Mechanized Farming

Variables	Farm Managers	Service Providers	Farm Engineers	Mean of Means	Interpretation
Effect of the Land Reform Act	3.41	3.57	3.66	3.55	High
Availability of Funds	3.76	4.10	3.92	3.93	High
Availability of improved seeds and seedlings	3.18	3.10	3.52	3.27	Average
Availability of fertilizer	3.44	3.57	3.73	3.58	High
Affordability of fertilizer	3.81	3.82	3.81	3.81	High
Availability of tractors and other implements	3.45	3.90	3.61	3.65	High
High Cost of maintaining tractors and other implements	3.69	4.02	3.87	3.86	High
Outbreak of diseases on crops	2.80	3.00	3.06	2.95	Average
Access to Credit facilities	3.65	4.00	3.77	3.81	High
Environmental factors; i.e. drought, erosion, desertification, etc.	2.87	3.26	3.31	3.15	Average
Training services	3.02	3.20	3.44	3.22	Average
Agricultural extension services	3.20	3.32	3.30	3.27	Average
Marketing of Agricultural products and produce	3.60	3.69	3.83	3.71	High
Storage facilities	3.13	3.65	3.58	3.45	Average
Transportation of Agricultural inputs, produce and products	3.49	3.48	3.48	3.48	Average

From Table 6, various respondents implicated all identified variables as challenges with general Mean Scores in the range of 2.95 – 3.93. However, Funding stands

out as the singular most inhibiting challenge with the highest mean score of 3.93. This is not surprising because funding is fundamental for achievement of goals in any field of endeavour. However, it is disturbing to note that funding remains an issue in agriculture in spite of government's commitment toward the development of this sector. In fact, many of the variables listed can be seen to stem from issue of Funding.

The second highest challenge is "Cost of maintaining tractors and other implements" with a mean score of 3.86. Implication of this challenge is that, there may be underutilisation of farm land thus, impeding attainment of food security. Among other challenges with high mean scores are "Access to Credit facilities" and "Affordability of fertilizer" with mean score of 3.81. These findings are also sources of concern for a nation like Nigeria which has established several schemes such as; [Small and Medium Industries Development Agency-SMIDA \(2000\)](#), [Nigerian Agricultural, Cooperative and Rural Development Bank-NACRDB \(2000\)](#), [now Agricultural Bank of Nigeria-ABN](#), [National Fadama Development Project-NFDP \(1992\) project which is being implemented in phases](#), [National Special Program on Food Security-NSPFS \(2003\)](#) and [the National Economic Empowerment and Development Strategy-NEEDS \(2004\) among others](#) for farmers. It would seem then, that, all the stringent conditions attached to accessing of credit facilities and the role of middle men in the distribution of fertilizers prevents farmers from benefitting from such schemes.

The implication of these findings is that, Mechanized Farming can only be successful to the extent that enough funds are available along with provision of adequate attention for all other variables. Perhaps our pre-occupation at this

stage should not be so much on the various challenges that impede Mechanized Farming but rather on what needs to be done to address these challenges.

PART FOUR

SUMMARY, CONCLUSION AND RECOMMENDATION

This part presents the summary, conclusion and recommendations of the Study. It also presents issues arising from the Study.

4.1 SUMMARY

The Study was carried out to identify Issues in Mechanised Farming in Nigeria. To achieve this, the Study; assessed availability of farm machinery, implements and infrastructure in mechanised farms; appraised the competencies of tractor operators and technicians or agricultural mechanics; the existence of linkages among stakeholders in mechanised farming; identified issues arising from such linkages; ascertained availability of Training Policy in mechanised farms; assessed perception of Farm Managers and Agricultural Service Providers on mechanised farming; identified challenges that impede the achievement of objectives of mechanised farming and recommended strategies for addressing identified challenges.

The target population consisted of Farm Managers, Agricultural Service Providers and Farm Engineers. Nine Hundred and Seventy (970) respondents were drawn from the various categories of the population were used as sample for the Study.

Cross-Sectional Survey design was employed for the Study and three sets of questionnaires were developed for each category of respondents. The instrument was validated by subject experts and statisticians from the Industrial Training Fund and a Pilot Study was carried out to further validate the Instrument.

Following the Pilot Study, the main Study was carried out and face-to-face administration of Questionnaires was adopted by Research Officers and Research Assistants. Data obtained from the instrument were then subjected to descriptive statistics to provide answers to the seven research questions posed. Analysed data on the research questions were presented in Tables using means scores and percentages. Discussions of findings were made and conclusions drawn within the confines of data obtained. Limitations of the research were stated so that conclusions drawn will not be taken at face value but viewed within the context of data generated and analysed. Finally, recommendations and suggestions for further Studies were made.

4.2 Major Findings of the Study

The major findings of the Study are summarised below:

4.2.1 Availability of Farm machinery, implements and infrastructure in Mechanised Farming

- 57% of the farms surveyed have tractors and farm implements while 43% do not.
- 34% of those that have tractors and farm implements indicated that they are adequate while 66% showed that they are inadequate.
- 52% of the farmers affirmed that they have storage facilities while 48% do not.
- 69% of those that have storage facilities agreed that they are adequate.

4.2.2 Competencies of Agricultural Mechanics and Tractor Operators

- Agricultural mechanics or technicians and tractor operators are competent and had no skill gap.

4.2.3 Linkage Activities among Stakeholders in Mechanised Farming

- Linkages exist among Farmers, Agricultural Service Providers and between Farmers and Agricultural Service Providers
- Among the Stakeholders, linkage is at the highest in the area of “Input Sourcing” and lowest in the area of “Credit provision in cash or kind”.

4.2.4 Issues arising from such Linkage Activities

- Farm inputs are inadequate for distribution to farmers when needed. E.g. Fertilizer, Farm machinery and equipment.
- Inputs are expensive to acquire e.g. Hybrid seeds, Fertilizer, Farm machinery and equipment.
- The ratio of Agriculture Extension Workers to farmers is low.
- Some farmers find it difficult to adopt new innovations and technology.
- Inadequate Funding by Government.
- Negative activities of middle men as disincentive for expansion.
- Difficulties in transporting farm produce to markets resulting from bad and poor road network, insufficient number of vehicles among other factors.
- Lack of price control mechanism for Farm produce.
- Inadequate storage and processing facilities.
- Inadequate training of farmers on Credit Facilities and Management; Farming for Business; Marketing; the use of Modern Technology and Environmental Management.
- Difficulty in accessing loans and farm inputs from Financial Institutions and other Service Providers.
- Incidences of default by farmers in loan repayment.

4.2.5 Availability of Training Policy

- 50% of the Farms have Training Policy.

4.2.6 Perception of Farm Managers, Engineers and Agricultural Service Providers on mechanised farming

- Perception of Farm Managers, Engineers and ASPs was positive with “Average” mean scores in key result areas.

4.2.7 Challenges that impede Mechanised Farms

- Funding stands out as the singular most inhibiting challenge with the highest mean score of 3.93. Other challenges with high mean scores are Cost of maintaining tractors and other implements; Access to Credit facilities and Affordability of fertilizer.

4.3 CONCLUSION

The Study identified Issues in Mechanised Farming in Nigeria using empirical data. Evidence from the Study indicated that, Farm inputs were inadequate for distribution to farmers when needed; inputs were expensive to acquire; the ratio of Agriculture Extension Workers to farmers is low; inadequate Funding by Government; inadequate training of farmers and difficulty in accessing loans and farm inputs were major issues in Mechanised Farming in Nigeria. This awareness calls for a better collaborative and adaptive strategy to be adopted by Stakeholders to increase productivity level in Mechanised Farming.

It was also found that Funding; high cost of maintaining tractors and other implements; access to credit facilities and affordability of fertilizer were major challenges in Mechanised Farming. In the light of the above challenges, the Study emphasized the importance of increasing government funding in the sector and encouragement of Public Private Partnership in purchase of tractors and implements.

The Study was undertaken in order to highlight opportunities in mechanised agriculture and issues that mitigate it. The Study has brought to the fore, issues that have previously been taken for granted by Farmers, Agricultural Service Providers and Farm Engineers.

4.4 RECOMMENDATIONS

Findings of the Study have a number of important implications for the future of Mechanised Farming in Nigeria. Deliberate and concerted efforts must be made to improve the current situation especially with food security issues on ground and the Transformation Agenda of the present administration. These recommendations are made keeping in mind that Funding is a major factor in realising the goals of Mechanised Farming in Nigeria, however, the strong will to properly implement past and present recommendations should be taken with more seriousness.

- There should be better and stronger collaborations among Agencies such as the Ministry of Agriculture; Ministry of Environment; Ministry of Water Resources and other relevant Stakeholders in educating Farmers on the implications of climate change and new farming practices.
- Funding of relevant Government agencies should be given appropriate attention. This will enable them overhaul broken down tractors and implements and monitor closely, deployments of tractors to farmers in the grass-root.

- Public Private Partnership should be encouraged in the acquisition of tractors.
- More storage facilities should be built at the Local Government level to preserve farm produce.
- More training centres should be established across the six geo-political zones and existing ones properly equipped.
- Training for farmers on Credit Facilities and Management; Farming for Business; Marketing; the use of Modern Technology and Environmental Management should be better structured and intensified.
- Investors should be encouraged to establish processing industry.
- More Agricultural Extension Workers should be employed and trained so as to increase their ratio to farmers.
- There is an urgent need for coordinated Agricultural Mechanisation Planning by the Federal and State Ministries of Agriculture which will foster team work within and between governments.
- Good road network should be constructed for easier access from farms to markets.
- Stringent conditions laid down by financial institutions for accessing credit facilities should be lowered for farmers.
- Price Control Mechanism such as Produce Marketing Board (PMB) should be reintroduced to curb negative activities of middle-men and also encourage increase in production.
- Close monitoring of distribution of fertilizer and hybrid seedlings should be pursued by relevant authorities.

4.5 Suggestions for further Studies

The vital position of the Agricultural sector in a developing economy, underscores the need for continuous study on Mechanised Farming. The Study has, to a large extent, established a baseline for further researches on Mechanised Farming. It is, therefore, expected to generate further research interest in examining other dimensions of the issue in Nigeria. Thus, the Researchers suggest the following:

- An evaluation of the implementation of Government's agenda on value chain in the Agricultural sector in Nigeria.
- A study of the National Policy on Agriculture in Nigeria to identify its role within the current Government Transformation Agenda.
- An in-depth sector-specific study of skill gaps in the Agricultural sector.
- Evaluation of the Agricultural Training Institutions in Nigeria.

REFERENCES

Bogue P., Phelan J.P. (2004). *Development of a family- focused advisory programme in the republic of Ireland*. Paper presented at the 20th Annual Association for International Agricultural and Extension Education Confegrence, Dublin, May 24-27, 2004.

Cadman, Greg (2011). *Barloworld Agricultural fills Gap*.
<http://www.masseyferguson.com/EMEA/ZA/1843>

Cooper, Olivia (2011) *Agriengineers: What does the future hold?* Farmers Weekly interactive

Dauda, S.M, Agidi G., & Shotunde, M.A (2010) *Agricultural tractor ownership and off-Season utilisation in ogun State, south western nigeria*. Vol. 6, No. 3, September 30, 2010.

Gerdien Meijerik & Pim Roza (2007) *The role of agriculture in economic development*. In Markets, Chains and Sustainable Development Strategy and Policy Paper No. 5 Stichting DLO: Wageningen <http://www.boci.wur.nl/uk/Publications>

Ibrahim, Ado-Kurawa (2002) *Leadership and Poverty in Northern Nigeria*. Institute for Contemporary Research, Kano

Ishola, T.A & Adeoti, J.S() *A Study on Farm tractors reliability in kwara State of Nigeria*. Proceedings of the Annual Conference of the Nigerian Institution of Agricultural Engineers 5th International Conference, Ilorin. Vol. 26, 2004.

Ladeinde M. A, Afanda E.O, Ageh A. J, Idowu S.O & Olayemi S.O (2009). *Agricultural machinery operators and mechanics training in Nigeria: An overview of contribution*. Journal of Agricultural Engineering and Technology (JAET), Volume 17 (No. 2).

Mijinyawa, Yahaya & Kisaku O.O (2006) *Assessment of the Edo State of Nigeria Tractor Hiring Services*. Agricultural Engineering International: The CIGR Ejournal No. 10, Vol VII, March 2006.

Munyua, C.N, Adams P.F., and Thomson J.S. (2002). *Designing effective linkages for sustainable agricultural extension information systems among developing countries in sub-Saharan Africa*. Proceedings of the 18th annual conference, Durban, South Africa.

Nlerum, F. E (...). *Effect of Green River Project on Rural Poverty Alleviation in Bayelsa State, Nigeria*. Department of Agriculture and Allied

Economics/Extension, Rivers State University of Science and Technology, Port-Harcourt, Nigeria.

Oni, K.C (...) *Agricultural Mechanisation for creation of rural wealth: The Imperatives*. Paper delivered at the Nigerian Institute

Oni, K.C (2009). *Adoption of Appropriate Agricultural Technologies for Commercial arable crops farming in Nigeria*. A paper presented at the Workshop on Commercial farming of Arable Crops in Nigeria. Organised by the Nigerian Agricultural, Cooperative and Rural Development Bank Ltd, Ilorin, 16th -18th June 2009

Oni K.C. (...) *Agricultural Mechanization for Creation of Rural Wealth: The Imperatives*. Director/Chief Executive, National Centre for Agricultural Mechanization (NCAM), Ilorin, Nigeria

Federal Republic of Nigeria. (2010). *Review of On-going Agricultural Development Efforts*. Publication of the Federal Government Nigeria.

**FEDERAL REPUBLIC OF NIGERIA
INDUSTRIAL TRAINING FUND**

**QUESTIONNAIRE ON EMERGING ISSUES IN MECHANISED AGRICULTURE IN NIGERIA FOR FARM
MANAGER**

INTRODUCTION

The study seeks to identify Emerging issues in Mechanised Agriculture in Nigeria. An honest response to these questions will be appreciated and treated with highest level of confidentiality.

SECTION A: Background Information

1. Name of Farm:
2. Location:
3. Farm size: (in Acres).....
4. Year of establishment:
5. Staff strength:

SECTION B: Training Policy and Plan

6. Do you have a Training Policy? Yes No
7. Do you have a Training Plan? Yes No
8. What type(s) of training do you offer your Staff?
 Induction Training On-the-Job Training Off-the-Job Training

SECTION C: Relationships

9. Are there relationship(s) between you and other farmers in your locality?
 Yes No
10. If yes to question 9, please indicate the relationship(s) that exist between you and other Farmers in your locality in Table 1 by ticking (✓).

Table 1: Relationships with Other Farmers

S/N	Relationships	Tick as appropriate
i.	Input sourcing	
ii.	Agricultural extension advice	
iii.	Marketing advice/market source	
iv.	Improved technology	
v.	Training on good agricultural practices	
vi.	Credit provision (cash or in-kind)	
vii.	Crops and support services	
Viii.	Others (specify)	

11. Please, outline issues arising from the relationship(s) identified above in Table 2.

Table 2: Issues from Relationship(s) with other farmers

S/N	Relationships	Issues arising from Relationship(s)
i.	Input sourcing	
ii.	Agricultural extension advice	
iii.	Marketing advice/market source	
iv.	Improved technology	
v.	Training on good agricultural practices	
vi.	Credit provision (cash or in-kind)	
vii.	Crops and support services	
viii.	Others (Please specify)	

12. Do you belong to any Farmer Group/Association?

Yes No

13. If yes to question 12, please indicate the relationship that exist between your Farmer Group/Association and Agricultural Service Agencies such as Ministry of Agriculture, FADAMA, etc. in Table 3 by ticking (✓).

Table 3: Relationship(s) with Agricultural Service Agencies

S/N	Relationships	Tick as appropriate
1	Input sourcing	
2	Agricultural extension advice	
3	Marketing advice/market source	
4	Improved technology	
5	Training on good agricultural practices	
6	Credit provision (cash or in-kind)	
7	Others (specify)	

14. Please, outline issues arising from the relationship(s) identified above in Table 4.

Table 4: Issues from Relationship(s) with Other Agricultural Service Agency.

S/N	Relationships	Issues arising from Relationship(s)
i.	Input sourcing	
ii.	Agricultural extension advice	
iii.	Marketing advice/market source	
iv.	Improved technology	
v.	Training on good agricultural practices	
vi.	Credit provision (cash or in-kind)	
vii.	Crops and support services	
viii.	Others (Please specify)	

SECTION D: Equipment, Implements and Infrastructure

15. Do you have Tractors and Farm implements?

Yes No

16. If yes to question 15, are they adequate?

Yes No

17. If yes to Question 15, how do you maintain your tractors and implements?

.....

18. If No, to Question 15, where do you hire tractors and implements?

.....

19. How would you rate the services of Agricultural Service Agencies in providing tractors and implements?

Very Good Good Fair Poor

20. Do you have storage facilities?

Yes No

21. If yes to question 20, are the storage facilities adequate?

Yes No

22. If No to Question 20, how do you store your farm produce and product?

.....

SECTION E: Perception on Mechanized Farming

23. Please, rate your Perception on Mechanised Farming in Nigeria in the following Key Result Areas on a scale of 1-5 (1 being that the perception is very low and 5 being that the perception is very high) in Table 5.

TABLE 5: Perception on Mechanised Farming

S/N	Key Result Areas	RATING				
		1	2	3	4	5
i.	Attainment of food security					
ii.	Increased production of agricultural raw materials					
iii.	Processing of export crops					
iv.	Employment generation					
v.	Utilization of agricultural resources					
vi.	Preservation of agricultural land resources from drought, soil erosion, flood and desert encroachment					

vii.	Promotion of increased application of modern technology to agriculture					
------	--	--	--	--	--	--

SECTION F: Challenges of Mechanised Farming

24. Please, rate the extent to which the following challenges affect Mechanized Farming in Nigeria on a scale of 1 – 5 (1 being that the challenge is very low and 5 being that the challenge is very high) in Table 6.

TABLE 6: Challenges Affecting Mechanized Farming

S/N	Challenges	Rating				
		1	2	3	4	5
i.	Land Reform Act					
ii.	Funding					
iii.	Availability of improved seeds and seedlings					
iv.	Availability of fertilizer					
v.	Affordability of fertilizer					
vi.	Availability of tractors and other implements					
vii.	Cost of maintaining tractors and other implements					
viii.	Outbreak of diseases on crops					
ix.	Access to Credit facilities					
x.	Environmental factors; i.e. drought, erosion, desertification, etc.					
xi.	Training services					
xii.	Agricultural extension services					
Xiii	Marketing of Agricultural products and produce					
Xiv	Storage facilities					
Xv	Transportation of Agricultural inputs, produce and products					
	Other challenges (please, specify)					
xvi.						
xvii.						
xviii.						
xix.						

**FEDERAL REPUBLIC OF NIGERIA
INDUSTRIAL TRAINING FUND**

QUESTIONNAIRE ON EMERGING ISSUES IN MECHANISED AGRICULTURE IN NIGERIA FOR FARM ENGINEER/TECHNICIAN

INTRODUCTION

The study seeks to identify Emerging issues in Mechanised Agriculture in Nigeria. An honest response to these questions will be appreciated and treated with highest level of confidentiality.

SECTION A: Background Information

1. Name of Farm:
2. Location.....
3. Farm size: (in Acres).....

SECTION B: Skills Level

4. Please, rate the ability of the **Farm Equipment Technicians/Agricultural Mechanics** in performing the following tasks on the scale of 1-5 (1 being the lowest and 5 being the highest) in Table 1.

Table 1: Tasks Performed by Farm Equipment Technicians/Agricultural Mechanics

S/N	TASKS	RATINGS				
		1	2	3	4	5
i.	Record details of repairs made and parts used.					
ii.	Reassemble machines and equipment following repair, test operation and make adjustments as necessary.					
iii.	Maintain, repair and overhaul farm machinery and vehicles.					
vi.	Examine and listen to equipment.					
v.	Dismantle defective machines for repair, using hand tools.					
vi.	Test and replace electrical components and wiring, using test meters, soldering equipment and hand tools.					
vii.	Repair or replace defective parts.					

5. Please, rate the ability of **Tractor Operators** to perform the following tasks on the scale of 1-5 (1 being the lowest and 5 being the highest) in Table 2.

Table 2: Tasks Performed by Tractor Operator

S/N	TASKS	RATINGS				
		1	2	3	4	5
i.	Interpret and follow operating manuals, maintenance manuals and service charts.					
ii.	Inspect and interpret manufacturer’s instruction for proper use of all controls for safe operation of tractor and all attachments.					
iii.	Perform safety inspections and comply with safety codes standards.					
iv.	Operate several sets of controls for tractor and attachments according to industry standards.					
v.	Connect/disconnect all attachments with mechanical drive shafts and hydraulic lines.					
vi.	Develop basic knowledge of soil types and mineral content.					
vii.	Learn Characteristics of soil types under various terrain and weather conditions.					
viii.	Follow oral and written instructions from supervisor.					
ix.	Operate tractor on rolling hills, flat terrain, along roadways within confined and congested areas.					
x.	Interpret and comply with safety codes and standards.					
xi.	Recognize and troubleshoot mechanical problems with tractor and all attachments.					
xii.	Use attachments to rough grade soil and landscaping materials.					
xiii.	Instruct others in routine and preventive maintenance of tractors and attachments.					
xiv.	Instruct others in the safe operation of tractors and attachments.					
xv.	Assist in the training and development of employees who possess the desire and aptitude to operate tractors and attachments.					

SECTION C: Perception on Mechanized Farming

6. Please, rate your Perception on Mechanised Farming in Nigeria in the following Key Result Areas on a scale of 1-5 (1 being that the perception is very low and 5 being that the perception is very high) in Table 3.

TABLE 3: Perception on Mechanised Farming

S/N	Key Result Areas	RATING				
		1	2	3	4	5
i.	Attainment of food security					
ii.	Increased production of agricultural raw materials					
iii.	Processing of export crops					
iv.	Employment generation					
v.	Utilization of agricultural resources					
vi.	Preservation of agricultural land resources from drought, soil erosion, flood and desert encroachment					
vii.	Promotion of increased application of modern technology to agriculture					

SECTION D: Challenges of Mechanised Farming

7. Please, rate the extent to which the following challenges affect Mechanized Farming in Nigeria on a scale of 1 – 5 (1 being that the challenge is very low and 5 being that the challenge is very high) in Table 4.

TABLE 4: Challenges Affecting Mechanized Farming

S/N	Challenges	Rating				
		1	2	3	4	5
i.	Land Reform Act					
ii.	Funding					
iii.	Availability of improved seeds and seedlings					
iv.	Availability of fertilizer					
v.	Affordability of fertilizer					
vi.	Availability of tractors and other implements					
vii.	Cost of maintaining tractors and other implements					
viii.	Outbreak of diseases on crops					
ix.	Access to Credit facilities					
x.	Environmental factors; i.e. drought, erosion, desertification, etc.					
xi.	Training services					

xii.	Agricultural extension services					
Xiii	Marketing of Agricultural products and produce					
Xiv	Storage facilities					
Xv	Transportation of Agricultural inputs, produce and products					
S/N	Other challenges (please, specify)	1	2	3	4	5
xvi.						
xvii.						
xviii.						
xix.						

APPENDIX C

FEDERAL REPUBLIC OF NIGERIA INDUSTRIAL TRAINING FUND

QUESTIONNAIRE ON EMERGING ISSUES IN MECHANISED AGRICULTURE IN NIGERIA FOR AGRICULTURAL SERVICES PROVIDER

INTRODUCTION

The study seeks to identify Emerging issues in Mechanised Agriculture in Nigeria. An honest response to these questions will be appreciated and treated with highest level of confidentiality.

SECTION A: Background Information

1. Name of Organisation:
2. Ownership: Government Private
3. Location.....
4. Year of establishment:
5. Type(s) of Service(s) rendered.....
6. Staff strength:

SECTION B: Relationships

7. Please, indicate the type(s) of relationship(s) that exist between your Organisation and Farmers in Table 1 by ticking (✓)

Table 1: Relationship(s) with Farmers

S/N	Linkage Activities	Tick as appropriate
I	Input sourcing	
ii.	Agricultural extension advice	
iii.	Marketing advice/market source	
iv.	Improved technology	
v.	Training on good agricultural practices	
vi.	Credit provision (cash or in-kind)	
vii.	Crops and support services	

viii.	Others (specify)	
-------	------------------------	--

8. Please, outline issues arising from the relationship(s) identified above in Table 2

Table 2: Issues from Relationship(s) with Farmers.

S/N	Relationships	Issues arising from Relationship(s)
i	Input sourcing	
ii.	Agricultural extension advice	
iii.	Marketing advise and market source	
iv.	Improved technology	
v.	Training on good agricultural practices	
vi.	Credit provision (cash or kind)	
vii.	Crop and support services	
viii.	Others (please specify)	

9. Are there relationship(s) between your Organisation and other Service Providers?

Yes No

10. If yes to question 9, please indicate the type(s) of relationship(s) that exist between your Organisation and other Service Providers in Table 3 by ticking (✓).

Table 3: Relationship(s) with Other Service Providers

S/N	Relationships	Tick as appropriate
i.	Credit provision (cash or in-kind)	
ii.	Credit management training	
iii.	Training on “farming for business”	
iv.	Training on plant disease management	
v.	Agricultural extension advice	
vi.	Marketing of Agricultural products and produce	
vii.	Crops and support services	
viii.	Others (Please specify)	

11. Please, outline issues arising from the relationship(s) identified above in Table 4.

Table 4: Issues from Relationship(s) with Other Service Providers

S/N	Relationships	Issues arising from Relationship(s)
i.	Credit provision(cash or in-kind)	
ii.	Credit management training	
iii.	Training on farming for business	
iv.	Training on plant disease management	
v.	Agricultural extension advice	
vi.	Marketing of Agricultural products and produce	
vii.	Crops and support services	
viii.	Others (Please specify)	

SECTION C: Perception on Mechanized Farming

12. Please, rate your Perception on Mechanised Farming in Nigeria in the following Key Result Areas on a scale of 1-5 (1 being that the perception is very low and 5 being that the perception is very high) in Table 5.

TABLE 5: Perception on Mechanised Farming

S/N	Key Result Areas	RATING				
		1	2	3	4	5
i.	Attainment of food security					
ii.	Increased production of agricultural raw materials					
iii.	Processing of export crops					
iv.	Employment generation					
v.	Utilization of agricultural resources					
vi.	Preservation of agricultural land resources from drought, soil erosion, flood and desert encroachment					
vii.	Promotion of increased application of modern technology to agriculture					

SECTION D: Challenges of Mechanised Farming

13. Please, rate the extent to which the following challenges affect Mechanized Farming in Nigeria on a scale of 1 – 5 (1 being that the challenge is very low and 5 being that the challenge is very high) in Table 6.

TABLE 6: Challenges Affecting Mechanized Farming

S/N	Challenges	Rating				
		1	2	3	4	5
i.	Land Reform Act					
ii.	Funding					
iii.	Availability of improved seeds and seedlings					
iv.	Availability of fertilizer					
v.	Affordability of fertilizer					
vi.	Availability of tractors and other implements					
vii.	Cost of maintaining tractors and other implements					
viii.	Outbreak of diseases on crops					
ix.	Access to Credit facilities					
x.	Environmental factors; i.e. drought, erosion, desertification, etc.					
xi.	Training services					
xii.	Agricultural extension services					
Xiii	Marketing of Agricultural products and produce					
Xiv	Storage facilities					
Xv	Transportation of Agricultural inputs, produce and products					
	Other challenges (please, specify)					

xvi.						
xvii.						
xviii.						
xix.						

The Farm Manager/General Manager

STUDY ON ‘EMERGING ISSUES IN MECHANIZED AGRICULTURE IN NIGERIA’

The Industrial Training Fund (ITF), is an Agency of the Federal Government saddled with the responsibility of developing the nation’s Human Resource for improved performance and increased productivity. As part of strategies towards actualizing its mandate, the ITF carries out Research in various Sectors of the Economy to identify issues with a view to proffering appropriate interventions.

In this regard, the ITF intends to carry out a Survey titled ‘**Emerging Issues in Mechanized Agriculture in Nigeria**’ in order to identify challenges in Mechanized Agriculture in Nigeria. Consequently, we are requesting for approval to carry out the Survey in your Farm to enable us acquire relevant data for the study. This will involve visit by Officers of the ITF to your Farm onMarch, 2012 for the Survey.

Please, be assured that any information collected will be treated with utmost confidentiality.

Kindly accept our best wishes in anticipation of your cooperation as we partner towards developing the nation’s human resource.

Yours faithfully

Industrial Training Fund
Area Manager
For: Director General

The Director

STUDY ON 'EMERGING ISSUES IN MECHANIZED AGRICULTURE IN NIGERIA'

The Industrial Training Fund (ITF), is an Agency of the Federal Government saddled with the responsibility of developing the nation's Human Resource for improved performance and increased productivity. As part of strategies towards actualizing its mandate, the ITF carries out Research in various Sectors of the Economy to identify issues with a view to proffering appropriate interventions.

In this regard, the ITF intends to carry out a Survey titled '**Emerging Issues in Mechanized Agriculture in Nigeria**' in order to identify challenges affecting in Mechanized Agriculture in Nigeria. Consequently, we are requesting for approval to carry out the Survey in your Organisation to enable us acquire relevant data for the study. This will involve visit by Officers of the ITF to your Organisation on March, 2012 for the Survey.

Please, be assured that any information collected will be treated with utmost confidentiality.

Kindly accept our best wishes in anticipation of your cooperation as we partner towards developing the nation's human resource.

Yours faithfully

Industrial Training Fund

Area Manager

For: Director General