INCOME AND EMPLOYMENT OPPORTUNITIES IN POULTRY FARMING: A CASE STUDY OF KADUNA SOUTH LOCAL GOVERNMENT AREA.

BY

UJATA OWOICHO STANLEY

(M.Sc/SOC-SCI/8715/2009-2010)

A Thesis submitted to Postgraduate School , Ahmadu Bello University Zaria in partial fulfillment of the requirements for the award of degree of Masters of Science (M.Sc) in Economics

June, 2015

SUPERVISORS:

PROFESSOR Patricia. S. Aku

PROFESSOR Abdul-Ganiyu Garba

DECLARATION

I Ujata Owoicho Stanley (M.Sc./Soc-Sci/8715/2009-2010) hereby declare that this research work titled "Income and Employment Opportunities in Poultry Farming: A Case Study of Kaduna South Local Government Area" was undertaken by me under the supervision of Professor Patricia .S. Aku and Professor Abdul-Ganiyu Garba To the best of my knowledge, the work has not been presented anywhere for the award of any Degree or Diploma in any institution of learning. All sources of information, materials and quotations used for this study were duly acknowledged by means of references.

…… **…….**

Ujata Owoicho Stanley **Date**

M.sc./Soc-Sci/8715/2009-2010

CERTIFICATION

This is to certify that this thesis "Income and Employment Opportunities in Poultry Farming: A Case Study of Kaduna South Local Government Area" conducted by Ujata Owoicho Stanley meets the requirement for the award of Masters of Science Degree in Economics in the Postgraduate School, Ahmadu Bello University, Zaria. The thesis work is this day approved for its contribution to knowledge and literally presentation.

…… **……..**

Professor Patricia .S. Aku **Date**

Chairman, supervisory committee

…… **…….**

Professor Abdul-Ganiyu Garba **Date**

Member, supervisory committee

…… **……..**

Dr. (Mrs) Salamatu Isah **Date**

Head of Department (H.O.D)

Department of Economics,

A.B.U. Zaria

…… **……**

Prof. Adebayo A. Joshua **Date**

Dean of Postgraduate School,

A.B.U. Zaria.

DEDICATION

This thesis is dedicated to the Almighty God, the memory of my late father Mr. Samuel Abu Ujata, my mother Mrs. Elizabeth Ujata, my dear wife Mrs. Joyce Ujata and my son Master Enoch Dominic Adakole Ujata who supported me all the way.

ACKNOWLEDMENTS

My appreciation first goes to the Almighty God, who manifested on every stage of this study. He has proved His supremacy by meeting all my needs beyond expectations and delivered me from difficult situations. Indeed, He is Awesome. Halleluyah to His most holy name! I employ the Holy Spirit to express my heartfelt gratitude.

I am greatly indebted to my supervisors, Professor Patricia S. Aku and Professor Abdul-Ganiyu Garba **.** Thank you for your patience, painstaking corrections and incisive comments. The contributions you have made to this study and I in person have created an indelible mark in my heart; because you did not only disciple me academically but you have also assumed the position of my parents.

I will also thank Dr Mike Duru, Dr Peter Njiforti, and Dr. S. A. Abdulsalam, for their suggestions and contribution. All members of the postgraduate committee are highly appreciated for their suggestions and contributions to this thesis work. I will also express my heartfelt gratitude to my Head of Department; Dr. (Mrs) Salamatu Isah. I also appreciate the Departmental Librarians, departmental computer instructor (Buhari) and non academic staff of the department (both junior and senior) for the role they played to make this work a success.

I am also grateful to my family. First, to my late father Mr Samuel Ujata, my mother Mrs Elizabeth Ujata, my sister ASP Grace Ujata , my brother Mr. Innocent Ujata, my dear wife Mrs. Joyce Ujata and my son Master Enoch Dominic Adakole Ujata. You did support both in finance and in prayers. In fact, one of the sources of my confidence and inspirations to approach difficult situations and moments in the course of this study has been from your constant calls to reassure me of your prayers every day. I appreciate your contributions in various ways.

To my friends, cousins and well-wishers: Raymond Ekele ,Bulus Bula, Sarah Effeh Eno, Ibrahim Abba, Caroline Dawam, Patricia Na'anshep, Jonathan Gaiya, Simon Ashiru, Baba Musa Ahmed, Francis Afemai, Bege Samson Sako, Clement Kogi, Yusuf Nanpan , 2009-2010 M. Sc. Class members, thak you for your support and prayers. Space will not permit me to mention all; however, I sincerely express my gratitude to all that contributed to the success of this study.

Abstract

This study evaluated the income and employment opportunities in poultry farming using Kaduna South Local Government Area as a case study. The main objectives were to analyze the poultry farming value chain in the study area, evaluate its income and employment opportunities and examine the challenges faced in poultry farming. Farm budgeting techniques was used to determine income opportunities while production function was used to determine employment potential. The study used primary source of data and employed descriptive statistics to analyze the data generated in the layer and broiler value chains which converge at the distribution segment. The study generated four main findings. First, the two value chains have positive rates of returns. However, the broiler value chain has the higher rate of return. Second, the distribution part of the value chain has higher potential for employment generation. Third, the relationship between flock size and profit levels is direct. This implies that scaling up of production will significantly increase profits. Fourth, Cost of feed is the highest variable cost in both layer and broiler farms. We conclude that income and employment potential of the poultry value chains is significant and could be actualized by a significant scaling up of activities. Second, a reduction in costs of feed will significantly reduce costs of production and increase income generated in the farms. The findings of the study recommend that policy makers encourage investments in all the segments of the value chain also policies targeting reduction of cost of feed should be formulated.

TABLE OF CONTENTS

Page

Title Page ……..……... i

Declaration ……..……. ii

Certification ……. iii

Dedication ……..…….. iv

Acknowledgment ……..... v

Abstract ……..….. vii

Table of Contents……..……viii

List of Tables……..……..……xiii

List of figures……..……xv

List of Appendices …….....…….. xvi

CHAPTER ONE

INTRODUCTION ……...…….…… 1

1.1Background to the Study ……..…… 1

1.2Statement of the Problem ……..…….2

1.3Research Questions …….……. 5

1.4 Objectives of the Study ……..……..…….. 5

1.4 Justification of the Study …….……..…..…. 5

1.5 Scope and Limitation of the Study …….…..….6

1.6 Organization of the Study ……..……..…. 7

CHAPTER TWO

REVIEW OF RELEVANT LITERATURE …….…... 8

2.1. Conceptual Literatures …….……..…….…….. 8

2.1.1 Poultry Farming ……..…….…….……...… 8

2.1.2 Importance of Poultry …….……..…….. 11

2.2. Theoretical Literatures …….…..……...……..……. 12

2.2.1 Value Chain Theory ……..…..… 12

2.2.2 Value Chain in poultry Farming ……..……..…… 15

2.2.2.1 Identification of the Actors in the Value Chain.……..... …...17

2.2.2.2 Developing Value Chain Systems Towards Benefits of Poultry Farmers…….. 20

2.2.2.3 Value Chain Marketing Systems……..……. 23

2.3 Empirical Literature ……..…….……24

2.3.1 **Value Chain Analysis of Nigerian Poultry Industry**……..…..... 24

2.3.1.1Spent-Layer Poultry and Commercial Table and Indigenous Poultry Egg Value Chain

……..….24

2.3.1.2 Actors, Production Practices, Costs and Livelihood Activities in the Commercial Broiler Chain ……..……..28

2.3.1.3 Indigenous Poultry Chain ……..……29

2.4 Poultry Industry in Nigeria. ……...….31

2.5 International Poultry Practices ……..……32

2.6 Gap in Literatures …..……..…….……. 35

CHAPTER THREE

METHODOLOGY……..……...……. 36

3.1 Value Chain Framework…….…….…….…. 36

3.1.1 Spent Layer and Table Egg Value Chain in Kaduna South Local Government Area…….…… 37

3.1.2 Broiler Value Chain in Kaduna South Local Government Area…….... 39

3.1.3 Indigenous Chicken Value Chain**……..**…… 40

3.2 Analytical Techniques……...…….…... 41

3.2.1 Farm Budgeting Analysis……... 42

3.2.2 Production Analysis of the Value Chains…….…. 43

3.3 Employment Potential of the Value Chain……....…....…. 51

3.4 The Study Area ……..52

3.5Sampling Techniques……..…….…. 52

3.6 Analysis of Data……..……...…...……...54

CHAPTER FOUR

4.0 PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS…... ……..…55

4.1 Socio Economic Characteristics of Respondents……..…... ..55

4.2 Analysis of Cost Structure and Pricing……..…. …….….58

4.3 Analysis of Income Opportunities…….……... 62

4.4 Returns on Investment in Value Chain ……..……68

4.5 Analysis of Employment Opportunities ……....70

4.6 Regression Analysis of Producer Stage of Value Chain…….……71

4.7 Challenges Faced In the Value Chain…….…… 73

4.8 Summary of Key Findings…….. 75

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS ……..... 76

5.1 Summary of the Study ……..… 76

5.2 Conclusion of the Study …… ……77

5.3 Recommendations of the Study ……. 77

REFERENCES .....……..…. …….79

APPENDICES 88

LIST OF TABLES

Table 3.1: Distribution of Samples along Value Chain 53

Table 4.1: Socio Economic Characteristics of Respondents 56

Table 4.2: Layer Farms cost structure 58

Table 4.3: Cost structure Of Broiler farms 59

Table 4.4: Cost structure of Distribution Segment 59

Table 4.5: Pricing of Eggs 61

Table 4.6:Pricing of Broiler and spent Layer 62

Table 4.7: Incomes of Layer Farms 63

Table 4.8: Incomes of Broiler Farms 64

Table 4.9: Incomes of Distribution segment 64

Table 4.10: Average Coefficient of Private Profitability in Value Chains 67

Table 4.11: Average Coefficient of Private Profitability in Backyard Farms 67

Table 4.12: Average Coefficient of Private Profitability in small scale farms 68

Table 4.13: Average Coefficient of Private Profitability in medium scale farms 68

Table 4.14: Average Returns per Naira Invested In Value Chain 68

Table 4.15: Average Returns per Naira Invested In backyard farms 69

Table 4.16: Average Returns per Naira Invested In small scale farms 69

Table 4.17: Average Returns per Naira Invested In medium scale farms 69

Table 4.18: Employment Potential Of Value Chain 70

Table 4.19: Employment Potential Of backyard farms 70

Table4.20: Employment Potential of small scale farms 70

Table 4.21:Employment Potential Of medium scale farms 71

Table 4.22:Regression Output of Layer farms 73

Table 4.23: Regression Output of Broiler Farms 73

LIST OF FIGURES

Figure 2.1 poultry industry value chain 16

Figure 2.2 A Value Chain Marketing System 24

Figure 2.3: flow of spent layer and table egg in Nigeria. 27

Figure 3.1.Spent layer/table egg value chain In Kaduna south local government area. 38

Figure3.2: broiler value chain in Kaduna south local government area. 39

Figure3.3: Indigenous chicken value chain in Kaduna south local government area 40

Figure 4.1 Cost structure of layer farms 60

Figure 4.2 cost structure of broiler farms 61

Figure 4.3 Cost structure of distributors 61

Figure 4.4 Relationship between flock size and profits in layer farms 66

Figure 4.5 Relationship between flock size and profit in broiler farms 66

Figure 4.6 Relationship between sales and profit levels in distribution segment 68

LIST OF APPENDICES

Appendix A: Cost Structure of Layer Farms

Appendix B: Cost Structure of Broiler Farms

Appendix C: Cost Structure of Distribution Segment

Appendix D: Income of Layer Farms

Appendix E: Income of Broiler Farms

Appendix F: Income of Distribution Segment

Appendix G: Returns on Investment in Layer Farms

Appendix H: Returns on Investment in Broiler Farms

Appendix I: Returns on Investment in Distribution Segment

Appendix J: Layer Farms Employment Potential

Appendix K: Broiler Farms Employment Potential

Appendix L: Employment Potential of Distribution Segment

Appendix M: Regression Output of Layer Farms

Appendix N: Regression Output of Broiler Farms

CHAPTER ONE

INTRODUCTION

1.1 *Background to the Study*

Poultry farming is the practice of raising chickens, turkeys, ducks and geese as a subcategory of animal husbandry for the purposes of using their meat and eggs for food. Egg production involves the use of good layer birds for the purpose of table egg production. The eggs are sold off fresh to the public while the layers, which are no longer laying eggs well, are culled off from the farm. Broiler production involves the keeping of chickens of heavy meat breeds for the purpose of getting good quality meat products usually sold live or processed.

Poverty is pronounced deprivation in well-being, and comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. Poverty also encompasses low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice, and insufficient capacity and opportunity to better one's life.

According to Briggs (1973) unemployment is the difference between the amounts of labor employed at current wage and working conditions, and the amount of labor not hired at these levels, however, Gbosi (1997) defined unemployment as a situation in which people who are willing to work at the prevailing wage rate are unable to find jobs. "The unemployed is a member of an economically active population, who are without work but available for and seeking for work, including people who have lost their jobs and those who have voluntarily left work (World Bank, 1998).

In the nutritive value, poultry egg rank second to cow milk. Poultry egg, apart from supplying protein is also a good source of lipids and vitamins of high zoological value to man. The importance

of egg is also observed in its contribution as a major ingredient in the baking of confectioneries and the use of the egg albumen in the making of shampoo and in bookbinding. In spite of this nutritional importance of poultry, poultry production appears to be grossly inadequate as demand for poultry produce in the country seems to be much greater than the supply. This implies that production has to be increased to a sustainable level. Poultry meat and eggs offer considerable potential for meeting human needs for dietary animal supply.

Poultry farming is an aspect of entrepreneurship that presents an opportunity for the extrication of the malaise of poverty and unemployment. Poultry production has developed and occupies a place of pride among the livestock enterprises due to its rapid monetary turnover (Laseinde, 1994). This single reason, among others has made the enterprise attractive and popular among small, medium, as well as large scale poultry farmers. The poultry industry has become a diverse industry with a variety of business interests such as egg production, broiler production, hatchery, vaccine, drugs and poultry equipment business.

It is also a promising source of additional income, employment generation and quick returns from investment (which can be established with a minimum cost and as a side project. Depending on the farm-size, layer (for eggs) farming can be main source of family income and can provide income and gainful employment to farmers throughout the year. Poultry manure has high fertilizer value and can be used for increasing yield of all crops. This study seeks to show that poultry farming and its value chain presents an opportunity to alleviate the effects of poverty and unemployment.

1.2 Statement of the Problem

Poverty and unemployment have adverse effects on individuals, groups and nations. It is at the root of many socio- economic and political problems. At the individual level, poverty and

unemployment leads to physical and psychological misery, it can also contribute to low self-esteem.(Arinze1995) . According to report, the high incidence of communicable diseases, malnutrition and destitution in households with low incomes is very large (World Health Organization 1996). At group level, members of families with low incomes often have limited educational opportunities, leading to much narrower employment options and consequently less participation in society. In this way poverty and social exclusion can affect successive generations. Narayan (2000) states that most family cohesion is being eroded consequent upon poverty and unemployment. At national level, with mass poverty and unemployment there tends to be a general loss of confidence in the constituted authority which generates disrespect for governmental institutions, consequently this tend to render government policies ineffective. There tends to be political apathy among contending forces and social disillusion with respect to what the societal objectives are and peoples' responsibilities towards the attainment of these objectives (Aku, Bulus, and Ibrahim, 1997).

The consequence of the aggregated effects of poverty and unemployment at the individual, group and societal level over a protracted period is inevitable; insecurity. (Mohammed, 2009) identified a strong positive correlation between poverty and these social vices. This view seems to have been reinforced by the recent report on the Nigeria poverty profile 2010 released by the National Bureau of Statistics. A careful look at page 16 of the report reveals that the two geo-political zones (north east and north west) where the incidence of poverty is reported to be most pronounced are the same zones where presently Nigeria seems to be experiencing the greatest challenges with the issue of insecurity occasioned by insurgency.

Evidence appears to indicate rising poverty and unemployment (Sodipe and Ogunrinola, 2011; NBS,2010, world Bank, 2011) while the economy is experiencing growth as indicated by

Nigeria's new status as Africa's largest economy, overtaking South Africa (Africa Development Bank,2014;Organization for Economic Cooperation and Development, 2014).This appears be in conflict with Okun's law in economic theory which postulates that 1 percent growth in economy will lead to 3 percent reduction in unemployment, as such the growth in the economy is a jobless growth.

Despite government policies and programmes (National Directorate of Employment, National Poverty Eradication Programme, Peoples Bank of Nigeria, Family Support Programme, etc) unemployment and poverty have remained a key problem (Akpan,2012; Sodipe and Ogunrinola, 2011). Arguments have emerged that developing value chains and improving their efficiency is critical to creating jobs and poverty reduction (Charitoneko, 2005; Gonzalez-Vega, Quorios and Rodriguez-Meza, 2007; Fries, Robert, and Banu Akin ,2004; Gereffi and Korzeniewicz, 1994; Goletti, 2004; Habyalimana, 2007; Mentzer, DeWitt, Keebler, Min, Nix, Smith and Zacharia;2001; Mitchell, Keane and Coles ,2009*;* *Kaplinsky* & Morris 2000).

The Federal ministry of agriculture has anchored its programme of poverty reduction and job creation in developing agricultural value chain. In Kaduna state poverty and unemployment is high(National Bureau of Statistics, 2012), it is also an agrarian state with a large poultry industry .Nnamdi, (2010) observes that individuals could make huge incomes by investing in poultry farming in Nigeria . Ahuja and Sen, (2007) note that small scale poultry is a viable income generating activity in India. Hassan, Nwanta and Mohammed, (2006) report that egg production is a profitable business venture in Kaduna. Consequently an evaluation of employment and income opportunities of the poultry industry value chain is necessary in the context of the initiative of the federal ministry of agriculture.

From the above discussions, the research questions are:

1.3 Research Questions

(i) What is the poultry farming value chain in Kaduna south local government area?

(ii) What are the income and employment opportunities in poultry farming value chain in Kaduna South local government area?

(iii) What are the challenges faced by poultry farmers in Kaduna south local government area

1.4 Objectives of the Study

(i) To analyze the value chain of poultry farming in Kaduna south local government area

(ii) To evaluate the income and employment opportunities in poultry farming value chain in Kaduna south local government area.

(iii) Examine the challenges faced by poultry farmers in Kaduna south local government area

1.5 Justification of the Study

The study of poultry farming as a tool for income and employment generation in Kaduna south local government area is justified by the need to provide useful information for policy. Plethora of similar literature seem to focus on marketing of poultry products and majority appear to conceptualize poultry farming as involving only the activities of farmers on their farms, so the analysis of income and employment potentials of poultry farming appears to be restricted only to on- farm activity.

This study seeks to widen concept of poultry farming to include its value chain, measure how the poultry value chain is being operated, and analyze the income and employment potentials inherent in the value chain in Kaduna south local government area in particular taking into account it's peculiar characteristics and by so doing capture more adequately the potentials of poultry farming to generate employment and reduce poverty. There is paucity of literature in this regard.

1.6 Scope and Limitation of the Study

The study was confined to Kaduna South local government area. This is due to its cosmopolitan nature. The limitations encountered in the course of the study could be summarized thus:

(i) There were cases of unwillingness and reluctance by farmers and other actors in the value chain to discuss the income profile of their business.

(ii) In cases where the farmers were willing to discuss it was discovered that most of them do not have formal and accurate techniques of record keeping in their businesses, this has a tendency of affecting accuracy of data obtained.

(iii) Many farmers are not registered with the poultry association office in the locality due to the fact that they are compelled to pay series of levies and they do not see any concrete value added to the businesses of their colleagues who are registered. Consequent upon this the number of farmers registered is not an accurate reflection of the situation on ground. The author had to rely on informal methods to locate farmers and administer questionnaires to them.

1.7 Organization of the Study

This research work is organized into five chapters. Chapter one comprised of introductory notes which will provide a background to the study, statement of the research problem, objectives of the study, justification for the study, research hypothesis, and scope of the study and organization of the study. Chapter two focused on review of related literature. Chapter three described the research methodology, procedure for data collection and analysis, and study area. Chapter four presented the results and discussions of these results. The final chapter is devoted to the summary of the findings, conclusions, recommendations and policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Literature

2.1.1 Poultry Farming

Poultry farming is the practice of rearing of birds domestically or commercially, primarily for meat and eggs but also for feathers (Encyclopedia Britannica 2011, Food and Agriculture Organization 2005, Sonaiya, 1990). Food and Agriculture Organization further classifies chickens farmed for meat are called broilers, whilst those farmed for eggs it defines as layers.

There are four farming systems which researchers seem to agree are the predominant techniques used (Bessei 1987, Food and Agriculture Organization 2004, Rushton and Ngongi 1998, Sonaiya et al 1999) . Under *free-range* conditions, the birds are not confined and can scavenge for food over a wide area. Rudimentary shelters may be provided, and these may or may not be used. The birds may roost outside, usually in trees, and nest in the bush. The flock contains birds of different species and varying ages. Although free range farming method is very suitable for poultry birds but it has some difficulties too. Excessive cold, heat and damp is very harmful for poultry birds and reduces their productivity. This system also requires less feed than confined systems. The poultry manure from free range farming used as fertilizer for crops directly.. In this system the poultry birds can be victim of predators easily and may be easily infected by various types of diseases.

In the European system of free-range poultry keeping, there are two other types of housing. The first of these is the “ark” system, where the poultry are confined overnight (for security against

predators) in a building mounted on two rails or skids (usually wooden), which enable it to be moved from place to place with draught power. A typical size is 2 × 2.5 m to hold about 40 birds. The second type of housing is the "fold" unit, with a space allowance (stock density) for adult birds of typically 3 to 4 birds per square metre (birds/m^2), both inside and (at least this) outside. The fold unit is usually small enough to be moved by one person. Neither of these two systems is commonly found in developing countries.

In *backyard Extensive* Systems Poultry are housed at night but allowed free-range during the day. They are usually fed a handful of grain in the morning and evening to supplement scavenging. The *Semi-Intensive* Systems involves a combination of the extensive and intensive systems where birds are confined to a certain area with access to shelter. They are commonly found in urban and suburban as well as rural situations. In the "run" system, the birds are confined in an enclosed area outside during the day and housed at night. Feed and water are available in the house to avoid wastage by rain, wind and wild animals.

Intensive Systems are used by medium to large-scale commercial enterprises, and are also used at the household level. Birds are fully confined either in houses or cages. Capital outlay is higher and the birds are totally dependent on their owners for all their requirements; production however is higher. There are three types of intensive systems:

(i) **Deep litter system**: birds are fully confined (with floor space allowance of 3 to 4 birds/m^2 within a house, but can move around freely. The floor is covered with a **deep litter** (a 5 to 10 cm deep layer) of grain husks (maize or rice), straw, wood shavings or a similarly absorbent (but non-toxic) material. The fully enclosed system protects the birds from thieves and predators and is suitable for specially selected

commercial breeds of egg or meat-producing poultry (layers, breeder flocks and broilers).

(ii) **Slatted floor system**: wire or wooden slatted floors are used instead of deep litter, which allow stocking rates to be increased to five birds/m^2 of floor space. Birds have reduced contact with faeces and are allowed some freedom of movement.

(iii) (iii)**Battery cage system**: this is usually used for laying birds, which are kept throughout their productive life in cages. There is a high initial capital investment, and the system is mostly confined to large-scale commercial egg layer operations.

The battery cage method has some benefits:

(i) It is very easy to care for the birds,(ii)Very easy to collect eggs,(iii)Cleaner eggs,(iv)Requires less feed to produce eggs,(v)Thousands of hens may be housed in a specific floor space of the house,(vi)The birds suffers less infections ,(vii)Labor cost is very low.

Besides those benefits battery cage system has some difficulties. By rearing large number of hens in a small place the air inside the house may contain high ratio of carbon dioxide. The hens can't get sufficient space to walk, flap their wings, stand or perch. For this reason they may suffer by frustration and boredom and their behaviors may change which affect their production. Battery cage system is banned in some countries because it is considered to be against the animal welfare.

An intensive system of rearing indigenous chickens commercially is uncommon, a notable rare exception being in Malaysia, where the industry developed in response to the heavy demand for

indigenous chickens in urban areas. However, this accounts for only two in every 100 000 (0.002 percent) of that country's indigenous chicken. (Supramaniam, 1988).

The above management systems frequently overlap. Thus free-range is sometimes coupled with feed supplementation, backyard with night confinement but without feeding, and poultry cages in confined spaces (Branckaert and Guèye, 1999).

2.1.2 Importance of Poultry

Poultry produce has been recognized as having apparently high nutritive and medicinal value which has made it very critical in vaccine production and cancer research (Wilson, 1980; Jurgens, 1978). Mbap, 1996; however caution against excessive consumption of eggs especially by elderly people as a result of high cholesterol content which could be fatal when accumulated in the blood.

Similarly poultry seems to play a significant role in the socio- cultural life of communities. They are used as gifts, especially in the sahelian regions of west Africa. Chicken blood is reportedly used for ritual sacrifice to ensure protection, good harvest and to honor ancestors; ostrich and peacock feathers are used for decorations and adornments in India and Africa. Chicken especially is known to be used for divination (Guoye, 1998; Tadelle and Ogle, 2001; Ibrahim and Abudu, 1996; Conroy, 2005; Evans-Pritchard and Gilles ,1976 ; Veluw, 1987).

Consequent to the socio-cultural, medicinal, ornamental and nutritive importance of poultry produce, researchers (Gueye,1998; Kushi, Adegbola, and Umeh, (1998).; Missohou , Traore and Faye, (2005); Altamirano ,2005; Aboe, P.A.T., Boa-Amponsem, K., Okantah, Dorward, and Bryant, M.J. (2006); Bush ,2006; Riise, J.C., Bonkoungou and Thomsen, K.A. (2007)) seem to have concurred about their high economic value. In some communities in Senegal and Uganda

poultry is exchanged directly for the essentials of life; one hen equivalent to a bar of soap, one kilogram of salt or one liter of kerosene .Two hens could be used to pay for a child's school fees for a term , five chickens could be used to procure a goat. Women use revenue from poultry farming to engage in other income generating activities such as petty commerce, formation of thrift co-operative societies (Aboe, 2006; Zoma, 2006; Thomsen, 2005). Ouandaogo (1990) estimated that export from guinea fowl eggs from Burkina Faso to Ivory Coast is worth CFA 2 billion annually. Poultry contributes about 13% of income from animal production to the gross domestic product of the Dominican Republic (Rauen, De Los Santos and Fabian, P**.** (1990).

2.2 Theoretical Literatures

2.2.1 Value Chain Theory

Value chain refers to the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producers services), delivery to final consumers and final disposal after use (Kaplinsky and Morris. 2000,). The concept was first described and popularized by Michael Porter in his 1985 best-seller, *Competitive Advantage: Creating and Sustaining Superior Performance.* He focused on how value chain analysis could help companies recognize their position in the market, and its relationships with suppliers, clients, and competitors. Based on this analysis, enterprises could identify their own competitive advantage to facilitate their product design, inputs, logistic, marketing, sales, after sales services, and/or resources management.

In 1994, Gereffi brought new initiative when arguing that the value chain should be coherent, and well analyzed by studying not only organization but also individuals that play crucial role in

the development and management of the value chain, not only within manufacturing system but also distribution one, and not only within domestic market but also at international market if the value chain has connection at global level. Interpreted in a narrow fashion, the value chain is a set of activities that take place within a manufacturing unit like firm or enterprise to produce a certain product or service. These activities create a connection or linkage between producers and customers. Interpreted in broader manner, however, a value chain is an assemblage of activities carried out by different actors (namely producers, processors, collectors, wholesalers, service suppliers, retailers, etc.) in order to turn raw materials into finished products that satisfy the needs of customers. This broad conception of value chain embraces a large number of issues related to value chains and development more generally, including organization, coordination, strategies and interaction among participants and even social problems (community relation, habits, and production standpoint, consumption attitudes, etc) and environment (land degradation, water pollution, and biographical diversification, etc.) This conception also keeps the emphasis on the close linkage among different economic actors to improve the value chain by adding value to the chain with their own activities (Golletti 2004).

Often multinational enterprises developed global value chains, investing abroad and establishing affiliates that provided critical support to remaining activities at home, for example Unilever operates tea estates and tea processing facilities in Kenya and then blends and packs the tea in Europe before selling it as Lipton, Brooke Bond or PG Tips brands. To enhance efficiency and to optimize profits, multinational enterprises locate research, development, design, assembly, production of parts, marketing and branding activities in different countries around the globe. Multinational enterprises offshore labour-intensive activities have mostly been relocated to China , Mexico, and Bangladesh for example, where the cost of labor is the lowest.(Gurría,

2012). Value chain analysis has also been successfully used in large petrochemical plant maintenance organizations to show how work selection, work planning, work scheduling and finally work execution can (when considered as elements of chains) help drive lean approaches to maintenance. The Maintenance Value Chain approach is particularly successful when used as a tool for helping change management as it is seen as more user-friendly than other business process tools.

At the heart of the agricultural value chain concept is the idea of actors connected along a chain producing and delivering goods to consumers through a sequence of activities. However, this vertical chain cannot function in isolation and an important aspect of the value chain approach is that it also considers horizontal impacts on the chain, such as input and finance provision, extension support and the general enabling environment. The approach has been found useful, particularly by donors, in that it has resulted in a consideration of all those factors impacting on the ability of farmers to access markets profitably, leading to a broader range of chain interventions. It is used both for upgrading existing chains and for donors to identify market opportunities for small farmers.

Information and communication technology (ict) has become an important tool in promoting agricultural value chain efficiency. There has been a rapid expansion in the use of mobile technologies, in particular. The price of ict services is falling and the technologies are becoming more affordable to many in developing countries. Software Applications can support farmers directly through SMS messages. Examples include iCow, developed in Kenya, which provides information on the gestation period, on artificial insemination of the cows, and on how to look after them. Applications such as M-Pesa can support access to mobile payment services for a large percentage of those without banks, thereby facilitating transactions in the value chain.

Other applications have been developed to promote provision of crop insurance through input dealers.

Information communication technology is also being used to strengthen the capacity of extension officers and NGO field staff to reach farmers with timely and accurate information and, at the same time, help capture data from the field. The Grameen Foundation's Community Knowledge Worker (CKW) programme is an example. Farmer representatives are trained to use ICT applications on a Smartphone to provide agricultural information and extension support. Most market price information is now delivered to farmers via SMS. Further along the chain, technologies offer considerable possibilities to enhance traceability, which is particularly relevant as certification grows in importance. Where necessary many exporters can now trace consignments back to individual farmers and take necessary measures to address problems. Finally, systems such as eRails are also supporting agricultural researchers through data collection and analysis and access to up-to-date research publications.

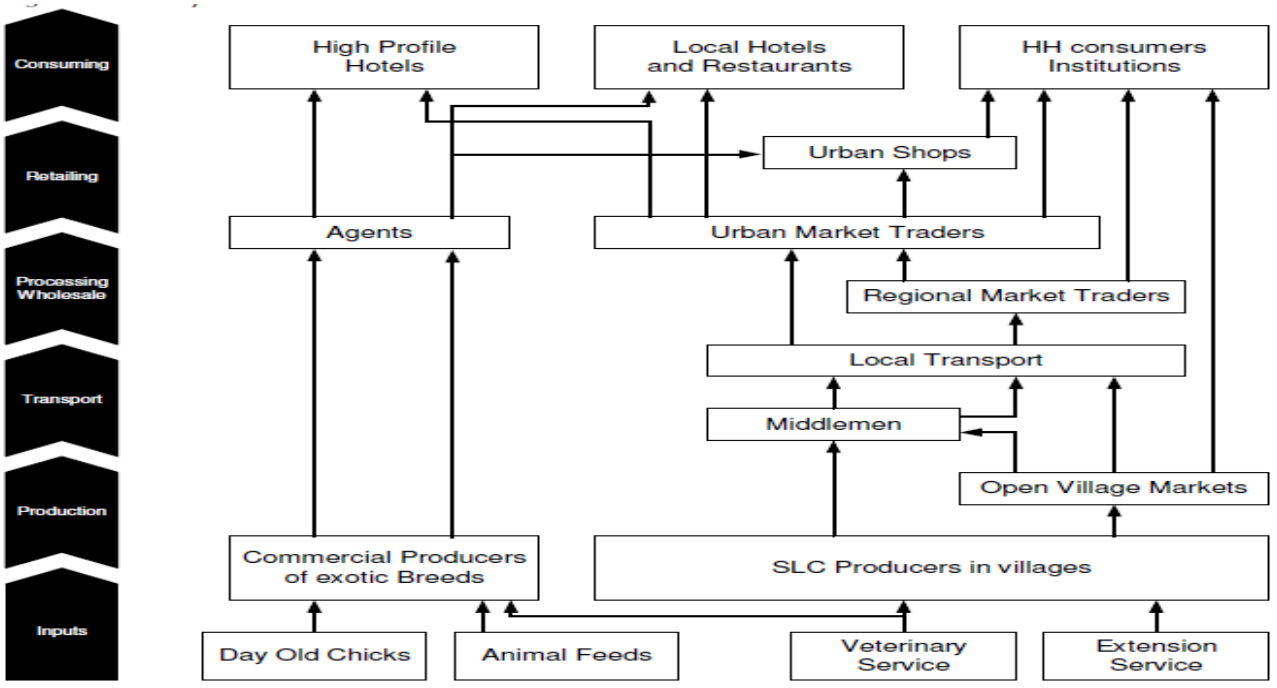
2.2.2Value Chain in Poultry Farming

Value chain in poultry farming refers to the full range of activities required to bring poultry products from conception, through the different phases of production and transformation until it reaches the final consumers. Value chain in poultry is made up of a series of actors (or stakeholders) from input suppliers , producers, processors, to exporters and buyers engaged in the activities required to bring poultry products from conception to end use.(Kaplinsky and Morris 2001) .Value chain actors are the set of people who deal directly with the product, that is produce, process, trade and own them. Value chain supporters refers to services provided by set

of people who never directly deal with the product, but whose services add value to the product. Value chain influencers consist of the regulatory framework, policies, infrastructures et cetera.

The chain as shown in fig 2.1 starts at the input stage where all the factors of production. All the necessary supporting services (vetnary and extension) are made available at this stage .The next stage is the production stage where both large and small scale producers harness the factors of production in order to achieve poultry output(meat ,eggs, feathers,etc). After production the output are transported to where they are processed by wholesalers, middlemen and traders. After processing some are moved to retail outlets by urban shops , while others are moved for consumption directly in high profile hotels, local hotels, restaurants and consumer institutions.

Figure 2.1: Poultry Industry Value Chain



Source: Rural Livelihood Development Company(2006)

2.2.2.1 Identification of the Actors in the Value Chain

Poultry producers are a core set of actors in the chain comprising farmers and companies that create the basic commodities around which poultry value chains are structured. They are grouped into three categories: free-range, backyard commercial and medium-to-large-scale commercial producers. (Sonaiya and Swan, 2004) These investors conceptualize the business, plan, locate and finance the establishment of physical infrastructures and employ workers with appropriate qualifications and competence to execute the project. They then supervise and monitor the operations, taking appropriate action as and when necessary. Above all, they bear the risk and earn the residual margin after all costs, levies and taxes have been paid. Workers carry out the day-to-day operations taking prompt actions to ensure growth, harvest, and prevention of waste (losses) that may arise from diseases of careless handling of operations. Individual free-range producers and some backyard commercial farmers sometimes embody all of these functions themselves (Sanni, 2003). Depending on an individual's capital, entering the value chain as a producer (free-range, backyard commercial or medium-to-large-scale commercial) presents an opportunity for income generation. There is also opportunity for employment as farm managers and farm workers, acting as value chain supporters. *Breeder/hatchery operators* are entrepreneurs who establish breeder farms, import and raise grandparent stock which produces parent stock, from which day old chicks are produced. Their main channels of distribution are: (a) Hatchery sales departments that deliver day old chicks to medium-to-large-scale producers based on batch orders, or make direct sales to some backyard commercial producers *(*b) Distributors, who often deposit large sums of money with the hatcheries, take delivery of day old chicks regularly and move them to all corners of the country. The distributors handle a high

percentage of day old chicks. For indigenous chickens, most producers obtain replacement stock from own broods or purchase new young pullets from neighbours or the village market, and so fall outside the day old chicks value chain. (Baba,2003 Nwosu,1979) .

Day-old chick distributors extend the geographical and client reach of the hatcheries by delivering day old chicks to medium-scale commercial producers, backyard commercial producers and some rural free-range producers. These distributors mainly handle broiler day old chicks and to a lesser extent layer day old chicks, and there is also a demand for growers (two-week to one-month-old chickens that have passed the critical brooding stage), especially from rural free-range producers who are serviced by a subset of small-scale itinerant distributors who often carry out their trade on motorcycles. (Nwanta, Okolocha and Alli-Balogun, 2003) Depending on an individual's capital for investment entering the value chain as a day old chick distributor presents an opportunity for income generation and employment. *Feed millers* are investors who set up companies that produce the food consumed by poultry at various stages of their growth. In 1980, only four livestock feed manufacturers dominated poultry feed supply, even when quantity demanded was much larger. More than 90% of all poultry farms then depended entirely on commercial feed while a few, very large poultry farms had their own feed mills. Since then, farmers have become more discerning, cost conscious and knowledgeable. (Tewe, Fawole, Abu, Oladele, Abdullah, and Oluwole-Banjo,2004) Thus, there are more fully integrated poultry firms which manufacture their own feed so that today only about 40% of poultry farms depend on commercial feed. Furthermore, in the last two decades, a new sub-sector referred to as **toll millers** has emerged. They are small companies (often unregistered) with small milling capacities which provide formulation and milling services for farmers within

their immediate surroundings. These toll millers have taken away a substantial portion of the commercial feed market from the major (branded) feed millers over the years. (Akinwunmi, Okike and Rich, 2010) .Entering the poultry value chain as a feed miller or toll miller depending on the capital outlay, presents a huge opportunity for income and profit generation. There is also opportunity to seek employment as a feed/ toll mill worker, acting as a value chain supporter.

Live-bird/egg traders comprises the traders who link producers with consumers. Some live-bird traders move from poultry farm to poultry farm in search of poultry for sale or which they buy in primary markets, bulk and transport to secondary or tertiary live-bird markets for subsequent sale to consumers. The traders include those who specialize in egg trade and concentrate on table eggs or guinea fowl eggs. The live-bird and egg traders often form associations with rules to guide their operations.(Ogundipe and Sani, 2002)

Entering the value chain at this point usually requires little capital and consequently making marginal profits, then gradually increasing volume of trade and profits subsequently. There is income generating opportunity here for those who have little capital for investment. *Transporters* must play their role in moving live chickens, day old chicks and eggs from various locations to the major centers of demand in order for the value chain to function effectively. Transporters are also crucial in helping to move inputs (feed, cages, wood shavings, waste) to and from business sites. They also carry products (mature live birds, point-of-lay pullets, processed broilers, eggs.) to points of sale such as live-bird markets, supermarkets, and frozen meat depots (Akinwunmi, Okike and Rich, 2010). Functioning as a transporter on the value chain represents an opportunity for employment and income generation. *Processors* include those who slaughter, de-feather, eviscerate and prepare poultry for cooking and consumption. Some processors stay around the

live-bird markets waiting to be invited to help housewives or other groups dress one or two birds for a fee. In other cases, the women who sell the chickens double as processors, collecting a fee in addition to the price paid for the chicken they have sold. Other cases exist where a group of processors sets up processing facilities to handle substantial numbers of birds each day. Such groups own tables, water-holding drums, boiling pots, sharp knives and cutlasses so that they can boil water, dip the slaughtered chickens in the hot water, de-feather, eviscerate and cut up the birds to the customer's wishes. Processors also include butchers who purchase and dress a number of birds, keep them in fridges for consumers to pick and choose without waiting. The price consumers pay includes the cost of processing. Furthermore there are some institutional and/or ceremonial consumers who buy relatively large quantities of live birds and hand them over for processing, to collect later after paying the agreed fee. (Sanni, 2003) Entering the value chain as a processor is an opportunity for income and employment generation and requires very little or no capital, the most essential thing is to acquire the skills needed efficiently through apprenticeship.

2.2.2.2 Developing Value Chain Systems Towards Benefits of Poultry Farmers

The focus of this approach lies in promotion of the economic potentials of the poor and disadvantaged group of farmers (OECD, 2006). The aim is to enable them react and take advantage of new opportunities arising out of economic growth, thereby overcoming poverty (Berg, 2006). The promotion of value chain in poultry industry aims to improve the competitiveness of poultry in national and international markets and to generate greater value added within the country or region. Pro – poor growth is one of the most commonly quoted

objectives of value chain promotion. In recent years, the need to connect producers to markets has led to an understanding that it is necessary to verify and analyze markets before engaging in upgrading the activities of value chain actors. Thus the value chain approach starts from an understanding of the consumer demand and works its way back through the distribution channel to the different stages of production, processing and marketing.(GTZ, 2006).

The value chain approach seeks to identify long term solutions to reduce the vulnerability of the poultry industry to fluctuating prices of trade shocks. It does not just focus on adding value to traditional poultry produce, (in other words diversifying the same product), but also in promoting alternative products. Another characteristic of this approach is that it does not solely concentrate on functional dimensions such as supplying appropriate inputs, or applying good processing, handling and distribution services. It emphasizes the importance of institutional arrangements, or rather governance issues, along the value chains that link and coordinate producers, processors ,and distributors of products (Heinz, 2005 cited in Berg et al, 2006). Moreover this aspect cover authority and power relationships that determine how financial, material and human resources are allocated and flow within the chain. (Gereffi. 1994).

Dynamic value chain systems respond to market shifts by developing and transferring knowledge to intermediaries and producers, so that they can adapt and maintain a competitive market position over time. Vibrant value chain systems grow and continuously incorporate new businesses, generating ever increasing jobs, income and assets. In this manner, value chain systems can have the potential to reduce poverty for large number of poor poultry farmers. The value chain approach contributes to reducing poverty when development programmes are employed strategically and concentrate on targeting disadvantaged groups. Development programmes have to overcome the bias towards the better off by consciously using the full range

of options available to support the poor small scale actors in the value chains. This includes skills development and learning, facilitating contract arrangements and supporting information and service delivery. Often it is necessary to combine value chain promotion with a livelihoods perspective, with local economic development or vocational training so as to enable the poor and disadvantaged actors enter and stay in the system (Aid Workers Network, 2007).

Value chain development is useful as a poverty reduction tool if it leads to increase in on and off farm rural employment and income (Lundy, 2002). Increased productivity alone is not a sufficient route out of poverty. A focus on post – production activities , differentiated value added products ,and increasing links with access to market for goods produced by low income producers would appear to be the strategy open to smallholders (Lundy, 2002). The poverty reducing potential of value chains is not only in generating rural income and employment but also complemented by improvements in processing and market chains that release time for the indigent actors along the chain to engage in other equally productive activities.

The poultry industry faces a variety of difficulties however, which must be resolved. Chief among these are the identification of market opportunities, access to appropriate and more modern technologies, techniques and drugs, implementation of effective business organization practices, more efficient farm to market channels and timely provision of key financial and non-financial business development services. These limitations can be overcome through development of skills, services and alliances between local and external actors and agencies. (Lundy, 2002,: 3)

Value chain analysis facilitates an improved understanding of competitive challenges, helps in the identification of relationships and coordination mechanisms, and assists in understanding

how chain actors deal with powers and who governs or influences the chain. Developing value chains is often about improving access to markets and ensuring a more efficient product flow while ensuring that all actors in that chain benefit. Changing agricultural contexts, rural to urban migration, and resulting changes for rural employment, the need for pro-poor development, as well as a changing international scene, all indicate the importance of value-chain analysis.

2.2.2.3 Value Chain Marketing Systems

In a Value Chain marketing system(figure 2.2), farmers are linked to the needs of consumers, working closely with suppliers and processors to produce the specific goods required by consumers. Using this approach, and through continuous innovation and feedback between different actors along the value chain, the farmer's market power and profitability can be enhanced. Rather than focusing profits on one or two links, actors at all levels of the value chain can benefit. Well functioning value chains are believed to be more efficient in bringing products to consumers and therefore all actors should benefit from value chain development. The market "Pull" is based on integrated transactions and information. Consumers purchase products that are produced according to their preferences. The farmer becomes the core link in producing the products that the consumers desire, thereby increasing his productivity and efficiency. Research and development, while including techniques targeted at increased production, is also focused on consumer needs, and attempts to take account of all of the links, and dependencies in the value chain, e.g. processing, environmental and social costs or considerations, as well factors such as health impacts, education and learning. Communication is in both directions. It is important that both consumers and processors are made aware of factors limiting production, just as much as farmers and other producers are made aware of consumer requirements.

Figure 2.2: A Value Chain Marketing System



Source: World Report Fall 2006: The Value Chain Approach; Strengthening Value Chains to Promote Economic Opportunities

2.3 Empirical Literature

2.3.2 Value Chain Analysis of Nigerian Poultry Industry

2.3.1.1 Spent-Layer Poultry and Commercial Table and Indigenous Poultry Egg Value Chain

Commercial poultry production takes place among specialized producers as shown in figure 2.3 who invest substantial amounts of money to build poultry houses, set up cages and deep litter (brooder) facilities and equip the houses with feeders, drinkers, brooding equipment. The large commercial producers either set up hatchery facilities in which they incubate and hatch fertile eggs or may purchase large quantities of layer day old chicks, brood and grow them to maturity,

keeping the birds on deep litter floors. When the birds start laying, they are transferred into battery cages where they are fed and watered continuously. The birds then lay eggs which are collected, graded and packaged in crates for sale. Arrangements are made through the sales department to deliver the eggs to traders and pre-planned outlets like supermarkets, restaurants, hotels or breakfast joints. Confectioners may also sign contracts to receive specific quantities of eggs at regular intervals. (Okoruwa, Obayelu and Ikoyo-Eweto, 2004)

The producers either set up their own feed mills or arrange to buy large quantities of feed from a commercial feed miller. Such large producers develop their own source of water by sinking boreholes or wells from which water is pumped into storage tanks to ensure constant supply. In the largest, highly integrated egg-layer farms, there is often automatic feeding, watering, egg collection and sorting, as well as waste collection and treatment.

There is usually a cadre of highly trained, competent technicians and engineers who maintain and repair equipment to ensure maximum efficiency and avoid breakdowns. As a result of large volumes of output, the fixed and variable costs, when spread over the output of eggs, become small per unit produced, hence achieving economies of scale. The producers are thus able to sell the produce at competitive prices. (Tewe, 2004)

Some smaller sized poultry farms rely more on family and hired labor to carry out daily chores. Such farms may stock between 10,000 and 50,000 layers. They are likely to purchase their inputs like day old chicks, feed and other materials. While the automated farm employs several managers for different aspects of the operation, the smaller farms may be managed personally by the owners.

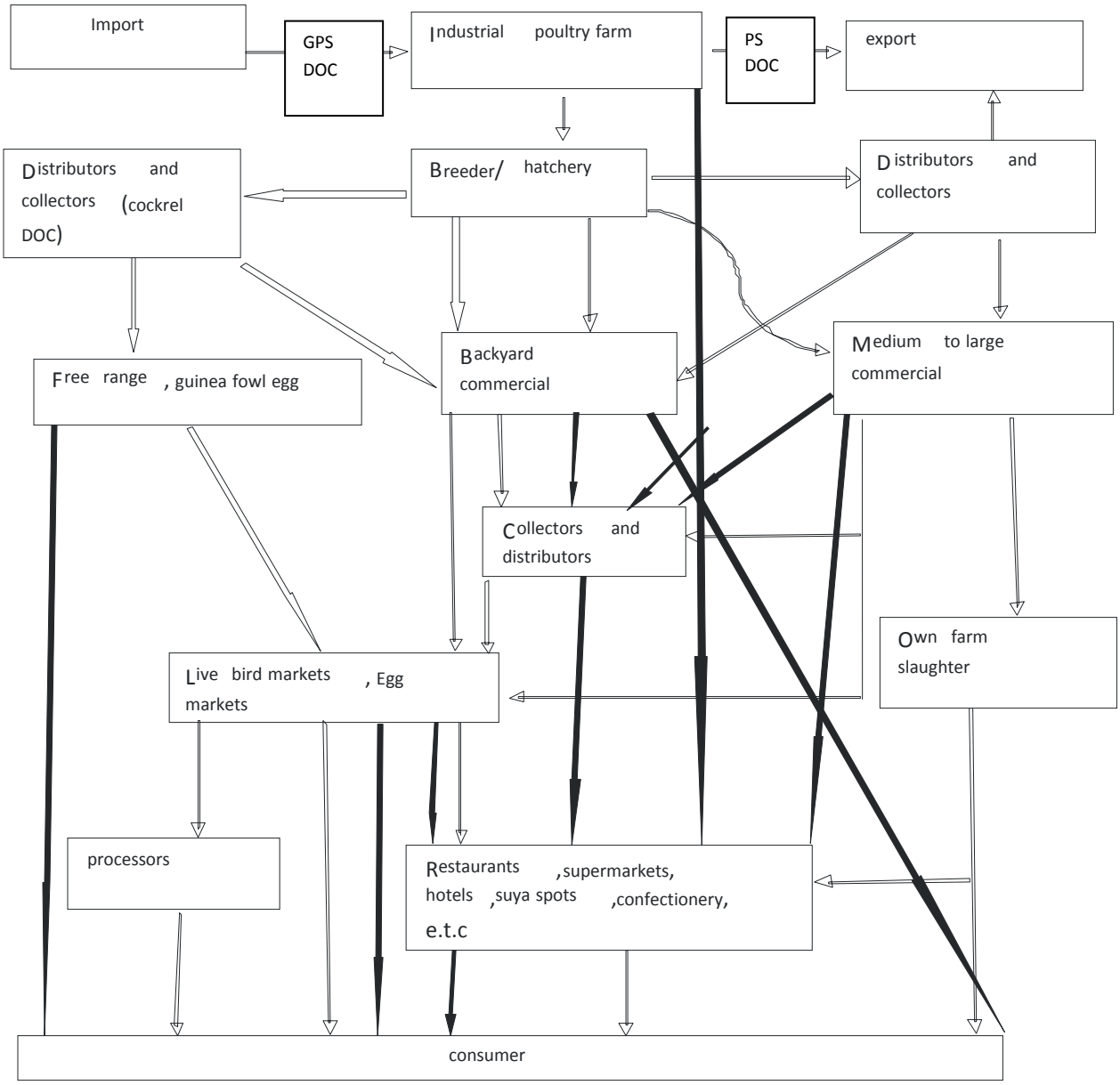
At a much smaller level (backyard commercial), there are part-time poultry keepers who produce eggs as a source of additional income to augment their main source of income. They may be civil

servants, traders, teachers or other professionals whose families participate actively in the management of the poultry farm. The number and level of qualification of hired workers may be low. At this smaller scale, backyard commercial farms mostly depend heavily on collectors who visit them regularly to buy eggs as well as spent layers after the chickens have completed their laying cycle. These actors in the commercial egg chain source eggs from farm to farm and sell to the public, hotels, and other traders in the secondary and tertiary markets. They usually earn substantial profits because of their knowledge of the egg supply and demand situation.

Major fixed costs are the land on which the farm is established, the poultry houses and the equipment, some of which is very expensive. Variable costs include day old chicks, feed, water, medication (vaccines and drugs), labor and packaging materials. In general, feed costs account for about 60% of the total cost of producing an egg or a layer. Utilities may be responsible for 5 to 10%, while stock and labour account for most of the remaining 20 to 25%.

(Akinwunmi, Okike and Rich, 2010)

Figure 2.3: Flow of Spent Layer and Table Egg in Nigeria.



Source: Food and agriculture organization , 2010

……Flow of spent layer

…. Flow of spent layer existing but not verified

…. Flow of table eggs

GPS= Grand parent stock, PS= parent stock

2.3.1.2 Actors, Production Practices, Costs and Livelihood Activities in the Commercial Broiler Chain

The key actors in commercial broiler production are the same as those in layer chicken production. However, the structure and patterns of production differ. The broiler day old chicks are hatched and distributed by the same breeder/hatchery farms. Their distributors are very active, being responsible for 50% of all broiler day old chicks. They use their financial power to prepay for the birds and thus make substantial profit when they serve producers /farmers punctually. Hatchery operators often direct smaller poultry producers to buy their day old chicks from distributors during the peak of optimal demand for time-bound broiler day old chicks.

Producers and feed millers are important actors whose decisions affect the supply of broilers, particularly at seasonal peaks. Among live-bird traders, collectors are very important because they visit several farms to assemble broilers. Feed millers and feeding ingredient suppliers are also important actors because broilers require varying amounts of feed (starter, grower, finisher) which must be supplied when needed for proper growth of the broilers. The scarcity of one ingredient or another may cause slow growth or stunting of broilers.

Finally, processors play vital roles in ensuring that several crops of broilers are produced and sold within a year. Their operations are critical towards profitability in broiler production because, when a batch of broilers matures within 8 to 10 weeks, it must be disposed of to prevent losses to the business. To feed a mature, market-ready broiler for an extra day results in waste of feed and other resources; the marginal gain in weight and value does not justify the marginal expenses. (Nwanta, Okolocha and Alli-Balogun, 2003)

Production practices involve setting and brooding broiler day old chicks at specific intervals that assure potential for high demand when the birds mature. Thus there is very high demand for

broiler day old chicks ten to twelve weeks before the dates of major festivals like Christmas, New Year, Easter, or Muslim *Sallah*. The prices of day old chicks go up at such periods, but drop when the peak is over.

From the perspective of livelihoods, the medium-to-large commercial farms earn considerable profit from their integrated broiler production. Some of these farms have production scattered in different locations and set their day old chicks at staggered intervals so that the processing factory is kept busy all year round. They package broilers into various sizes and cut-up parts that meet the demand of various types of consumers. They have depots in different parts of the country to which they deliver refrigerated broiler packages every week. Although these operations involve additional costs, the regular volume of sales suggests that the business is profitable. Urban consumers who include individuals, families, ceremonies (marriages, burials, parties) and fast food groups consistently patronize these large-scale broiler producers.

The smaller backyard commercial broiler producers serve live-bird markets for consumers who purchase live broilers directly for home slaughter or custom-processing by standby processors. Roughly 40% of backyard broiler production is directly sold to consumers, with another 20% geared towards live-bird markets. (Baba,2003). Pricing of processed, packaged broilers is often based on unit kilogram weight.

2.3.1.3 Indigenous Poultry Chain

In addition to indigenous chickens, this chain covers ducks, guinea fowl and turkeys. The birds are kept by farmers who make relatively small investments in housing, feeding and management. The production usually begins with the purchase of one or two local pullets and a cock which mate as they mature with the females laying fertile eggs and brooding in batches of 10 to 15 eggs. When hatched, the small scavenge with the mother for food that includes household waste,

insects and edible plants. They are occasionally given a few grains of corn, millet or sorghum. Some producers provide supplementary feed, water and local herbs to cure common diseases like Newcastle Disease, coccidiosis etc. (Oluyemi,1979)

Young birds are usually exposed to danger from predators like eagles, snakes and even domestic carnivorous pets like cats, hence the survival rate is rather low. Farmers who make a formal business of indigenous poultry production do more by providing safe housing which may be inside cages or unoccupied rooms within the living quarters. They give compounded feed once a day and purchase veterinary drugs to improve the health and survival rates of their poultry. These farmers usually upgrade their stock by purchasing cockerels from high performing exotic breeds and setting them to run with the local pullets. Thus the offspring become bigger, heavier and meatier. Local chickens are rarely kept for egg production, though their eggs are sometimes traded for medicinal purposes. As the surviving growers mature, the strong ones (both male and female) are selected for continuation and multiplication of the flock while the rest are sold, given away as gifts or consumed in the family. Depending on their location, farmers may keep between 10 and 25 chickens but the number frequently rises to 50 or even 100 in some households in northern Nigeria. (Katule,1991)

Indigenous poultry meat is considered to be tastier due to gradual growth and selective feeding. Thus it is very popular among consumers and used as a delicacy for *suya* dishes. There is a definite popular demand and trade in indigenous live chickens.

Ducks are similarly produced by farmers all over the country, but they are much fewer and less popular than chickens. Their production is enhanced by presence of a pool of water or a stream in which they swim. Ducks do fly off and migrate far from their owners' homes and may be lost in the process. Some consumers relish duckmeat and both the eggs and meat are used for rituals

or traditional medicine. They are thus sold and bought in the markets like local chickens.

Guinea fowl are peculiar because they do not brood (i.e. do not sit on their eggs to hatch them). In the wild, guinea fowl bury their eggs in the soil so that the heat from the soil causes the eggs to hatch in due course. The producers collect the eggs which are usually fertile because male and female guinea fowl scavenge together and mate regularly. The eggs may then be set under a brooding chicken (to replace some of her own eggs) or taken to a hatchery.. (Oluyemi,1979)During the rainy season, guinea fowl lay many eggs and the trade in guinea fowl eggs increases to the extent that commercial chicken egg sales become slightly depressed.

The principal actors in the indigenous poultry chain are farmers (especially rural dwellers), live-bird traders, transporters and consumers.(Akinwunmi, Okike and Rich, 2010)

2.4 Poultry Industry in Nigeria.

Poultry farming appears to be a highly profitable venture in Nigeria (Sani, Musa, Daneji, Yakassai, and Ayodele, 2007; Ugwu, 2009; Hassan, Mwanta and Mohammed, 2000; Amos, 2006) however , the industry appears not to be operating at full potential (Effiong and Umoh, 2010; Ajibefun ,2002;). An analysis of cost structure reveals that feed seems to account for majority of the variable costs (Sani et al, 2007; Hassan, 2002), this situation possibly led to the emergence of **toll millers** whom the farmers patronize to produce feed according to their individual specifications at lower costs so as to increase their profit margin (Food and agriculture organization, 2010) especially in the case of layer farming (Abeke, Sekoni, Oni, Adeyinka and Nwagu, 2008).

Chicken farming seems to be the dominant type of poultry farming practiced by Nigerians (Food and agriculture organization, 2010; Zahraddeen, Butswat, Sanusi and Adamu ,2010) this may be

due to the high profitability of that sector which is positively related to flock size (Sani et al, 2007; Bamiro, 2008). On the basis of income generation layer farming appears to rank highest amongst the aspects of chicken farming (Bamiro, 2008, Amos, 2006; Rahman and Yakubu, 2009). Within layer farming brown (isa brown) is probably more commercially productive and profitable than the black (bovan nera) layer strain (Olawumi and Adeoti, 2009). Amongst the large scale commercial farms, vertical integration seems to yield greater efficiency and profitability (Olasunkanmi, Bamiro, Dayo, Phillip and Momoh, 2006) this may due to economies of scale and other associated advantages.

Prevalent diseases experienced which threaten productivity, income and employment include Newcastle, gumboro , coccidiosis ,chronic respiratory disease(CRD) and fowl cholera (Omeke, 1988) however, these diseases were found to have higher outbreaks in the wet season (Zahardeen et al ,2010). Improvements in the area of finance and agric extension could possibly lead to an increase in income and employment generating capacity of the industry (Adebayo and Adeola, 2005).

2.5 International Poultry Practices.

Production systems appear to be similar across the countries in the West African sub region and Zimbabwe. In general, there is a divide between traditional (low input) production systems and commercially-oriented, higher input production. There is also a geographic component to this division whereby most industrial and semi-industrial commercial producers are located in urban areas, especially around capital cities. Low input production is most common in rural areas, although it is also practiced by some urban households and similarly some rural households practice higher input production. (Schneider & Plotnick, 2010; Kusina and Kusina, 1999;

Shumba and Whingwiri, 1988). This trend seems to be reversed in North Carolina, United States of America where majority of the commercial poultry farms are located in the rural areas from which the produce are transported to the urban areas , this is probably due to the availability of a highly developed processing , storage and transport system (Wklna , Roka and Carter 1995). In the Arab world consisting of 22 independent countries spread over the south eastern part of Asia and all North Africa and most of the eastern part of Africa (Egypt, Sudan, Algeria, Morocco, Iraq, Saudi Arabia, Yemen, Syria, Tunisia, Somalia, Libya, Jordan, Arab Emirates, Lebanon, Palestine, Mauretania, Kuwait, Oman, Qatar, Djibouti, Bahrain, Comoros) , Only about 78,000 people or 0.22% of the agricultural population produce for the entire populace . This small number reflects the high degree of mechanization of the poultry industry with modern hatcheries, feed plants, processing plants and predominantly large production units (Freiji, 2008).

The United States of America is presently the world's leading producer of poultry products .The major milestone in 20th century poultry production in United States which served as a catalyst for their phenomenal success was the discovery of Vitamin-D (named in 1922), which made it possible to keep chickens in confinement year-round. Before this, chickens did not thrive during the winter (due to lack of sunlight), and egg production, incubation, and meat production in the off-season were all very difficult, making poultry a seasonal and expensive proposition. Year-round production lowered costs, especially for broilers. Today, eggs are produced on large egg ranches on which environmental parameters are controlled. Chickens are exposed to artificial light cycles to stimulate egg production year-round. In addition, it is a common practice to induce molting through manipulation of light and the amount of food they receive in order to further increase egg size and production .

Processing poultry for sale is mainly limited to industrial producers in West Africa. Supermarkets are increasingly important suppliers of meat for urban consumers, offering new opportunities and challenges for domestic poultry producers. Without adequate resources and training, small domestic producers seem unable to provide consistent, high-quality products that are competitive with the products supermarkets can procure from imported sources. In most of the countries, poultry tend to be sold whole and often live, limiting access to the supermarket supply chain. Nigeria is the exception where about 90 percent of commercial broiler output is processed and sold frozen (Schneider and Plotnick, 2010). South Africa processing structure appears a little more advanced where small scale producers have more access to modern processing facilities which in turn has improved their efficiency, income and productivity (Gauteng Enterprise Propeller, 2010). The United States, Europe and the Arab world processing facilities appear to be most advanced, this is reflected in the fact that despite very little proportion of the populace (in some cases less than 1%) are engaged in the poultry industry and the farms are mostly located very far from city centers where most of the produce are consumed , the demand requirements are sufficiently met with a surplus which are then exported. This is an indication of highly sophisticated processing, storage and transportation network (Freiji ,2008*)*

Efficient operation of poultry value chain would have immediate multiplier effects on the economy of a region , in North Carolina the poultry industry supports 52,000 jobs and generates $1.6 billion annually, also for every dollar income earned by poultry processing firms 3 dollar is generated across the state economy . Similarly for every person hired by a poultry processing facility employment across the state increases by 2.92 persons (Wklna, Roka and Carter 1995). Conversely in Iran , the dearth of proficiency in marketing and management skills by operators

of the value chain is preventing them from reaping the full potentials for income and employment inherent (Allahyari, Sadegh and Keshavarz ,2011) .

Owing to the crucial role drugs and vaccines play in poultry productivity the Senegalese government partially subsidizes vaccines but the prices remain high for most small holder producers , thereby limiting their capacity (Schneider and Plotnick, 2010). In Africa Newcastle appears to be the most common disease affecting flock and it seems more prevalent in the wet season(Goodger, Bennett and Dwinger 2009). America and Europe have seemingly made great advancements in drugs and vaccination techniques which has reduced mortality among the flock and has greatly boosted income and profitability of farmers.

2.6 Gap in Literatures

A strong consensus that seems to emerge from the theoretical literature is that efficiency of resource use is germane to the success of the poultry industry. Also apparent was supply falls far short of the domestic demand for poultry products, implying that the potentials of the industry are not yet fully tapped. Evidence from the empirical literature review showed that while poultry farming is a very profitable business venture, weak value chains prevent the full benefits of the industry from being tapped .The fundamental purpose of this work is to show that strengthening the value chain in the poultry industry represents a great opportunity for income and employment generation, and to provide a lucid guide as to how it can be operated so as to maximize all the inherent benefits along the value chain.

CHAPTER THREE

METHODOLOGY

3.1 Value Chain Framework

The study adopted the value chain framework for poultry farming in Kaduna South local government area. This is anchored in the fact that value chain analysis facilitates understanding of the value-adding productive activities in the poultry industry which reveals points at which income and employment opportunities can be identified and analyzed. It also allows for the analysis of the interdependencies and linkages between vertically and horizontally arrayed actors in the process of value creation in the poultry industry. An analysis of the value chain in addition, allows for the identification of institutional arrangements that may need to be targeted to improve capabilities, remedy distributional distortions and increase value added. Finally value chain analysis plays a key role in identifying the distribution of benefits of actors in the chain thereby helping in determining who is benefitting from participation in the chain and who would benefit from increased support or organization.

There are three related chains according to type of birds in the study area; the spent layer and table egg value chain , broiler value chain and indigenous chicken value chain, the indigenous chain is however unstructured and consequently did not feature in the empirical analysis. Also there are three main types of chains according to organization: backyard comprising of farms with population of 1to 499 birds, small scale – comprising of farms with 500 to 999 birds and medium scale comprising of farms with population of birds from 1000 to 1500. An analysis of the operations of each the value chain was made with the aim of identifying the income and

employment opportunities inherent within them. Given the two dimensions (type of bird and business organization), the value chain (V) is given by:

$V=V_I+V_{B1}+V_{B2}+V_{SL1}+V_{SL2}$ 3.1

V=Value chain

V_I= Indigenous chicken value chain

V_{B1}= Backyard commercial broiler value chain

V_{B2}= Medium to large scale broiler value chain

V_{SL1} =Backyard commercial spent layer/ eggs value chain

V_{SL2} = Medium to large scale spent layer / eggs value chain

From equation 3.1 the broiler value chain(V_B) is given by :

$V_B = V_{B1} + V_{B2}$ 3.2

Similarly, spent layer value chain (V_{SL}) is:

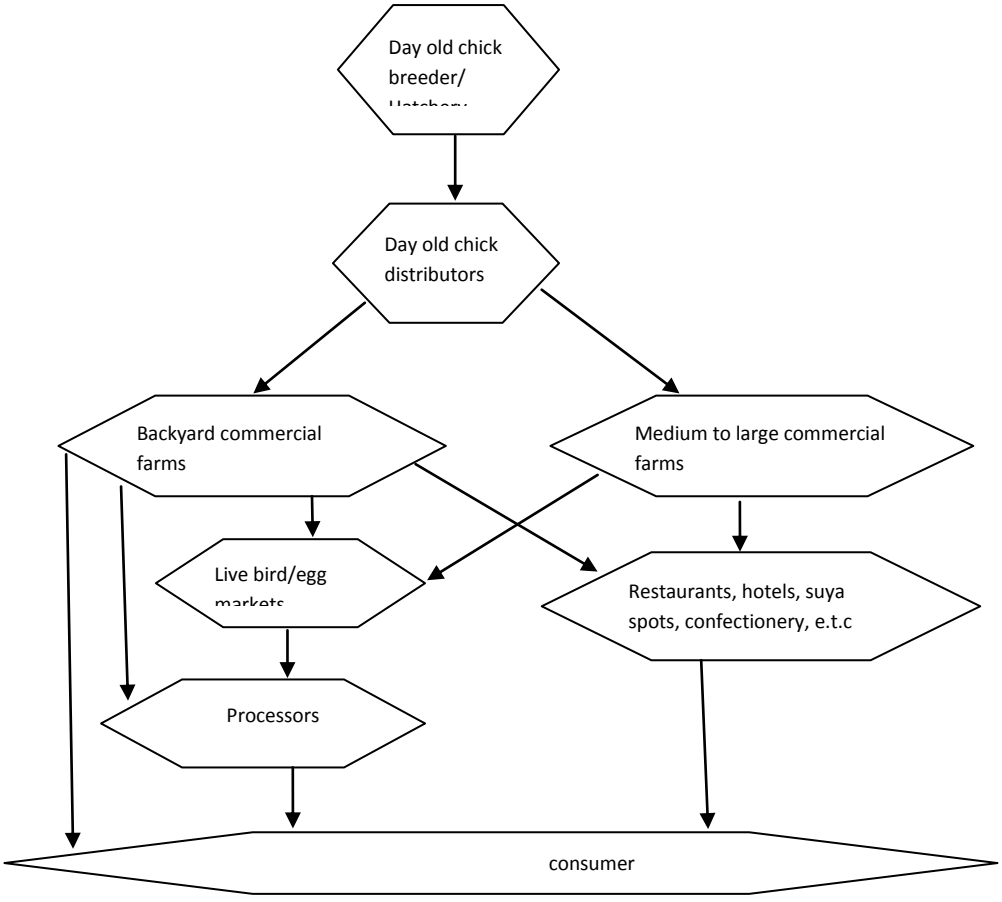
$V_{SL} = V_{SL1} + V_{SL2}$= spent layer/egg value chain 3.3

3.1.1 Spent Layer/Table Egg Value Chain in Kaduna South Local Government Area

The flow as shown in figure 3.1 begins with the hatching of day old layer chicks by the breeders/ hatcheries .The chicks are then sold to distributors on the same day, most of who have booked in advance for various numbers. The breeder adds value to the chain through the process of incubating and hatching the eggs laid by the parent stock to produce the day old chicks for which he makes a profit. The distributor immediately markets the chicks to backyard commercial farms

and medium to large commercial farms that have pre-paid for the chicks, the chicks spend very few hours with the distributors who are always anxious to dispose of their consignments as they are not equipped to cater for the chicks .The backyard and medium to large commercial farms are responsible for nurturing the day old chicks for about 22 weeks until they begin laying, their value addition in the value chain is critical in the sense that it is their inputs into the value chain that directly brings out table egg as output. There also exists a practice in some farms in which the farmer raises the bird for about 16-20 weeks and the sells them off before they begin laying as point- of – lay(POL) .

Figure 3.1. Spent Layer/table Egg Value Chain In Kaduna South Local Government Area.



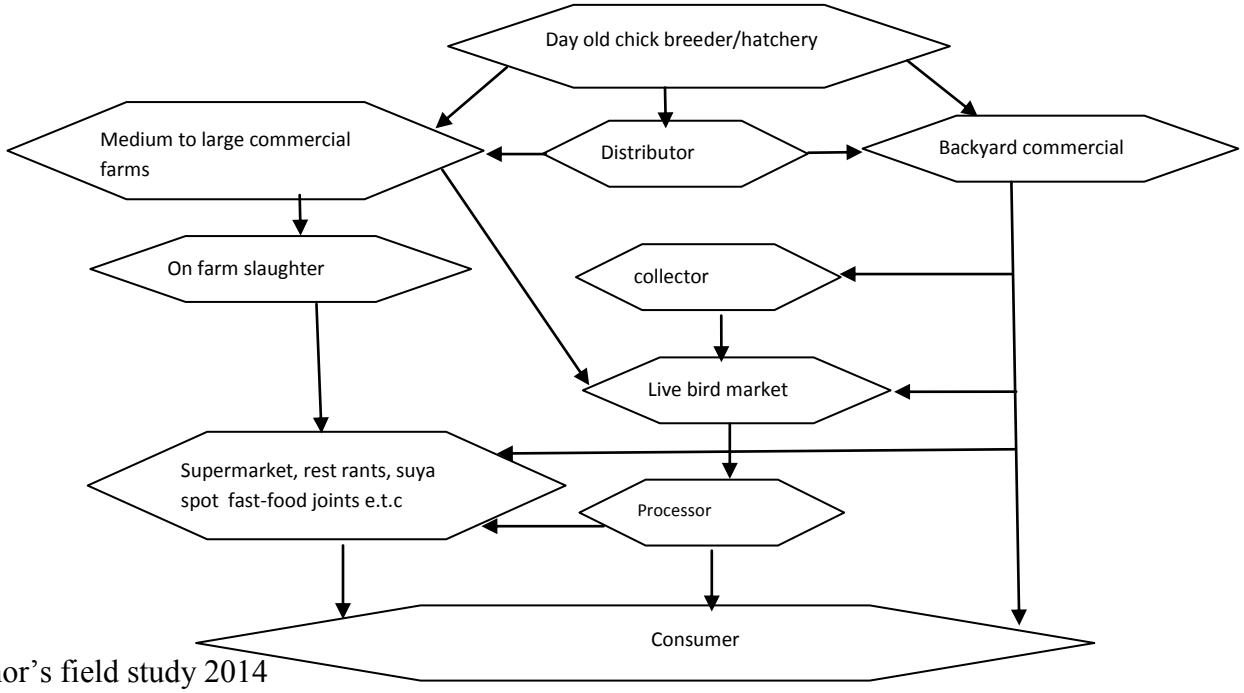
Source: Author's field study 2014

The farmer then disposes the eggs to egg markets, restaurants, hotels, confectioneries, collectors based on business arrangements, these in turn supply the eggs to consumers although backyard commercial also supply directly to consumers. When the layers are more than 18 months in laying(averagely) they are sold off as spent layers to live bird markets, restaurants, hotels , suya joints, etc or in some cases they are sold directly by the farmers to consumers

3.1.2 Broiler Value Chain in Kaduna South Local Government Area

The day old chick broiler is produced from the same hatchery as those of the layer. The hatchery supplies backyard commercial farms, medium to large commercial farms and distributors who also supply to farms as shown in figure 3.2. The chicks are then nourished for about 8 to 10 weeks after which they are due for sale. The greatest value addition in the chain is carried out at these farms who transform chicks into adult broilers ready for sale.

Figure 3.2: Broiler Value Chain in Kaduna South Local Government Area.



Source: Author's field study 2014

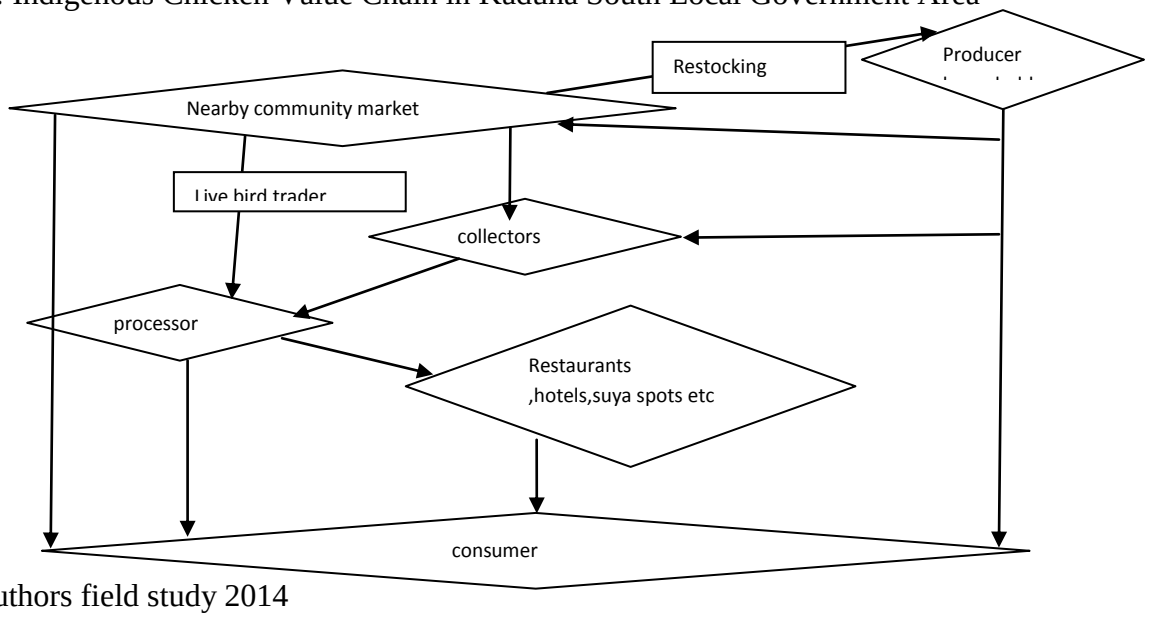
The medium to large farms carry out on –farm slaughter and processing of birds which they dress and supply to Supermarkets, restaurants, suya spots fast-food joints e.t.c from which consumers purchase the product. These medium to large commercial farms hardly sell live broilers.

The backyard commercial farms deal heavily in live birds which they supply to collectors who trade them at live bird markets, they also sell directly to the live bird markets, some restaurants, suya spots, fast food spots, etc. They also process some of their birds which they sell to supermarkets, restaurants and fast food joints who pay for the birds after weighing them and paying at an agreed price per kilogram.

3.1.3 **Indigenous Chicken Value Chain**

Figure 3.3 shows that the production usually begins with the purchase of one or two local pullets and a cock from the nearby community market which mate as they mature with the females laying fertile eggs and brooding in batches of 10 to 15 eggs.

Figure 3.3 : Indigenous Chicken Value Chain in Kaduna South Local Government Area



.Source: Authors field study 2014

When hatched, the small scavenge with the mother for food that includes household waste, insects and edible plants. They are occasionally given a few grains of corn, millet or sorghum. Some producers provide supplementary feed, water and local herbs to cure common diseases like Newcastle Disease, coccidiosis etc.

Young birds are usually exposed to danger from predators like hawks, snakes and even domestic carnivorous pets like cats, and dogs hence the survival rate is low. After the birds reach maturity, they are sold at the community market, to consumers or to collectors who process the birds and sell them to suya spots and restaurants from which consumers make their purchases.

3.2 Analytical Framework

The empirical analysis covered each activity along each of the stages in the two predominant types of value chains of poultry industry in the study area and also the supporting activities. The indigenous value chain was excluded because it was discovered to be unstructured and it is easier to scale up the broiler and layer chains. It is also noteworthy to state here that the broiler and layer chain were found to intersect, and having almost the same individuals as actors in the same stages of both chains performing similar roles.

Farm budgeting techniques using Stata SE 10 software was used to first capture income potential of value chains while production function was used to subsequently capture employment potential and output of the value chains also using Stata SE 10 software.

It was pertinent to initially demonstrate the income potential of each of the stages of the value chain before subsequently analyzing their employment potential. This is hinged on the fact that it is mostly only when an enterprise is deemed profitable that it would continue production and consequently attract new investment that would lead to its expansion and subsequently increase

it's employment potential. If a business does not have income potential it would most likely not have any employment potential.

3.2.1 Farm Budgeting Analysis

A) Coefficient of Private Profitability (CPP)

This term is used to measure the profitability of the firm. If CPP is less than 1, then it is unprofitable to produce the product at the present production level and/or the present price level. Conversely if CPP is greater than 1 then it is very profitable to produce the product at the present production and/or price level.

CPP=TR/TC 3.4

B) Gross Margin Analysis

GM= TR-TVC 3.5

GM=Gross margin, TR=Total Revenue ,TVC=Total Variable Cost, = TC-TFC

TC=Total Cost, TFC=Total Fixed Cost TVC=cost of acquiring the various inputs in the production function ,TR=Price × output

C) RETURNS PER NARA INVESTED

=GM/TVC 3.6

3.2.2 Production Analysis of the Value Chains

3.2.2.1 Spent Layer/Table Egg Chain

(A)first stage

Input Supplier/Producer

This is the base of the value chain in the study area due to the near absence of hatcheries in the study area. Consequently the farmers mostly import their day old chick from outside the zone(Mostly from Ibadan). The main actors at this stage are the farmer who run and operate the poultry farm, hatchery operator/distributor who supplies day old chick to the farm, feed miller who provide the food to be consumed by the chicks at various stages of their growth. There are those who act as supporters of the value chain at this level, they include vetnarian who comes to the farm periodically to administer medication and to prescribe drugs for the chickens, the extension service worker and trader who specializes in the sale of poultry drugs and equipment.

The inputs necessary for production at the base of the value chain include farm size(number of birds), number of workers employed, quantity of feed consumed , drugs and medication, credit and extension services , number of years in business(experience) and quantity of water consumed.

a) Farm budgeting at this stage is represented as:

i**) Coefficient Of Private Profitability (CPP)**.

$$CPP=TR/TC \qquad 3.7$$

TR= unit price of output(eggs/spent layers)x quantity of output produced

TC= amount spent in acquiring Independent variables

ii) Gross Margin Analysis

GM= TR-TVC 3.8

GM=Gross margin(Profits), TR=Total Revenue ,TVC=Total Variable Cost, = TC-TFC

TC=Total Cost, TFC=Total Fixed Cost TVC=cost of acquiring the various inputs in the production function ,TR=Price × output

iii)RETURNS PER NAIRA INVESTED

=GM/TVC 3.9

b)The model for the study is specified as:

Output=f(Fsze**,**Lab**,** Feed**,**Drg**,** Crd**,** Yrs**,**Wat)

The production function adopted for the study is:

Output $=\beta_o+\beta_1 Fsze+ \beta_2 Lab+ \beta_3 Feed+ \beta_4 Drg+ \beta_5 Crd+ \beta_6 Yrs+ \beta_7 Wat+ e$ **3.10**

(B) Second Segment

Distribution

This stage of the chain deals with the purchase of poultry produce from farmers and delivering them to retail outlets(restaurants, hotels, confectioneries, suyaspots and consumers) for final consumption . The main actors are live bird and egg traders, collectors and farmers.

The income and profitability depends on the quantity of produce distributed as the charge is per unit of produce. The employment potential at this stage is large and often fluctuates with festive seasons.

Analysis of Distributing Segment

At this stage of the value chain analysis will be made of the income and employment potential inherent.

The income potential using farm budgeting is calculated as :

i) TR-TC

Where: TR= revenue from sale of products(eggs and spent layers)

TC=costs incurred in the process acquiring and sale of products (cost price of goods, transportation ,wages and other costs).

ii) Coefficient Of Private Profitability (CPP).

CPP=TR/TC ……3.11

iii) Gross Margin Analysis

GM= TR-TVC 3.12

GM=Gross margin, TR=Total Revenue ,TVC=Total Variable Cost, = TC-TFC

TC=Total Cost, TFC=Total Fixed Cost TVC=cost of acquiring the various factor inputs in the distribution process ,TR=Price × quantity of output distributed

iv)Returns Per Naira Invested

=GM/TVC 3.13

The employment potential at the distributing segment includes the demand for labour services required to distribute the produce efficiently to retailers. Opportunities exist for employment here as egg/live bird traders , collectors and transporters.

(C)Third Segment

Retailing

This is the final segment of the value chain; it involves the marketing and sale of poultry product to the final consumer. The main actors at this stage are the restaurants, hotels, suya spots, confectionery e.t.c. These outlets receive the produce from the distributors. Some farms also engage in retailing by selling directly to consumers ,the retailers make income and profit from their knowledge of market demand and supply situation.

Analysis of Retailing Segment

At this stage of the value chain analysis will be made of the income and employment potential inherent.

The income potential using farm budgeting is calculated as :

i) TR-TC

Where: TR= revenue from sale of products(eggs and spent layers)

TC=costs incurred in the process acquiring and sale of products(cost price of goods, transportation ,wages and other costs).

ii) Coefficient Of Private Profitability (CPP).

CPP=TR/TC 3.14

iii) Gross Margin Analysis

GM= TR-TVC 3.15

GM=Gross margin(Profits), TR=Total Revenue ,TVC=Total Variable Cost, = TC-TFC

TC=Total Cost, TFC=Total Fixed Cost , TVC=cost of acquiring the various inputs in the retail process ,TR=Price × quantity of output retailed

iv)Returns Per Naira Invested

=GM/TVC 3.16

The income potential of the spent layer/egg value chain is sum total of the gross margins of each of the three segments of the chain

3.2.2.2 Broiler Chain

(A)First Stage

Input Supplier/Producer

The farmers also mostly import their day old chick from outside the zone(Mostly from Ibadan). The main actors at this stage are the farmer who run and operate the poultry farm, hatchery operator/distributor who supplies day old chick to the farm who is more active than in the layer/egg chain due to frequent demand. Feed miller who provide the food to be consumed by the chicks at various stages of their growth. There are those who also act as supporters of the

value chain at this level, they include vetnarian who comes to the farm periodically to administer medication and to prescribe drugs for the chickens, and trader who specializes in the sale of poultry drugs and equipment.

a)Farm budgeting at this stage is represented as:

i) Coefficient Of Private Profitability (CPP).

CPP=TR/TC 3.17

TR= unit price of output(broilers)x quantity of output produced

TC= amount spent in acquiring Independent variables

ii) Gross Margin Analysis

GM=TR-TVC 3.18

GM=Gross margin, TR=Total Revenue ,TVC=Total Variable Cost, = TC-TFC

TC=Total Cost, TFC=Total Fixed Cost TVC=cost of acquiring the various inputs in the production function ,TR=Price × output

iii)RETURNS Per Naira Invested

=GM/TVC 3.19

b) The production model is specified as:

Output=f(Fsze**,**Lab**,** Feed**,**Drg**,** Crd**,** Yrs**,**Wat)

The production function adopted for the broiler chain is:

Output $=\acute{\alpha}_o+\acute{\alpha}_1$**Fsze+** $\acute{\alpha}_2$**Lab+** $\acute{\alpha}_3$**Feed+** $\acute{\alpha}_4$**Drg+** $\acute{\alpha}_5$**Crd+** $\acute{\alpha}_6$**Yrs+** $\acute{\alpha}_7$**Wat+e** 3.20

(B) Second Segment

Distribution

This stage of the chain deals with the purchase of poultry produce from farmers and delivering them to retail outlets(restaurants, hotels, confectioneries, suyaspots and consumers) for final consumption . The main actors are live bird and egg traders, collectors and farmers.

The employment potential at this stage is large and often fluctuates with festive seasons. The income and profitability depends on the quantity of produce distributed as the charge is per unit of chicken.

Analysis of Distributing Segment

At this stage of the value chain analysis will be made of the income and employment potential inherent.

The income potential using farm budgeting is calculated as :

i) TR-TC 3.21

Where: TR= revenue from sale of products(eggs and spent layers)

TC=costs incurred in the process acquiring and sale of products(cost price of goods, transportation ,wages and other costs).

ii)Coefficient Of Private Profitability (CPP).

CPP=TR/TC 3.22

ii) Gross Margin Analysis

GM= TR-TVC 3.23

iii)Returns Per Naira Invested

=GM/TVC 3.24

(C)Third Segment

Retailing

This is the final segment of the value chain, it involves the marketing and sale of poultry product to the final consumer. The main actors at this stage are the restaurants, hotels, suyaspots, confectionery e.t.c. These outlets receive the produce from the distributors. Some farms also engage in retailing by selling directly to consumers. The retailers make income and profit from his knowledge of market demand and supply situation.

Analysis of Retailing Segment

The income potential using farm budgeting is calculated as :

i) TR-TC

Where: TR= revenue from sale of products(eggs and spent layers)

TC=costs incurred in the process acquiring and sale of products(cost price of goods, transportation ,wages and other costs).

ii)Coefficient Of Private Profitability (CPP).

CPP=TR/TC 3.25

ii) Gross Margin Analysis

GM= TR-TVC 3.26

iii)RETURNS PER NARA INVESTED

=GM/TVC 3.27

The income potential of the broiler value chain is sum total of the gross margins of each of the three segments of the chain

Note: In the process of data collection through structured questionnaires it became apparent that the roles and functions of distributors and retailers overlap and intersect. Most distributors sell their goods in large quantities and also in smaller units making them retailers for example they could supply 250 crates of eggs to a bakery like Ostrich bakery and sell 2 crates of eggs to consumers at the same time. Also some retailers secure periodic contracts to supply large quantities of poultry produce making them distributors. Consequently the analysis of both segments was merged under distribution as a result of their similarities and duplication of roles.

3.3 Employment Potential of the Value Chain

The opportunities for employment along the value chain are wide and varied, they include farmer , hatchery operator, day old chick distributor,miller, vetnarian , extension service worker ,trader in poultry equipment, farm worker, live bird/egg trader, transporter, collector, processor, and

retailer of processed poultry produce (fried chicken, suya spot owner, and mini kiosk operator selling fried eggs with tea and indomie (mai shai) .

It is pertinent to note that scale of production was a crucial factor in determining the size of employment potential inherent in the value chain. There appeared to be a direct relationship between scale of production, income potential and employment potential in the value chain. A large scale of production implied high income being generated, consequently many workers and actors were required to handle the high output in the value chain resulting in high employment potential and vice versa.

3.4 **The Study Area**

Kaduna South local government area is located in Kaduna state North Western Nigeria, capital of Kaduna state. Kaduna State comprises 23 Local Government Areas (LGAs) with a land area of about 46,053 km2 and an estimated population of 6,066,562 (Census, 2006).It is the 3rd most populated state in Nigeria after Lagos & Kano. Kaduna State is bordered by Katsina, and Kano State to the North, Plateau to the East and South, Niger to the West and Abuja to the South. Kaduna South l.g.a is made up of 13 wards namely: *Makera , Barnawa , Kakuri Gwari , Television , Kakuri Hausa ,Tudun Wada North ,Tudun Wada South ,Tudun Wada West ,Tudun Nupawa ,Sabo Gari South ,Sabo Gari North ,Ungwar Sanusi ,Badikko* .

3.5 Sampling Techniques

The study adopted a stratified sampling technique to collect data. The choice of stratified sampling was to capture all the segments of the value chain relevant to the study .The first stage involved the selection of Kaduna South local government area based on the level of development of the poultry value chain in the study area.

The second stage involved the identification of the two main types of value chain the study is focusing in (table 3.1). The third stage involved the identification of the three main stages within each the two value chains. The fourth stage comprised the random selection of 25 respondents each from the first stages of both value chains and 11 respondents from each of the other 2 stages randomly spread across the 13 wards in Kaduna South local government area making a total of 72 respondents.

Greater emphasis was laid in sampling at the first stage (base) of the value chain because this is where production, greatest value addition and product transformation appears to take place along the value chain.

Table 3.1: Distribution of samples along the value chain

	Spent layer/table egg chain	**Broiler chain**	**Total**
Stage 1 Input supplier/producer	**25**	**25**	**50**
Stage 2 Distributor	**10**	**12**	**22**
Total	**35**	**37**	**Grand total 72**

Source: Author's field study, 2014

The data to be used for this study was cross-sectional data obtained by the use of structured questionnaires through interview scheduled. The questionnaire is designed to elicit information on business profile, sources of raw materials and costs, employment, source of capital , infrastructures ,marketing ,challenges, expansion plans, and other related issues from the respondents.

3.6 Analysis of Data

Farm budgeting techniques involving tables, graphs and charts using Stata SE 10 software was used to first capture income potential of value chains while cobb douglas production function using estimates of variables(farm size, labor, feed, drug, credit, years of experience, water) was used to subsequently capture employment potential and output of the value chains also using Stata SE 10 software.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.0 Introduction

This chapter presents, discusses, analyses and interprets the results obtained from the questionnaires distributed to respondents.

4.1 **Socio economic Characteristics of Respondents**

Table 4.1 indicates that the average age of the layer farmers was 41 years, while that of broiler farmers and distributors was 42 and 43 respectively This implies that most of the producers are in their active age of productivity. This appears to agree with Afolabi (2007), who stated that majority of the poultry producers in South-Western Nigeria, were in their productive years.

The sex distribution of the respondents in the table also shows that layer producers are almost evenly composed by the two sexes while broiler farming and distribution is dominated by males. Analysis of farm size reveals that majority of both broiler and layer farmers in the study area were backyard and small scale farmers with flock size of 1000 birds or less , while only few are medium scale farmers with flock size of above 1000. Also noteworthy is the fact that almost all farmers practiced deep litter system.

Majority of the layer and broiler farmers are well educated with over 40% of them as graduates while 27% of distributors were graduates. This is a positive development as educated farmers would be highly receptive to new innovations, which could enhance poultry production. The respondents are fairly experienced with years in poultry business ranging from years with mean ranging from 8-10 years.

Table 4.1: Socio -economic Characteristics of Respondents

	Layer			Broiler			Distribution	
Variable	**Frequency**	**Percent**		**Frequency**	**Percent**		**Frequency**	**Percent**
Age								
20-35	5	20		4	16		8	13
36-50	16	64		19	76		16	74
51-65	4	16		2	8		3	13
Total	25	100		25	100		22	100
	Mean 41			Mean 42			Mean 42	
Experience(yrs)								
0-10	18	72		17	68		17	77
11-20	5	20		6	24		4	18
20 and above	2	8		2	8		1	5
Total	25	100		25	100		22	100
	Mean 10			Mean 9			Mean 8	
Sex								
Female	13	52		9	36		1	5
Male	12	48		16	64		21	95
Total	25	100		25	100		22	100

Table 4.1: Socio -economic Characteristics of Respondents

	Layer			Broiler			Distribution	
Variable	**Frequency**	**Percent**		**Frequency**	**Percent**		**Frequency**	**Percent**
Farm Size								
0-499	8	32		16	64			
500-999	10	40		6	24			
1000-1500	7	28		3	12			
Total	25	100		25	100			
	Mean 654			Mean 556				

Education								
Graduates	11	44		10	40		6	27
NCE	1	4		4	16		1	5
OND	7	28		4	16		5	23
SSCE	5	20		7	28		7	31
PRY SCH	1	4		0	0		3	14
Total	25	100		25	100		22	100
Location								
Baddikko	5	20		7	28		2	9
Barnawa	5	20		4	16		4	19
Kakuri	2	8		1	4		8	37
Makera	3	12		1	4		2	9
Television	5	20		2	8		2	9
Tudun nupawa	1	4		3	12		0	0
Tudun wada	3	12		3	12		2	9
Ungwan sanusi	1	4		3	12		1	4
sabo	0	0		1	4		0	0
Ungwar sarki							1	4

4.2 **Analysis of Cost Structure and Pricing**

Tables a,b and c (see appendix) shows the cost structure of the value chain in the study area . The total variable cost(TVC) associated with each of the farms is shown. The five other columns represent the costs that constitute the TVC(cost of feed daily, cost of electricity daily, drug costs daily,daily wage bills and other daily miscellaneous costs. The costs of the distribution segment constitute mainly of cost of goods, wages and other miscellaneous costs.

Tables 4.2, 4.3 and 4,4 shows the proportion of what each of the costs constitute of TVC. feed appears to be the largest cost incurred by both broiler and layer farmers daily with over 80% of TVC, while costs of goods is the highest costs incurred by distributors constituting over 95% of

total costs ;wages electricity , drugs , and other miscellaneous costs constitute the remaining costs .

Table 4.2: Layer Farm Cost Structure

Variable	Sample	Mean	Min	Max
FCD	25	.8794108	.7687827	.9390104
FDRG	25	.0263337	.0149597	.0611532
FWAG	25	.0448241	.0213333	.0791753
FPHCN	25	.0448241	.0213333	.0791753
FOTH	25	.0317529	.0076717	.0594139

Source: Authors field study, 2014

Table 4.3: Cost Structure of Broiler Farms

Variable	sample	Mean	Min	Max
FCD	25 .	8330253	.4905621	.9329878
FDRG	25	.073307	.0063763	. 1850746
FWAG	25	.0288223	.0139975	.0682283
FPHCN	25	.0144055	0	.0722767
FOTH	25	.05044	.0079339	.4015017

Source: Authors field study 2014

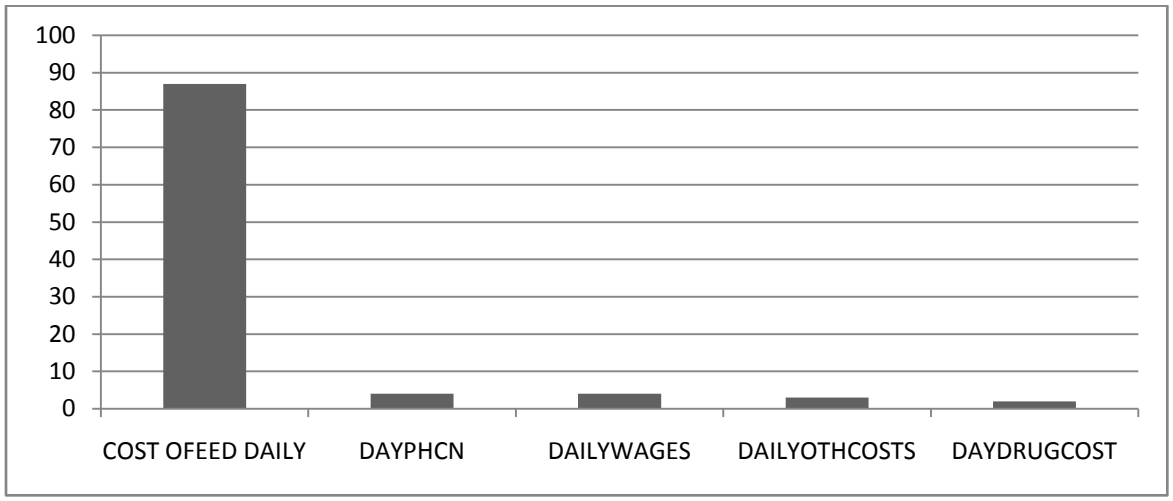
Table 4.4: Cost Structure of Distribution Segment

Variable	sample	Mean	Min	Max
FGOODS	22	.9672665	.8763278	.9938287
FWAG	22	.0081213	.0023732	.0254237
FOTH	22	.0246122	.0036066	.1024279

Source: authors field study 2014

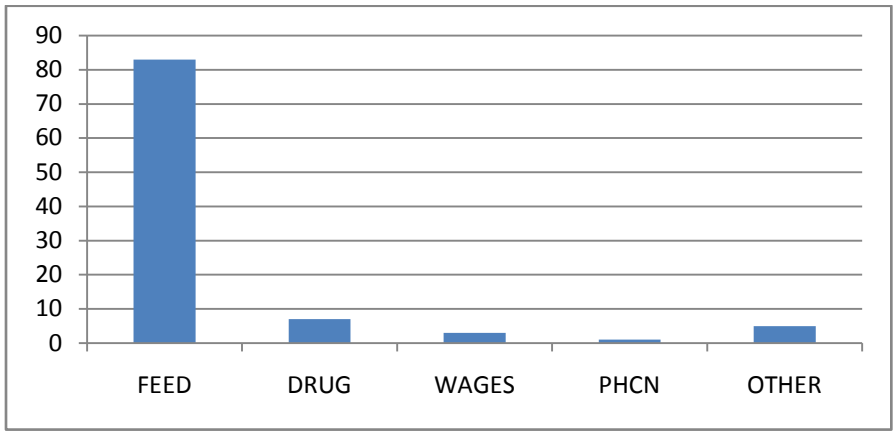
The information in table 4.2 to 4.4 is shown in graphs 4.1 to 4.3 which clearly shows cost of feed and cost of goods as the greatest costs in the cost structure of the value chain

Figure 4.1: Cost Structure of Layer Farms



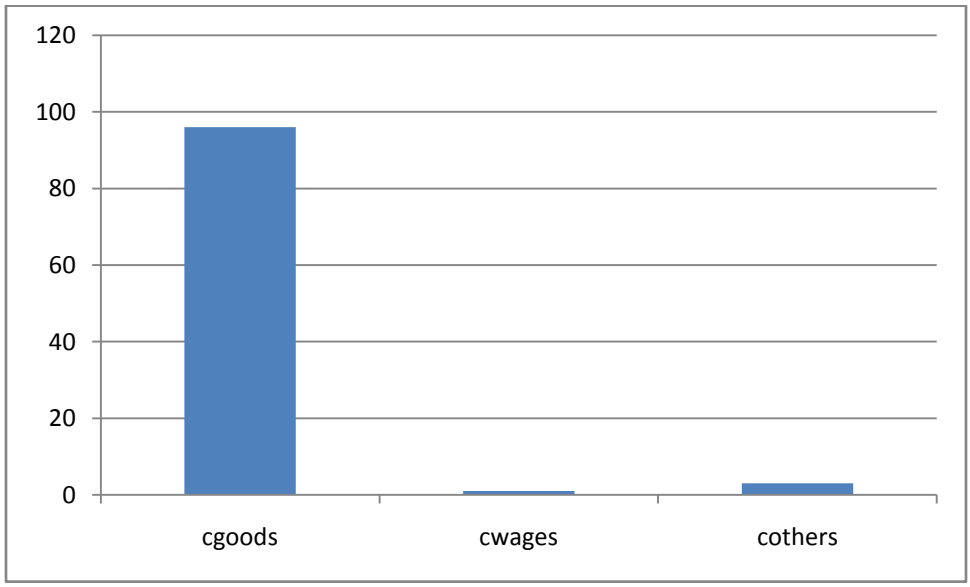
Source : Authors field study ,2014

Figure 4.2: Cost Structure of Broiler Farms



Source: Authors field study, 2014

Figure 4.3: Cost Structure of Distributors



Source: Authors field study, 2014

Tables 4.5 and 4.6 show the pricing of products in the value chain. Table 4.5 appears to show that the distribution segment has the highest price for eggs. It could also be deduced from table 4.6 that distribution segment has the most expensive chickens while spent layers from small scale layer farms appear to be the most costly in the value chain.

TABLE 4.5: Pricing of Eggs

	Sample	Mean	Min	Max
Backyard	8	668	650	700
Small	10	680	650	750
Medium	7	674	620	750
Distribution	10	828	750	900

Source: Authors field study, 2014

TABLE 4.6: Pricing of Broiler and Spent Layer

	Sample	Mean	Min	Max
Backyard broiler	11	1388	1200	1600
Backyard layer	8	878	850	950
Small broiler	11	1359	1200	1500
Small layer	10	895	850	950
Medium broiler	3	1366	1300	1450
Medium layer	7	840	800	900
Distribution	12	1479	1200	1700

Source: Authors field study, 2014

4.3 A**nalysis of Income Opportunities**

4.3.1 I**ncome Potential of the Value Chain**

As we begin the analysis of income potential, it would suffice to note that the income to the layer farm is mainly from two sources: Firstly from the sale of eggs produced by the birds daily and then from the sale of culled birds at the end of their productive cycle (average of 12 months) while income for broiler farm and distribution segment is mainly from a singular source.

Table 4.7 to 4.9 shows the budget profiles of the farms sampled and the income potential inherent. The income of the layer farm is calculated as:

i)Daily profit = Total Revenue –Total variable cost (Gross margin) 4.1

ii)Final balance = (price of spentlayer-cost of brooding bird to maturity) x no of birds 4.2

The monthly balance is the daily profit multiplied by 30, while the Business profit is monthly balance multiplied by 12. This is so due to the fact the average profitable productive cycle of the layer bird is 12 months.

The Grand Profit represents the total income expected to be generated by the farmer at the end of the business enterprise. This is calculated as Business profit+ Final Balance

The income for the broiler farm is calculated as:

Profit = Total Revenue-Total Variable Costs 4.3

while income from the distribution segment is calculated as:

Profit = Total Revenue-Total Variable Costs 4.4

Incomes of Layer Farms

Table 4.7: Backyard Layer

Variable	Sample	Mean	Min	Max
Daily profit	8	1740	669	3752
Final balance	8	46187	-21000	112500
Monthly profit	8	52225	20075	112575
Business profit	8	626700	240900	1350900
Grand profit	8	672887	267900	1398900

Table 4.7: Small Scale Layer

Variable	Sample	Mean	Min	Max
Daily profit	10	3332	-77667	7490
Final balance	10	72310	-12500	15000
Monthly profit	10	99971	-23000	224700
Business profit	10	1199655	-275999	2696400
Grand profit	10	1271965	-151999	2731400

Source: Authors field study, 2014

Table 4.7: Medium scale layer

Variable	Sample	Mean	Min	Max
Daily profit	7	10711	7853	17037
Final balance	7	213857	110000	435000
Monthly profit	7	321337	235590	511125
Business profit	7	3856054	2827080	6133500
Grand profit	7	4069911	3117080	6568500

Source: Authors field study, 2014

TABLE 4.8: Incomes of Broiler Farms

	Variable	Sample	Mean	Min	Max
Backyard	profits	11	131647	13350	260500
Small		11	423768	194800	689475
medium		3	1216500	786550	1607425

I**ncomes of Distribution Segment**

Table 4.9: Chicken

Variable	Sample	Mean	Min	Max
Daily profit	12	15303	8930	41315
Monthly profit	12	459094	267900	1239466

Table 4.9: Eggs

Variable	Sample	Mean	Min	Max
Daily profit	10	3295	671	8660
Monthly profit	10	98873	20133	259800.00

Source: Authors field study, 2014

There appears to be a positive relationship between the flock size ,quantity of goods sold and profit earned as illustrated by the data in table D, E and F in the appendix.

This is also reaffirmed in Figures 4.4, 4.5 and 4.6 The graphs illustrates further the positive relationship between flock size, quantity of goods sold and profits in the value chain.

Figure 4.4: Relationship between Flock Size and Grand Profits in Layer Farms

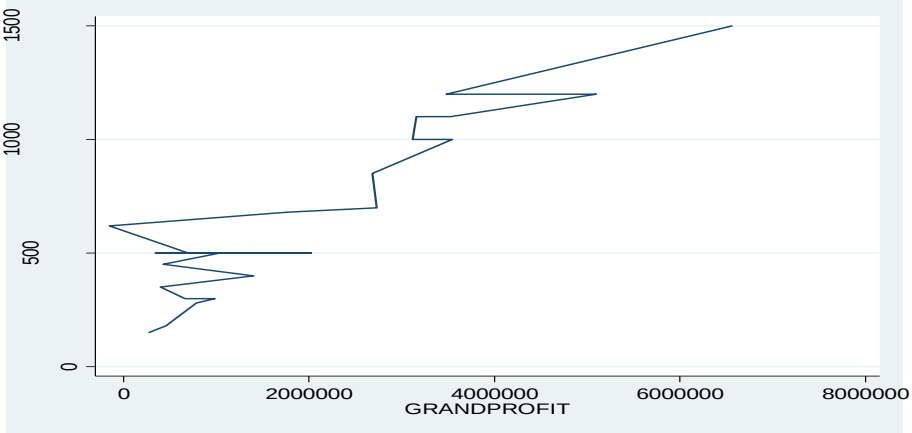
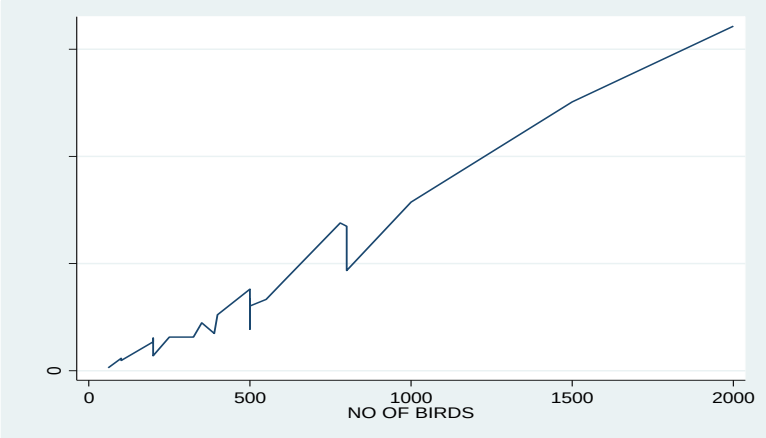
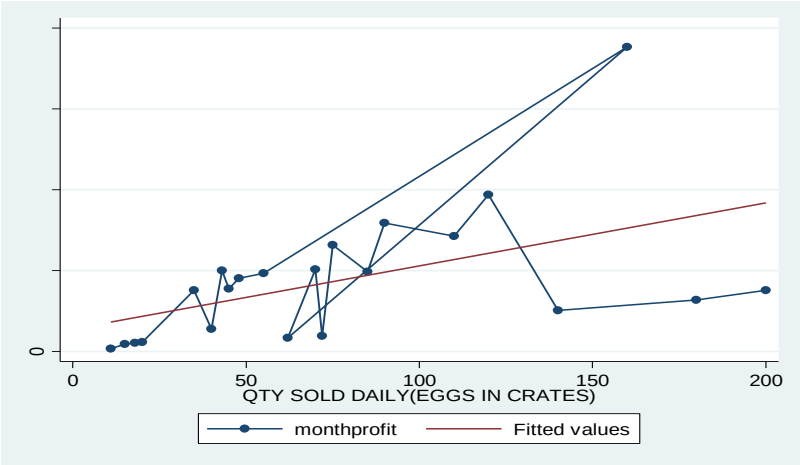


Figure 4.5: Relationship between Flock Size and Profit in Broiler Farms



Source: Authors field study, 2014

Figure 4.6: Relationship between Sales and Profit Levels in Distribution Segment



Source: Authors field study, 2014

4.4 Returns on Investment in Value Chain

4.4.1 Coefficient of Private Profitability in Value Chain

Table 4.10 shows the average coefficient of private profitability of the three sectors sampled. All sectors have CPP above 1 implying that it is profitable to engage in all three sectors , broiler farming appears to have the highest value indicating that it is the most lucrative sector.

TABLE 4.10: Average Coefficient of Private Profitability in Value Chain

	Sample	Mean	Min	Max
Layer farms	25	1.73	.87	3.58
Broiler farms	25	1.90	1.20	2.67
Distribution	22	1.46	1.12	1.85

Table 4.11to 4.13 shows the CPP of the three categories of farms in the study area (backyard, small and medium scale). Medium scale broiler farms appear to have the highest CPP with a value of 2.48 indicating an average profit level of 148% in the farms.

TABLE 4.11: Average Coefficient of Private Profitability of Backyard Farms

	Sample	Mean	Min	Max
Layer farms	8	1.57	1.18	2.03
Broiler farms	11	1.64	1.21	2.08

TABLE 4.12: Average Coefficient of Private Profitability of Small Scale Farms

	Sample	Mean	Min	Max
Layer farms	10	1.53	.87	2.10
Broiler farms	11	2.01	1.45	2.66

TABLE 4.13: Average Coefficient of Private Profitability of Medium Scale Farms

	Sample	Mean	Min	Max
Layer farms	7	2.20	1.71	3.58
Broiler farms	3	2.48	2.18	2.63

4.4.2 **Returns Per Naira Invested in Value Chain**

The average returns per naira invested of the three sectors sampled are shown in table 4.14. All RPNI values are positive indicating that they all enjoy positive returns on investment. Broiler farms appear to have the highest rate of returns on investment with an average value of approximately 0.91 indicating that for every naira invested 91kobo is gained.

TABLE 4.14: Average Returns per Naira Invested in Value Chain

	Sample	Mean	Min	Max
Layer farms	25	.73	-.12	2.58
Broiler farms	25	.90	.20	1.67
Distributors	22	.45	.13	.85

Tables 4.15 to 4.17 shows the RPNI of the three categories of farms in the study area (backyard, small and medium scale). Medium scale broiler farms appear to have the highest RPNI with a value of 1.48 indicating that for every naira invested in medium scale broiler farms 148kobo is gained.

TABLE 4.15: Average Returns per Naira Invested of Backyard Farms

	Sample	Mean	Min	Max
Layer farm	8	.57	.19	1.03
Broiler farm	11	.64	.21	1.08

TABLE 4.16: Average Returns per Naira Invested of Small Scale Farm**s**

	Sample	Mean	Min	Max
Layer farm	10	.53	-.13	1.10
Broiler farm	11	1.01	.45	1.67

TABLE 4.17: Average Returns per Naira Invested of Medium Scale Farms

	Sample	Mean	Min	Max
Layer farm	7	1.20	.71	2.58

Broiler farm	3	1.48	1.18	1.63

4.5 **Analysis of Employment Opportunities**

The average number employed in each of the sectors sampled is shown in table 4.16 . The distribution segment appears to employ the highest number of people .

TABLE 4.18: Employment Potential of Value Chain

	Sample	Mean	Min	Max
Layer farm	25	3	1	5
Broiler farm	25	3	1	10
Distribution	22	4	2	14

Tables 4.19 to 4.21 shows the employment potentials of the three categories of farms in the study area (backyard, small and medium scale). Medium scale broiler farms appear to have the highest potential for employment generation with a value of 8.

TABLE 4.19: Employment Potential of Backyard Farms

	Sample	Mean	Min	Max
Layer farm	8	2	1	3
Broiler farm	11	1	1	2

TABLE 4.20: Employment Potential of Small Scale Farms

	Sample	Mean	Min	Max
Layer farm	10	3	2	5
Broiler farm	11	2	2	3

TABLE 4.21: Employment Potential of Medium Scale Farms

	Sample	Mean	Min	Max

Layer farm	7	4	3	5
Broiler farm	3	8	6	10

4.6 Regression Analysis of Producer Stage of Value Chain

The F – value is significant at all levels in both layer and broiler farms (table 4.22 and 4.23) this implies that the independent variables included in the models were important in explaining the dependent variable. The results show that the adjusted R^2 is above 0.90 in both tables implying that over 90% of variation in outputs in each of the respective farms is accounted for by the explanatory variables in the models.

The coefficient of flock size is positive for layer farming, this implies that increase in the number of birds in the farm will lead to increase in output(crate of eggs). A unit increase in flock size causes output to increase by 0.47 units. This result agrees with the findings of Ajibefun (2000),Shubahash (1999), and Bamiro (2006).

The coefficient of quantity of feed consumed daily is positive for both farms indicating that increasing feed consumed by the birds daily will bring about increase in output in the farms. This is in consonance with Bamiro, (2001). The coefficient of labour input is positive in both farms indicating that increasing labour input will increase farm output. This suggests that there is potential for employment generation in both farms while also increasing output and income , which are the cardinal objectives of this study.

The coefficient of water intake is negative in layer farms implying that increasing water supply to the birds in the farm is detrimental to productivity in the farm ,while it is positive in broiler farms implying it improves productivity. The years of experience coefficient is positive in layer

farms indicating that the more years spent in layer the higher the productivity of the farmer . A unit increase in years of experience causes output to increase by 0.15 units . This could be due to the fact that over the years the farmer acquires experience and better production practices consequently the farmer becomes more efficient resulting in greater output and profits. This is consistent with the findings of Adepoju,(1999), Hassan,(2002), Ojo,(2003),also with Adebayo and Adeola,(2005). Conversely years of experience has a negative value in broiler farms indicating that the more years spent in broiler farming the lower the productivity of the farmer . This could be due to the fact that as the farmer acquires experience he becomes complacent in some necessary production practices like vaccination and drug administration this results in inefficiency leading to lower outputs and profits.

The coefficient for credit and extension is positive for layer farmers . This means that assistance to farmers in area of loans , vetenary and other technical expertise will increase their productivity. This is in agreement with the findings of Desai and Mellor (1993) and Nwagbo,(1989). However coefficient for credit and extension is negative for broiler farmers This result agrees with the findings of Nwaru,(2006) who reported that receiving credit contributed to drop in productivity of farmers. They explained that this could be as a result of disbursement of credit in cash rather than in kind and this leads to loan misapplication engendered by poverty.

The returns to scale of the model shows a returns to scale of 1.25 for layer farms and 1.17 for broiler farms indicating increasing returns to scale. This implies that it is beneficial to invest and participate in both layer and broiler farming which appears to corroborate the results of coefficient of private profitability (CPP) and returns per naira invested (RPNI) .

TABLE 4.22: Regression Outputs of Layer Farms

Output= -0.694+0.474(flock size)+0.055(labor)+0.481(feed)+0.231(credit extension)+

(-0.41) (1.42) (0.43) (1.62) (1.75)

0.146(years of experience)+-0.135(water intake)+e

(1.70) (-0.55)

F –Value (6,18)=55.65

Adjusted R^2 =0.931

Table 4.23 : R**egression Output of Broiler Farms**

Output = 4.659+0.810(feed)+0.120(water)+0.319(labor)+-0.020(credit extension)+-0.051(years

(5.28) (6.06) (0.62) (2.33) (-0.16) (-0.83)

of experience)+e

F value (5,19)= 106.86

Adjusted R^2 = 0.956

4.7 : C**hallenges Faced in the Value Chain**

A) Capital:

Farmers find it difficult to access loans for expansion of their enterprise, and prospective farmers also cannot access finance to set up their farms. Majority of the farmers started their business from their personal savings and with help from friends and family members. Most of the financial institutions that give out loans do so at high interest rate, short gestation period, and with difficult collateral .

The institution that appears to be an exception is Bank of Agriculture (BoA). This bank requires 2 shortees, own an account with 20% of the amount that is applied for as loan. However the

farmers sampled have only accessed up ₦150,000 maximum which they say is inadequate to meet their expansion plans. As a result most farmers save a part of the profit to re-invest in the business for their expansion. This process is slow.

B) Infrastructure:

Some roads in the study area are bad , this causes some eggs to damage while in transit causing losses. The bad roads also prolong the time taken to transport goods from farm to market. Some of the farmers , distributors and retailers reported that their broiler birds have suffocated due to delays in transit. Telecommunication services are epileptic this affects information about where and when to market the goods.

C) Diseases and Sickness:

There are incidents of outbreaks in farms which reduce flock size, productivity and profitability. Common diseases experienced include chronic respiratory diseases(CRD), Coccidiosis ,fowl typhoid, Newcastle , lice and vaccine failure . The farmers also complained of a dearth of competent vetnary doctors to take adequate care of their birds , many incompetent practitioners claim to be vet doctors , treating birds only by trials and instinct and in many cases causing death of flock and losses in revenue.

D) Others:

Some of labourers employed are dishonest and unfaithful , resulting in loss of chicken , eggs and inadequate keeping of farm records. Rats and other rodents invade the farms especially at night when it’s dark and due to their nomadic nature they often carry with them diseases and lice

causing outbreaks. They also damage eggs stored . Some of the farmers also experience delay in payment from distributors and retailers which affects business planning and progress

4.8 S**ummary of Key Findings**

From the administration of structured questionnaires to respondents ,farm budget analysis and regression analysis the following are summary of the major findings of the study.

a) The study discovered two value chains (layer and broiler) to be well structured and fully developed and a third (indigenous) value chain that is largely unstructured.

b) The layer and broiler value chains converge at the distribution segment of the value chain.

c) The layer farms generate an average profit of 73%, while broiler farms and distribution segment generate 90% and 45% profits respectively .

d) The layer and broiler farms employ an average of three persons , while the distribution segment employs an average of four persons.

e) There is positive relationship between flock size and quantity of goods with profit levels in the value chains.

f) Cost of feed is the largest variable cost in layer and broiler farming enterprise

g) There is a direct relationship between labor employed and output in both layer and broiler farms.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 **Summary of the Study**

This study analyzed the employment and income potential in the poultry industry, using Kaduna south local government area as a case study. The objectives of this study are to analyze the value chain of poultry farming in Kaduna south local government area ,to evaluate the income and employment opportunities in poultry farming value chain in Kaduna south local government area and to determine the challenges faced in poultry farming in Kaduna south local government area and to make policy recommendations.

The results from the key findings of the study indicate layer and broiler value chains as the two main types of value chains that are functional in the study area and both chains converge at the distribution segment of the value chain. The results of the findings also indicated a positive Returns Per Naira Invested in all segments of the value chain with the broiler value chain having the highest rate of returns. The findings further revealed all segments of the chain having the potential for generating employment but the distribution segment having a marginally higher potential. A positive relationship was found to exist between flock size and profit levels for farmers and quantity of goods traded and profitability for distributors and retailers. Cost of feed was also revealed to be the highest variable cost incurred by farms .The study appears to reveal a positive relationship existing between labor employed and output in both layer and broiler farms. Finally the study discovered increasing returns to scale in the production segment of the value chain.

5.2 Conclusion of the Study

The findings of the study allow us to draw some conclusions. Firstly on the issue of positive Returns Per Naira invested in all segments of the value chain, we can conclude that individuals who invest in any segment of the segment are sure to generate a certain level of income with investors in medium scale broiler farming earning the highest profits which would be 17% higher than layer farms and 45% higher than distributors averagely. Secondly the distribution segment has the greatest potential for generating employment in the value chain but it is only marginally higher than layer and broiler farms. We can also conclude that increasing flock size and quantity of goods traded will lead to increased income . Fourthly our findings can also lead us to conclude that reduction in costs of feed will significantly reduce costs of production and increase income generated in the farm.

Finally increasing labour input at the farm level has the dual advantage of increasing output and employment which are the primal objectives of this study.

5.3 Recommendations of the Study

Given the above findings and conclusion, the study therefore recommends the following measures:

a) From the finding that Returns Per Naira invested is positive in all segments of the chain and the highest value in broiler farming, there is need for policy makers to encourage investments in all the segments as investors are certain to generate reasonable income in any of the segments they decide to invest in based on their capital, but broiler value chain and medium scale broiler chain particularly should be scaled up in order to realize the high potential it possesses in generating income.

b) From the finding that the distribution segment possesses highest potential for employment , policies aimed at scaling up the distribution segment should be formulated in order to harness the potential it has for generating jobs thereby reducing unemployment eg the bottlenecks involved in granting loans to genuine investors imposed by micro finance, commercial and agric banks should be relaxed to ensure easier access to the facilities.

c) Policies targeting reduction of cost of feed should be formulated (especially reducing cost of grains like maize ,wheat, etc which are integral components of feed used in poultry industry), so as to reduce production cost and increase profitability of investors. This could be achieved by giving subsidies to farmers who cultivate these crops and also by building modern silos for the storage of these crops to reduce loss and wastage , ensuring all year round supply of raw materials for feed production.

REFERENCE.

Abda A. E and Amin M. H (2010). Economics of egg poultry production in Khartoum State with emphasis on the open-system- Sudan. African Journal of Agricultural Research Vol. 5(18), pp. 2491

Abeke, F. O. Sekoni, A.A. Oni, O. O. Adeyinka, I. A. and Nwagu, B.I.(2008). Response of shika-brown pullet chicks and layers to home made and commercial feeds in zaria, kaduna state, nigeria. Journal of Tropical Agriculture, Food, Environment and Extension Vol7(3) September 2008 pp. 223 – 228.

Aboe, P.A.T, Boa-Amponsem, K., Dorward, P.T. and Bryant, M.J. (2006). Free-range village chickens on the Accra Plains, Ghana: Their contribution to households. Trop. Anim. Health Prod.vol 38: 223–234.

Aboyade, O. (1995), On the need for an operational specification of poverty in the Nigerian economy. In: Poverty Alleviation in Nigeria,Proceedings of the 1975 Annual Conference of Nigerian Economic Society.

OECD (2006). World Report Fall 2006: The Value Chain Approach; Strengthening Value Chains to Promote Economic Opportunities.

ACI . 2007. Poultry sector rehabilitation project: The economic impact of highly pathogenic avian influenza – related biosecurity policies on the Vietnamese poultry sector. Prepared for the Food and Agriculture Organization of the United Nations and the World Health Organization by Agrifood Consulting International. Bethesda, Maryland, USA.

Adepoju. A.A (2008). Technical efficiency of egg production in Osun state. Int.J. Agric Econ Rural Devt.vol1:1-8.

Adu, I.F. (1996). Poultry Development in Nigeria; Politics, problems and prospect. Nigeria Journal of Animal production. vol13 (1) 1-4.

Afriat, S. N. (1972) Efficiency estimation of production functions. International Economic Review. vol13 (3) 568 – 598

Ahuja . V and Sen .A. (2007) .Scope and space for small scale poultry production in developing countries. Paper presented at international conference "poultry in the 21st century : avian influenza and beyond". Nov 5-7, 2007

Aigner D.J., Lovell C.A.K., and Schmidt P. (1977) Formulation and estimation of stochastic frontier production functions. Journal of Econometrics. Vol 6 (21). 37.

Aigner, D. J. and Chu, S. F. (1968) On estimating the industry production function. American Economic Review. Vol 58 (4) 826 – 839

Akinwunmi.J, Okike.I, and Rich .K.M (2010) Analyses of the poultry value chain and its linkages and interactions with HPAI risk factors in Nigeria. FAO, RVC,RDRC,IFPRI,ILRI Africa/Indonesia Team Working Paper 34

Aku, P. S., Ibrahim, M. J. and Bulus, Y. D. (1997), Perspectives on poverty and poverty alleviating strategies for Nigeria. In: Poverty Alleviation in Nigeria, Selected Papers for the 1997 Annual Conference of NigerianEconomic Society.

Altamirano, W.T. 2005. Egg production of two breeds and three diets in the highlands of Bolivia.The Royal Veterinary and Agricultural University, Copenhagen (MSc thesis).

Baba, S.S. (2003): Smallholder family poultry as a tool for poverty eradication in Nigeria: an adaptation of the Bangladesh model. A paper presented at the Annual Veterinary Week organized by Association of Veterinary Medical students (AVMS), University of Maiduguri Chapter, 20-23 October, 2003, Maiduguri, Nigeria..

Bera, A.K. and Sharma, S. C. (1999) Estimating Production Uncertainty in Stochastic Frontier Production Function Models. Journal of Productivity Analysis. Vol 12 (187) .210.

Berg, M., Boomsma, M., Cucco, I., Cuna, L., Jnassen, N., Moustier, P., Prota, L., Purcell, T., Smith, D. and Van Wijk, S. Making Value Chains Work Better for the Poor: A Toolbook for Practitioners of Value Chain Analysis. Working Group, Market Access for the Poor (SNV), Markets and Agriculture Linkages for Cities in Asia (CIRAD/VAAS/IPSARD)

Bessei, W. 1987. Tendencies of world poultry production. Paper presented at the 3rd International DLG-Symposium on Poultry Production in Hot Climates, June 1987, Hameln, Germany.

Binuomote S.O, J.O Adetomobi and A.O. Ajao (2008). Technical efficiency of poultry egg producers in oyo state of Nigeria. Int.J. Poult Sci vol (7):1227-1231

Chenery, Hollis B. (1975). "The Structuralist Approach to Development Policy. "American Economic Review vol 65 : 310–16.

Charitonenko, Stephanie, et al. (2005) *Value Chain Finance*. Washington, D.C.: USAID, Ruraland Agricultural Finance Initiative notes, Issue

Claudio Gonzalez-Vega, Geoffrey Chalmers, Rodolfo Quiros, and Jorge Rodriguez- Meza (2007); *Value Chains and Financial Intermediation: Some Theory and a Case Study about Creditworthiness, Supermarkets*

and Small Producers in Central America. Paper presented at"International Conference on Rural Finance Research: Moving Results into Policies and Practice", FAO Headquarters, Rome, Italy, March 19-21, 2007.

Coelli, T.J., Rao, D.S.P. and Battese, G. E. (1998) An Introduction to Efficiency and Productivity Analysis. Kluwer Academic Publishers.

Coelli.T.J and G.Battesse (1996). Identification of factors which influence the technical efficiency of Indian farmers. Aust. J of Agric Econs ,vol40:103-128.

Conroy, C., Sparks, N., Chandrasekaran, D., Sharma, A., Shindley, D., Singh, L.R.,Natarajan, and Anitha, K. 2005. Improving backyard poultry-keeping: a case study from India. Agricultural Research and Extension Network. Paper146.July2005

D. Zahraddeen, I.S.R. Butswat, M. Sanusi and S. A. Adamu (2010). Characterization of poultry farming in nigeria: a case study of taraba state. Continental J. Animal and Veterinary Research Vol 2: 1 - 8,

Daniel S. Ugwu(2009). Baseline Study of Small and Medium Scale Poultry Production in Enugu and Lagos States of Nigeria. World Journal of Agricultural Sciences Vol 5 (1): 27-33, 2009

Debreu, G. (1951) The coe¢ cient of resource utilization. Econometrica. Vol 19(3) 273-292.

Effiong E.O and Umoh G.S(2010). Cobb douglas production function with composite error term in egg laying enterprise in akwa ibom state, nigeria. Journal of Tropical Agriculture, Food, Environment and Extension Vol 9 (1) 1-7

Evans-Pritchard, E.E. & Gillies, E. 1976. Witchcraft, oracles and magic among the Azande. Oxford, UK, Clarendon Press.

FAO 2005.Nigeria:Poultry sector country review

FAO, 1961. Marketing eggs and poultry, by Stewart and Abbott. FAO Animal Production and Health Series No. 5 and FAO Marketing Guide No. 4. Rome.

FAO, 1984. Rapport de l'Atelier FAO sur le développement de l'aviculture rurale dans les paysfrancophones de l'Afrique de l'ouest, centrale et de l'est. Rome.

Farrell, M. (1957) The Measurement of Productive Efficiency. Journal of the Royal Statistical Society. Vol 120 (3) 253-281.

FEDERAL Office of Statistics (FOS). Poverty profile for Nigeria: 1980-1996. Lagos: FOS, 1999.

FIAS. (2007). Moving Towards Competitiveness: A Value Chain Approach. FIAS: The Foreign Investment Advisory Service, World Bank.

Folorunsho, O.R. and G.E. Onibi, 2005. Assessment of the Nutritional Quality of Eviscerated Waste from Selected Chicken Types. In Onibi, G.E., Agele, S.O. and Adekunle, V.A.J. 2005. Proceedings of the 1st Annual Conference on Developments in Agriculture and Biological Sciences. 27th April, 2005. School of Agriculture and Agricultural Technology, Federal University of Technology, Akure, Nigeria, pp: 300.

Francis L. Kampeni, 2000. Smallholder poultry production in malawi . Proceedings of the Workshop on the Possibilities for Smallholder Poultry Projects in Eastern and Southern Africa, Morogoro, Tanzania, 22-25 May 2000

Gereffi, G. & M. Korzeniewicz, Ed. (1994) Commodity chains and global capitalism. Westport, CT: Praeger Publishers, 1994. 334 pp

Gloy, B. (2005). A guide to understanding the value chain. Department of Applied Economics and Management, Cornell University, Ithaca, NY 14853. Smart Marketing, September 2005. 2 pp.

Goletti, Francesco (2004). *The Participation of the Poor in Agricultural Value Chains. A draft Research Program Proposal.* Ha Noi, Viet Nam, Agrifood Consulting International for Marking Markets Work Better for the Poor Project, Asian Development Bank

GTZ (2007). ValueLinks Manual. The Methodology of Value Chain Promotion. GTZ.

Gueye E.F (1998). Village egg and fowl meat production in Africa. World's Poultry Science Journal, vol 54: 73-86.

Gueye E.F (2000) The role of family poultry in poverty alleviation, food security and the promotion of gender equality in rural Africa. Outlook on Agriculture, vol 29(2): 129-136.

Guèye, E.F. (2003). Poverty alleviation, food security and the well-being of the human population through family poultry in low-income food-deficit countries. Journal of Food, AgricultureEnvironment, vol 1(2): 12–21.

Habyalimana . S. (2007). *Access to finance through value chains: Lessons from Rwanda* AEGIS European Conference on African Studies 11-14 July 2007, Leiden, the Netherlands

Hassan.A.A , Nwanta. J, Mohammed.A (2006).Profitability of egg production in Kaduna State ,Nigeria.Nigerian Vetenary Journal vol (1) 8-16

Ibrahim, M. & Abdu, P.(1996). Ethno-agroveterinary perspectives on poultry production in rural Nigeria. In C. McCorkle, E. Mathias & T.S. van Veen, eds. Ethnoveterinary research and development, pp. 103–115. London, Intermediate Technology Publications,

Igene, F.U., E.E. Ikheloa, and S.O. Oboh, (2005). Poultry egg glut and management: A case study of commercial poultry farms in some selected local government Areas of Edo state. Nigeria society of Animal production, vol 30:133-135.

J.O. Oladeebo and A.I. Ambe-Lamidi(2007). Profitability, Input Elasticities and Economic Efficiency of Poultry Production among Youth Farmers in Osun State, Nigeria. International Journal of Poultry Science vol 6 (12): 994-998

JURGENS, M. H. (1978). Animal Feeding and Nutrition. Kendall/Hunt Pub. Co. Inc. NewYork. 457pp.

Kaplinsky, R. and Morris, M. (2002). A Handbook for Value Chain Research. Institute of Development Studies.

Kate Schneider & Robert Plotnick (2010). Poultry Market in West Africa: Overview & Comparative Analysis. Evans School Policy Analysis and Research (EPAR),University of Washington. EPAR Brief No. 82.

Katule, A.M. 1991. Performance of local chickens under scavenging and intensive management systems. *Entwicklung ländlicher raum vol* 5: 26-28.

Kekocha, C.C., 1994. Poultry Production Handbook. Macmillan Publishers Ltd. London, pp: 166.

Kumbhakar, S. C. and Lovell K. C.A. (2000) Stochastic Frontier Analysis.Cambridge University Press, Cambridge.

Kushi, D.H., Adegbola, T.A. & Umeh, A.P. 1998. The role of women in animal production. In O.O. Oduguwa, A.O. Fanimo & O.A. Osinowo, eds. Animal agriculture in West Africa: the sustainability question. Proceedings of the Silver Anniversary Conference of the Nigerian Society for Animal Production and the Inaugural Conference of the West African Society for Animal Production held on March 21-26, 1998 at Gateway Hotel, Abeokuta, Nigeria, pp. 254–255.

Kusina, J.F and Kusina, N.T. (1999). Feasibility study of Agricultural and Household activities as they relate to livestock production in Guruve district of Mashonaland Central Province with emphasis on poultry production. Report prepared for HASP, Harare, Zimbabwe

Laseinde, E.A.O., 1994. Terminology in Poultry Production. Tropical Agricultural Production Series.

Meeusen, W. and van Den Broeck,. J. (1977) E¢ ciency estimation from Cobb .Douglas Production Functions with Composed Error. International Economic Review. Vol 18 (2) 435-444.

Missohou, A., Traore M. & Faye, A. 2005. Village chicken production and contribution to household revenues in a Newcastle disease controlled environment (Senegal). Paper presented at the AusAID Southern Africa Newcastle Disease Control Project International Conference: Opportunities for Village Chickens to Assist with Poverty Alleviation with Special Emphasis on the Sustainable Control of Newcastle Disease. Dar es Salaam, Tanzania, 5–7 October, 2005.

Mohammad S.A, Mohammad S.S and Fatholah,K (2011). Analyzing Farm Management Skills in Poultry Production Enterprises in Iran. Life Science Journal, Vol8, (1), 2011

Muhammed GM. 2009. Prototype live bird market (LBM): A tool for HPAI control. Paper presented at the regional workshop on prevention and control of HPAI in LBM of West Africa. 7–10 December 2009. Tahir Guest palace, Kano, Nigeria. 36 pp.

Musa Freiji,(2008). The Poultry Industry in the Arab World - Present & Future. Lohman Information Vol. 43 (1), April 2008, Page 44.

NARAYAN D. et al. Voices of the poor: Can anyone hear us? New York: Oxford UniversityPress, 2000.

Nigerian Bureau of Statistics (2011): Nigeria Poverty Profile.

National Bureau of Statistics (2012): NBS (2012) 2011 Annual socio-economic report. Abstract of the Nigerian Unemployment Report 2011

Nwanta, J.A., E.C. Okolocha and J.K. Alli-Balogun, 2003. Poultry Production n Kaduna state Nigeria Constraints and Prospects. Sokoto Journal of Veterinary Sciences, vol 4(2).

Nwosu, C.C. 1979. Characterization of the local chicken of Nigeria and its potential for egg and meat production. *Proceedings 1st national Seminar on Poultry Production in Nigeria*, 11-13 December, Ahmadu Bello University, Zaria, Nigeria. National Animal Production Research Institute, 187-210.

Nwosu, A.C. (1993). Economic crisis and Government Policies. Implications for Commercial poultry production in Nigeria. Journal of the Nigerian Institute of Social and Economic Research vol 10 (1&2): 118 - 131.

Obi, O.O. & E.B. Sonaiya. 1995. Gross margin analysis of smallholder rural poultry production in Osun State. *Nig. Journal Anim. Prod.*,vol 22: 95-107.

Ogundipe, S.O. and S.A. Sani, 2002. Economics of Poultry Production in Nigeria. In: J.O. Gefu, I.A. Adeyinks and A.A. Sekoni (eds). A Training Manual on National Training Workshop on Poultry Production in Nigeria. National Production Research Institute (NAPRI), ABU, Zaria, Nigeria, Pp.27-45.

O. O. Adebayo and R. G. Adeola (2005). Socio-Economics Factors Affecting Poultry Farmers in Ejigbo Local Government Area of Osun State. J. Hum. Ecol., vol 18(1): 39-41

Okoruwa, V.O., A.E. Obayelu, and Ikoyo-Eweto, 2004. Profitability of semi intensive and intensive egg production in southwest and south –south zones of Nigeria. Nigeria Journal of Animal production, 33 vol (1) 118-121.

Olasukanmi.M.Bamiro(2008).Economic performance of commercial poultry farms in oyo state Nigeria. International journal of poultry science.vol 7(11):1117-1121

Olasunkanmi M. Bamiro, Dayo O.A. Phillip and S. Momoh(2006). Vertical Integration and Technical Efficiency in Poultry (Egg) Industry in Ogun and Oyo States, Nigeria. International Journal of Poultry Science vol 5 (12): 1164-1171

Olawoye, J.E. & D.C. di Domenico, (1990). *Socio-cultural factors related to livestock production in southern Nigeria*. Paper presented at the National conference on Nigerian livestock industry and prospects for the 1990s, 19-22, November, 1990, Kaduna, Nigeria NISER, 18 pp.

Oluyemi, J.A. 1979. Potentials of the indigenous species of poultry for meat and egg production in Nigeria. pp.163-186. Proceedings 1st National Seminar on Poultry Production in Nigeria, 11-13 December, 1979. Ahmadu Bello University, Zaria, Nigeria. National Animal Production Research Institute

Oluyemi, J.A. and F.A. Roberts, 1979. Poultry Production in warm Climate. Macmillan Press Ltd. London, pp:197.

OMEKE, Benjamin C.O.(1988). "Aspects of Intensive Poultry Production In Nigeria: Constraints and Solutions". Zaria Veterinarian Vol. 5.(1) 1

Ouandaogo, Z.C. 1990. Programme de développement des animaux villageois (PDAV), Proceedings International Seminar on Smallholder Rural Poultry Production, 9-13 October, 1990, Thessaloniki, Greece, (2): 27-36.

Rauen, H.W, De Los Santos, M. and Fabian, P. (1990): Actual situation of the small scale poultry production in rural areas in the Dominican Republic and improving perspectives for the future. Proceedings CTA International Seminar on Smallholder Rural Poultry Production, Thessaloniki, Greece, Oct. 9-13.Vol. 2.

Reifschneider, D. and Stevenson, R. (1991) Systematic Departures from the Frontier: A framework for the Analysis of Firm inefficiency. International Economic Review. Vol 32 (3) 715-723.

Riise, J.C., Bonkoungou, G. & Thomsen, K.A. 2007. Revue mi-parcours du projet de reduction de la pauvreté en milieu rural (PRPMR), executé par l'AAJAC/COLUFIFA en collaboration avec Cykler til Senegal. Copenhagen, Network for Smallholder Poultry Development.

R. M. Sani, R.M., I. Tahir and S. Kushwaha, (2000): Economics of poultry production in Bauchi State: A case study of Bauchi Local Government Area. Nigerian Journal of Animal Production vol 27(1) :109-113.

S. A. Rahman and A. Yakubu.(2009). Analysis of poultry egg production, distribution and consumption in parts of Nasarawa State, Nigeria. International journal of natural and applied sciences (ijnas) vol. 1,(1) 1 – 4,.

Sanni, S.A., (2003). Economics of four modules of Poultry Production in Northern Nigeria. In: A.A. Taiwo et al (eds)Nigeria Livestock. A Goldmine for Economic Growth and Food Security. Proceeding of the Nigerian Society of Animal Production 28: 436-469.

Sani, R.M.;Musa, S.A.;Daneji,M.I; Yakasai,M.T.and Ayodele, O(2007). 'Costs and returns analysis in poultry production in Bauchi and Gombe metropolis areas". Continental J. Agricultural Economics vol 1: 14 - 19,

Schmitz, H. (2005). Value Chain Analysis for Policy Makers and Practitioners. InternationalLabourOffice.

Sekoni, A.A., 2002. Management of Layers and Breeders. In: Poultry Production in Nigeria (Gefu, J.O., I.A. Adeyinka and A.A. Sekoni eds) held 1st – 6th Sept. 2002 at NAPRI Shika, Nigeria. Published by National Production Research Institute, Ahmadu Bello University Shika, Zaria, Nigeria

Shumba, E.M. and E.E. Whingwiri (1988). Prospects for increased livestock production in Communal Areas: An Agronomist's Perspective. Research and Extension for Livestock in Communal Area Farming Systems. Henderson Research Station, 10-18 February 1988.

Sonaiya, E. B. (1990). The context and prospect for development of smallholder rural poultry production in Africa. CTA-Seminar Proceedings on smallholder poultry production, 9-13 October 1990, Thessaloniki, Greece, 1: 35-52.

Sonaiya, E.B and Swan S.E.J (2004) FAO,small scale poultry production technical guide, ISSN,1810-1119

Sonaiya, E. B. and V.E.Olori, (1990). Village chicken Production in SW.Nigeria. In Proc. Intn Workshop on Rural Poultry In Africa. Ed E. B. Sonaiya. ANRPD-FAO-IDRC-CTA. Publisher –ANRPD –Thelia House, Ife, Nigeria. Pgs 243 – 247..

T.T. Amos(2006). Analysis of Backyard Poultry Production in Ondo State, Nigeria. International Journal of Poultry Science vol 5 (3): 247-250

Tadelle, D. & Ogle, B. 2001. Village poultry production systems in the central highlands of Ethiopia. Tropical Animal Health and Production, vol 33(6): 1573–7438.

Tewe, O.O., Fawole, O.P., Abu, A.O., Oladele, O.A., Abdullah, A.R. and Oluwole-Banjo, A.K., (2004). Report of field survey on major constraints impeding poultry production and feedmill operations in southwest Nigeria: Farmer's perspective and suggested biotechnological interventions. *International Livestock Research Institute (ILRI). Ibadan.*

TOMISLAV WKlNA' and FRITZ ROKA.(1995). Economic impact of poultry industrty: a case study of north Carolina. Applied Poultry Science Inc.

Van Veluw, K. 1987. Traditional poultry keeping in Northern Ghana. ILEIA, December ,3(4): 12-13.

W.J. Goodger, T.B. Bennett and R.H. Dwinger(2009). Comparative analysis of family poultry production in twelve african countries.

WILSON, B.W. (1980). Birds. Scientific American. W.H. Freeman and Co. San Francisco. Pp1-8.

World Health Organization (1996)," Nigeria Poverty in the Midst of Plenty, the Challenge of Growth with Inclusion" A World Bank Poverty Assessment Handbook.

WORLD BANK(2001) . NIGERIA: Voice of the Poor,Country Synthesis Report. Consultations with the Poor, World Development Report 2000/1 on Poverty and Development.

World Bank, World Development Indicators: 1998, 1999 and 2000.

Yusuf .S.A and O. Malomo. (2007). Technical efficiency of egg production in ogun state :A Data envelopment analysis (DEA)approach. Int .J. Poult sci ,vol 6: 222-229.

Zoma, J. 2006. Aviculture traditionnelle: enjeux économiques et perspectives de développement en milieu rural. (MSc thesis)

APPENDICES

Appendix A COST STRUCTURE OF LAYER FARMS

	Number of birds	Total variable cost	cost of feed daily	daily phcn costs	daily drug costs	daily wage bills	daily other costs
1	150	1430.83	1100	93.33	87.5	83.33	66.67
2	180	2075.83	1750	66.67	62.5	73.33	123.33
3	280	2858.33	2400	13.33	91.67	193.33	160
4	300	2560	2175	60	58.33	150	116.67
5	300	3616.67	3200	33.33	83.33	133.33	166.67
6	350	4687.5	4200	116.67	70.83	100	200
7	400	4297.5	3600	83.33	120.84	300	193.33
8	450	4646.67	4000	100	103.33	250	193.33
9	500	5651.667	5000	93.33	141.66	233.33	183.33
10	500	5191.67	4500	66.67	175	250	200
11	500	4926.667	4200	133.33	200	200	193.33
12	500	4661.67	4250	33.33	111.67	166.67	100
13	500	5052.08	4200	133.33	135.41	400	183.33
14	500	6220.83	5500	150	120.83	260	190
15	620	5966.67	5500	100	116.66	133.33	116.67
16	680	5715.83	5100	140	129.16	280	66.67
17	700	6760	6000	140	166.67	280	173.33
18	850	10154.17	9200	116.67	154.16	500	183.33
19	1000	10145.83	9200	66.67	312.5	300	266.67
20	1000	8397	7312	100	258.33	400	326.67
21	1100	9975	9000	66.67	291.67	400	316.67
22	1100	10808.33	9900	83.34	225	500	100
23	1200	5252.33	4800	33.33	125	200	100
24	1200	13174.17	12100	93.33	287.5	500	193.33
25	1500	10862.5	10200	83.33	162.5	333.33	83.33

Appendix B COST STRUCTURE OF BROILER FARMS

	number of birds	Total variable costs	weekly cost of feed	weekly phcn costs	week drug costs	weekly wage bills	weekl other cost	age of sale of birds(weeks)
1	60	64650	8400	0	1500	250	625	6
2	100	82550	8400	375	1142.86	625	1250	7
3	100	96850	9100	1000	2285	375	1075	7
4	200	124850	19250	175	833.33	300	250	6
5	200	16750	16800	675	4428	575	1450	7
6	200	239725	16800	500	2571	625	13750	7
7	250	242900	27300	200	1937.5	425	500	8
8	325	233650	30800	375	5666	1350	750	6

9	350	284000	32200	500	675	750	1375	8
10	390	313700	46200	250	2583.33	1500	1750	6
11	400	359500	36400	687.5	5500	900	1450	8
12	500	345025	45500	750	314.28	1500	1225	7
13	500	288600	44625	650	350	1350	1125	6
14	500	430200	50400	1000	7000	1800	11500	6
15	500	342800	42000	625	3571	1400	1375	7
16	500	397550	50400	750	3142.85	1250	1250	7
17	550	437400	48300	1000	3000	1000	1375	8
18	600	488000	52500	725	4250	2400	1125	8
19	780	480525	58800	575	6571	1575	1125	7
20	800	405150	63000	375	2000	1500	650	6
21	800	435300	67200	650	950	1875	1875	6
22	800	57300	63700	800	3625	2250	1250	8
23	1000	663450	81900	725	6428	4500	1225	7
24	1500	769475	93100	950	7000	7500	1375	7
25	2000	992575	128800	750	6571	4550	1125	7

Appendix C COST STRUCTURE OF DISTRIBUTION SEGMENT

Good	Daily sales(eggs in crates)	Total variable costs	Monthly cost of goods	Monthly wages	Monthly other costs
EGGS	11	263600	231000	5600	27000
EGGS	15	318300	292500	4800	21000
EGGS	18	383600	351000	5600	27000
EGGS	20	424800	390000	10800	24000
CHICKEN	35	924300	892500	7800	24000
EGGS	40	806000	780000	5000	21000
CHICKEN	43	1196200	1161000	11200	24000
CHICKEN	45	1387400	1350000	10400	27000
CHICKEN	48	1255500	1224000	7500	24000
CHICKEN	55	1426500	1402500	9000	15000
CHICKEN	160	4390600	4320000	40600	30000
EGGS	62	1228500	1209000	7500	12000
CHICKEN	70	1819500	1785000	7500	27000
EGGS	72	1429000	1404000	10000	15000
CHICKEN	75	1949700	1912500	13200	24000
CHICKEN	85	2076000	2040000	6000	30000
CHICKEN	90	2463900	2430000	9900	24000
CHICKEN	110	2864000	2805000	14000	45000
CHICKEN	120	3101000	3060000	14000	27000
EGGS	140	2768200	2730000	11200	27000
EGGS	180	3413100	3375000	8100	30000

EGGS	200	3743100	3720000	9600	13500

Appendix D INCOME OF LAYER FARMS

number of birds	Total revenue	Total variable costs	Daily profit	Monthly profit	Business profit	Final balance	Grand profits
150	2100	1430.83	669.17	20075	240900	27000	267900
180	3250	2075.83	1174.17	35225	422700.10	36000	458700
280	4875	2858.33	2016.67	60500	726000	56000	782000
300	5200	2560	2640	79200	950400	36000	986400
300	5250	3616.67	1633.33	49000	587999.9	75000	662999.9
350	5850	4687.5	1162.5	34875	418500	-21000	397500
400	8050	4297.5	3752.5	112575	1350900	48000	1398900
450	5525	4646.67	878.33	26350	316200.1	112500	428700.1
500	8400	5651.67	2748.33	82450.01	989400.1	50000	1039400
500	6500	5191.67	1308.33	39250	471000.1	-125000	346000
500	7150	4926.67	2223.33	66700.01	800400.1	150000	950400.1
500	6175	4661.67	1513.33	45400	544800.1	90000	634800.1
500	10500	5052.08	5447.92	163437.5	1961250	60000	2021250
500	7800	6220.83	1579.167	47375	568499.9	130000	698499.9
620	5200	5966.67	-766.67	-23000	-275999.9	124000	-151999.9
680	10400	5715.833	4684.17	140525	1686300	81600	1767900
700	14250	6760	7490	224700	2696400	35000	2731400
850	17250	10154.17	7095.84	212875	2554500	127500	2682000
1000	19600	10145.83	9454.16	283625	3403500	140000	3543500
1000	16250	8397	7853	235590	2827080	290000	3117080
1100	18200	9975	8225	246750	2961000	198000	3159000
1100	20300	10808.33	9491.67	284750	3417000	110000	3527000
1200	18850	5258.33	13591.67	407750	4893000	204000	5097000
1200	22500	13174.17	9325.833	279775	3357300	120000	3477300
1500	27900	10862.5	17037.5	511125	6133500	435000	6568500

Appendix E INCOME OF BROILER FARMS

	number of birds	total revenue	total variable cost	age of sale of birds (weeks)	PROFIT
1	60	78000	64650	6	13350
2	100	140000	82550	7	57450
3	100	145000	96850	7	48150
4	200	260000	124850	6	135150
5	200	320000	167500	7	152500
6	200	310000	239725	7	70275
7	250	400000	242900	8	157100
8	325	390000	233650	6	156350
9	350	507500	284000	8	223500
10	390	487500	313700	6	173800
11	400	620000	359500	8	260500
12	500	725000	345025	7	379975
13	500	600000	288600	6	311400
14	500	625000	430200	6	194800
15	500	675000	342800	7	332200
16	500	700000	397550	7	302450
17	550	770000	437400	8	332600
18	600	900000	488000	8	412000
19	780	1170000	489525	7	689475
20	800	1080000	405150	6	674850
21	800	1000000	435300	6	564700
22	800	1040000	573000	8	467000
23	1000	1450000	663450	7	786550
24	1500	2025000	769475	7	1255525
25	2000	2600000	992575	7	1607425

Appendix F INCOME OF DISTRIBUTION SEGMENT

i) CHICKEN

Good	quantity sold daily	cost price	selling price	experience(yrs)	total revenue	total variable cost	Daily profit	Monthly profit
CHICKEN	12	850	1600	12	19200	10270	8930	267900
CHICKEN	14	900	1700	8	23800	13291.11	10508.89	315266.7
CHICKEN	15	1000	1600	9	24000	15415.56	8584.44	257533.2
CHICKEN	16	850	1500	7	24000	13950	10050	301500
CHICKEN	18	850	1450	5	26100	15850	10250	307500
CHICKEN	53	900	1700	8	90100	48784.44	41315.56	1239466.8
CHICKEN	23	850	1350	11	31050	20216.67	10833.33	324999.9
CHICKEN	25	850	1450	15	36250	21663.33	14586.67	437600.1
CHICKEN	28	800	1200	20	33600	23066.67	10533.33	315999.9
CHICKEN	30	900	1500	4	45000	27376.67	17623.33	528699.9
CHICKEN	39	850	1300	5	50700	31822.22	18877.78	566333.4

CHICKEN	40	850	1400	6	56000	34455.55	21544.45	646333.5

ii) EGG

Good	crates sold daily	cost price	selling price	experience(yrs)	total revenue	total variable cost	daily profit	monthly profit
EGGS	4	700	900	8	3600	2928.889	671.111	20133.33
EGGS	5	650	900	6	4500	3536.667	963.333	28899.99
EGGS	6	650	900	8	5400	4262.222	1137.778	34133.34
EGGS	7	650	900	9	6300	4720	1580	47400
EGGS	13	650	900	4	11700	8955.556	2744.444	82333.32
EGGS	21	650	750	7	15750	13650	2100	63000
EGGS	24	650	750	5	18000	15877.78	2122.22	63666.6
EGGS	47	650	780	12	36660	30757.78	5902.22	177066.6
EGGS	60	625	750	8	45000	37923.33	7076.67	212300.1
EGGS	67	620	750	7	50250	41590	8660	259800

Appendix G RETURNS ON INVESTMENT IN LAYER FARMS

	Number of birds	Coefficient of private profitability	Returns per naira invested
1	150	1.47	.47
2	180	1.56	.56
3	280	1.70	.70
4	300	2.03	1.03
5	300	1.45	.45
6	350	1.25	.25
7	400	1.87	.87
8	450	1.48	.48
9	500	1.48	.48
10	500	1.25	.25
11	500	1.45	.45
12	500	1.32	.32
13	500	2.07	1.07
14	500	1.25	.25
15	620	1.81	.81
16	680	1.81	.81
17	700	2.10	1.10
18	850	1.69	.69
19	1000	1.93	.93

20	1000	1.94	.94
21	1100	1.82	.82
22	1100	1.87	.87
23	1200	3.58	2.58
24	1200	1.70	.70
25	1500	2.56	1.56

Appendix H RETURNS ON IVESTMENT IN BROILER FARMS

	Number of birds	Coefficient of private profitability	Returns per naira invested
1	60	1.20	.20
2	100	1.69	.69
3	100	1.49	.49
4	200	2.08	1.08
5	200	1.91	.91
6	200	1.29	.29
7	250	1.64	.64
8	325	1.66	.66
9	350	1.78	.78
10	390	1.55	.55
11	400	1.72	.72
12	500	2.10	1.10
13	500	2.07	1.07
14	500	1.45	.45
15	500	1.96	.96
16	500	1.76	.76
17	550	1.76	.76
18	600	1.84	.84
19	780	2.43	1.43
20	800	1.81	.81
21	800	2.29	1.29
22	800	1.81	.81
23	1000	2.18	1.18
24	1500	2.63	1.63
25	2000	2.61	1.61

Appendix I RETURNS ON INVESTMENT IN DISTRIBUTION SEGMENT

Good	CPP	RPNI
CHICKEN	1.817592	0.817592
CHICKEN	1.833305	0.833306
CHICKEN	1.556869	0.556869

CHICKEN	1.72043	0.72043
CHICKEN	1.677182	0.677182
CHICKEN	1.858516	0.858516
CHICKEN	1.55812	0.55812
CHICKEN	1.673334	0.673334
CHICKEN	1.473989	0.473989
CHICKEN	1.643736	0.643736
CHICKEN	1.497905	0.497905
CHICKEN	1.625282	0.625282
EGGS	1.126707	0.126707
EGGS	1.272385	0.272385
EGGS	1.266945	0.266945
EGGS	1.271186	0.271186
EGGS	1.33995	0.33995
EGGS	1.135531	0.135531
EGGS	1.13366	0.13366
EGGS	1.18344	0.18344
EGGS	1.186605	0.186605
EGGS	1.202212	0.202212

Appendix J Layer farms employment potential

Number of birds	employees
150	1
180	1

280	2
300	2
300	1
350	1
400	3
450	3
500	2
500	3
500	2
500	2
500	4
500	3
620	2
680	3
700	3
850	5
1000	3
1000	4
1100	4
1100	5
1200	3
1200	5
1500	4

Appendix K Broiler farm employment potential

Number of birds	employees
60	1
100	1

100	1
200	1
200	1
200	1
250	1
325	2
350	1
390	2
400	2
500	2
500	2
500	2
500	2
500	2
550	2
600	3
780	3
800	3
800	3
800	3
1000	6
1500	10
2000	7

Appendix L Employment potential of distribution segment

good	Daily sales(eggs in crates)	employees
EGGS	11	2

EGGS	15	2
EGGS	18	2
EGGS	20	4
CHICKEN	35	3
EGGS	40	2
CHICKEN	43	4
CHICKEN	45	4
CHICKEN	48	3
CHICKEN	55	3
CHICKEN	160	14
EGGS	62	3
CHICKEN	70	3
EGGS	72	5
CHICKEN	75	6
CHICKEN	85	3
CHICKEN	90	3
CHICKEN	110	5
CHICKEN	120	4
EGGS	140	4
EGGS	180	3
EGGS	200	4

Appendix M REGRESSION OUTPUT OF LAYER FARMS

Source | SS df MS Number of obs = 25

```
-------------+------------------------------                    F(  6,    18) =   55.65
       Model |  9.78788349     6   1.63131391                   Prob > F      =  0.0000
    Residual |  .527683559    18   .029315753                   R-squared     =  0.9488
-------------+------------------------------                    Adj R-squared =  0.9318
       Total |  10.315567    24    .429815294                   Root MSE      =  .17122

        lout |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lbirds |   .4737214   .3333158     1.42   0.172    -.226549    1.173992
    lqtyfeed |   .4811075   .2977321     1.62   0.124    -.1444043    1.106619
      lwater |   -.134888   .2465541    -0.55   0.591    -.652879    .3831029
        lyrs |   .1468477   .0865561     1.70   0.107    -.0349998    .3286953
        llab |   .0553935   .1278929     0.43   0.670    -.2132996    .3240866
creditexte~n |   .2316138   .1323111     1.75   0.097    -.0463617    .5095892
       _cons |  -.6937172   1.678152    -0.41   0.684    -4.219383    2.8319
```

APPENDIX N REGRESSION OUTPUT OF BROILER FARMS

```
Source |       SS       df       MS                              Number of obs =      25
```

F(5, 19) = 106.86

Model | 16.1427186 5 3.22854373 Prob > F = 0.0000

Residual | .574056114 19 .03021348 R-squared = 0.9657

Adj R-squared = 0.9566

Total | 16.7167747 24 .696532281 Root MSE = .17382

lbirds	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lqtyfeed	.8100285	.1336134	6.06	0.000 ***	.5303725	1.089685
lwat	.1207564	.1957915	0.62	0.545	-.2890399	.5305527
llab	.3196096	.1372093	2.33	0.031**	.0324271	.6067921
creditext	-.0207942	.1282895	-0.16	0.873	-.2893072	.2477187
lyrs	-.0519042	.062804	-0.83	0.419	-.1833545	.0795461
_cons	4.659265	.8826049	5.28	0.000	2.811952	6.506578