COMPETITIVENESS OF COCOA VALUE CHAIN IN SOUTHERN NIGERIA

KAYODE AKANNI OLUYOLE
B. Agric. (Abeokuta), M.Sc., M.Phil. Agric. Econs. (Ibadan)
MATRIC. NUMBER: 97139

UNIVERSITY OF IBADAN, IBADAN, NIGERIA

OCTOBER 2016

COMPETITIVENESS OF COCOA VALUE CHAIN IN SOUTHERN NIGERIA

BY

KAYODE AKANNI OLUYOLE
B. Agric. (Abeokuta), M.Sc., M.Phil. Agric. Econs. (Ibadan)

A Thesis in the Department of Agricultural Economics

Submitted to the Faculty of Agriculture and Forestry

in partial fulfilment of the requirements for the Degree of

DOCTOR OF PHILOSOPHY

of the

UNIVERSITY OF IBADAN, IBADAN, NIGERIA

OCTOBER 2016

ABSTRACT

Cocoa contributes immensely to Nigeria's export earnings but it has low domestic value addition. In order to improve this, there is a need to ascertain the competitiveness along cocoa value chain. However, there's a dearth of information on the competitiveness at each stage of cocoa value chain. The competitiveness of cocoa along the value chain in Southern Nigeria was therefore investigated. Using three-stage sampling procedure, six cocoa producing Local Government Areas (LGAs) were purposively selected from Oyo, Ondo and Cross River states in Southern Nigeria using two LGAs per state. In each LGA, two cocoa producing communities were randomly selected. A total of 250 cocoa farmers and 102 cocoa marketers were randomly selected from the twelve communities proportionate to the number of cocoa farmers and cocoa marketers in each community. Fifty-four cocoa processors were randomly selected from the study area. Structured questionnaire was used to collect data on the participants' socio-economic characteristics, input and output prices at each stage (production, marketing and processing) of cocoa value chain. At production stage, there are Sharecropped Farmers (SF), Self-Owned Farmers (SOF) and Leased/Rented Farmers (LRF); at marketing stage, there are exporters, Licensed Buying Agents (LiBA) and Local Buying Agents (LoBA), while at processing stage there are Cocoa Butter Processors (CBP), Cocoa Powder Processors (CPP) and Black Soap Processors (BSP). Data were analysed using descriptive statistics, policy analysis matrix and partial equilibrium analysis at $\alpha_{0.05}$.

The working experience of cocoa producers, cocoa marketers and cocoa processors were 23.5±14.1, 18.3±8.3 and 9.2±9.2 years, respectively. At the production stage, SF, SOF and LRF had Private Profit (PP) of ₦468 729.76/ha, ₦397 465.03/ha and ₦331 465.03/ha, respectively while Private Cost Ratio (PCR) were 0.22, 0.24 and 0.25, respectively. The SF, SOF and LRF had Social Profit (SP) of ₦792 038.37, ₦536 178.10 and ₦468 729.76, respectively. Also, SF, SOF and LRF had Nominal Protection Coefficient (NPC) of 0.75, 0.85 and 0.79, respectively. At the marketing stage, exporters, LiBA and LoBA had PP and PCR of ₦43 018.01/tonne, ₦36 104.98/tonne, ₦24 279.81/tonne and 0.18, 0.27, 0.40, respectively. Exporters had the highest SP of ₦51 159.04/tonne while exporters, LiBA and LoBA had NPC of 0.98, 0.94 and 0.90, respectively. At the processing stage, CBP, CPP and BSP had PP and PCR of ₦730 229.77/tonne, ₦309 708.13/tonne, ₦92 262.26/tonne and 0.02, 0.05 and 0.27, respectively. The CBP had the highest SP of ₦814 273.32/tonne and lowest Domestic Resource Cost of 0.02. The NPC of 0.95, 0.94 and 0.79 for CBP,

CPP and BSP, respectively showed lack of fiscal policies' protection on cocoa processing. Welfare loss of producers was ₦429 432.36/tonne, while consumers' gain was ₦123 492.22/tonne in the value chain.

Competitiveness and comparative advantage along the stages of cocoa value chain exist in Southern Nigeria. The most competitive stage is cocoa processing. Cocoa production, marketing and processing were profitable to cocoa stakeholders in the study area. It is recommended that input use efficiency technologies should be introduced to maintain the competitiveness along the entire cocoa value chain.

Keywords: Cocoa value chain, Social cost benefit, Comparative advantage, Effective protection coefficient.

Word count: 497

DEDICATION

This work is dedicated to the LORD JESUS CHRIST, the AUTHOR and FINISHER of my faith.

ACKNOWLEDGEMENT

Special thanks go to GOD ALMIGHTY, who deemed it fit to see me through the period of this programme. HE has always been my strength.

I hereby express my sincere gratitude to my thorough, kind and accessible supervisor, Dr. O.A. Oni for his wonderful role of encouragement from the beginning to the completion of this work. My appreciation equally goes to members of my supervisory committee in persons of Prof. B.T. Omonona and Dr. K.K. Salman. I thank all the academic and non-academic staff of the Department of Agricultural Economics, University of Ibadan, for their assistance, constructive criticisms and encouragement in the course of executing the study.

I am also grateful to the staff of Cocoa Research Institute of Nigeria (CRIN), Ibadan, Nigeria, particularly all the staff of Economics and Statistics Division of the Institute for their assistance and encouragement in many ways. Also, I appreciate all the staff of CRIN Substations (especially Ajassor Substation in Cross River State and Owena Substation in Ondo State) for the assistance rendered during the collection of the data for the study. I am equally grateful to CRIN Internal Management Committee (IMC) for the permission given me to pursue the Ph.D programme.

My sincere gratitude goes to my darling wife, Deaconess Florence Olayinka Oluyole and all my children for their love, understanding, prayers and support. To my siblings, I say thank you for your support and encouragement.

Finally, to all my friends and colleagues, I appreciate all your contributions to this work. Worthy of mention is Dr. (Mrs) Iyabo Adeoye for her immense contributions right from the beginning of the work to the end. I say thanks for your good wishes.

CERTIFICATION

I certify that Kayode Akanni OLUYOLE carried out this research work under my supervision in the Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.

Dr. O.A. Oni
B.Agric. Agric Econs. (Hons.) (O.A.U.); M.Sc., Ph.D. Agric. Econs. (Ibadan),
Reader, Department of Agricultural Economics,
University of Ibadan, Ibadan.

TABLE OF CONTENTS

CHAPTER PAGE
TITLE PAGE……...i
ABSTRACT……iii
DEDICATION……v
ACKNOWLEDGEMENTS……vi
CERTIFICATION…… vii
TABLE OF CONTENTS……viii
LIST OF TABLES……...xv
LIST OF FIGURES……...xviii
DEFINITION OF SOME TERMS USED IN THE TEXT……xix
1.0 INTRODUCTION……..1
1.1 Background Information……1
1.2 Problem Statement……2
1.3 Objectives of the study……5
1.4 Justification of the study……5
2.0 LITERATURE REVIEW……7
2.1 Origin of cocoa……7
2.2 Cocoa production in Nigeria……7
2.3 Government policies on cocoa production and marketing in Nigeria……8
2.4 World outlook of cocoa production……10
2.5. Review of value chain analysis……12
2.6 Methodological review……15
2.6.1 Policy Analysis Matrix (PAM)……15
2.6.2 Partial Equilibrium Model……15
2.7 Empirical Review……17
3.0 THEORETICAL AND CONCEPTUAL FRAMEWORK……32
3.1. Theoretical Framework……32
3.1.1 Theory of Trade……32
3.1.1.1 Ricardian theory……33

3.1.1.2 Factor price equalization model……..33
3.1.1.3 Heckscher–Ohlin theorem……...34
3.1.1.4 Stolper–Samuelson theorem……34
3.1.1.5 Rybczynski theorem……...34
3.1.1.6 Michael Porter theory……...35
3.1.1.7 Theory of comparative advantage……36
3.1.1.8 Theory of competitiveness……36
3.2 Conceptual Framework……38
3.2.1 Concept of Value Chain Analysis (VCA)……38
4.0 RESEARCH METHODOLOGY……..42
4.1 Study Area……..42
4.2 Sources and types of data……..44
4.3 Sampling procedure and sample size……44
4.4 Method of data collection……..48
4.5 Analytical Techniques and Models……..48
4.5.1 Policy Analysis Matrix (PAM)……..48
4.5.1.1 Private Profitability (PP)……..50
4.5.1.2. Private Cost Ratio (PCR)……..50
4.5.1.3. Social Profitability (SP)……..51
4.5.1.4. Domestic Resource Cost (DRC)……..51
4.5.1.5. Social Cost Benefit (SCB)……..52
4.5.1.6. Nominal Protection Coefficient (NPC)……..53
4.5.1.7. Effective Protection Coefficient (EPC)……..……53
4.5.1.8. Profitability Coefficient (PC)……..54
4.5.1.9. Output Transfer……..……54
4.5.1.10. Tradable-Input Transfer……..……55
4.5.1.11. Factor Transfer……..……..55
4.5.1.12. Profit (Net) transfer……..56
4.5.1.13. Sensitivity Analysis……..56
4.5.2 Partial Equilibrium Model (PEM)……..56
5.0 RESULTS AND DISCUSSION……..59

5.1. Socio-economic Characteristics of Cocoa Value Chain Actors ……59
5.1.1. Socio-economic characteristics of cocoa farmers……59
5.1.1.1. Age distribution of cocoa farmers……59
5.1.1.2 Gender distribution of cocoa farmers……61
5.1.1.3 Marital status distribution of cocoa farmers……63
5.1.1.4 Educational status distribution of cocoa farmers……65
5.1.1.5 Household size distribution of cocoa farmers……67
5.1.1.6 Socio-economic group membership distribution of cocoa farmers……69
5.1.1.7 Farming experience distribution of cocoa farmers……71
5.1.1.8. Farm size distribution of cocoa farmers……73
5.1.1.9 Age of farm distribution of cocoa farmers……75
5.1.2 Socio-economic characteristics of cocoa marketers……77
5.1.2.1. Age distribution of cocoa marketers……77
5.1.2.2. Gender distribution of cocoa marketers……79
5.1.2.3. Marital status distribution of cocoa marketers……81
5.1.2.4. Educational status distribution of cocoa marketers……83
5.1.2.5 Marketing experience distribution of cocoa marketers……85
5.1.2.6 Association membership distribution of cocoa marketers……87
5.1.3 Socio-economic characteristics of cocoa processors……89
5.1.3.1 Age distribution of black soap processors……89
5.1.3.2 Gender distribution of black soap processors……91
5.1.3.3 Marital status distribution of black soap processors……93
5.1.3.4 Educational status distribution of black soap processors……95
5.1.3.5 Household size distribution of black soap processors……97
5.1.3.6 Association membership distribution of black soap processors……99
5.1.4. Mapping out the stages, actors and activities in cocoa value chain……101
5.1.4.1. Stages, activities, actors and output from each stage in Cocoa Value Chain……101
5.1.4.2. Key actors in cocoa value chain and their functions……103
5.1.4.3. Flow and volume mapping in cocoa value chain……104
5.2.1. Competitiveness of cocoa cultivation at each stage of cocoa value chain……106
5.2.1.1. Private and social budget of cocoa production management system……106

5.2.1.2. Private profitability of cocoa cultivation ……..110
5.2.1.3. Private cost ratio of cocoa cultivation……...110
5.2.2. Competitiveness of cocoa marketing…….113
5.2.2.1. Private and social budget in cocoa marketing……..113
5.2.2.2. Private profitability of cocoa marketing ……116
5.2.2.3. Private cost ratio of cocoa marketing……116
5.2.3. Competitiveness of cocoa processing……119
5.2.3.1. Private and social budget of cocoa processing……119
5.2.3.2. Private profitability of cocoa processing……122
5.2.3.3. Private cost ratio of cocoa processing……122
5.2.4. Comparative advantage of cocoa cultivation ……...124
5.2.4.1. Social profitability of cocoa cultivation……124
5.2.4.2. Domestic resource cost of cocoa cultivation……..124
5.2.4.3. Social cost benefit of cocoa cultivation……..125
5.2.5. Comparative advantage of cocoa marketing……..127
5.2.5.1. Social profitability of cocoa marketing……..127
5.2.5.2. Domestic resource cost of cocoa marketing ……127
5.2.5.3. Social cost benefit of cocoa marketing ……..128
5.2.6. Comparative advantage of cocoa processing……...130
5.2.6.1. Social profitability of cocoa processing……...130
5.2.6.2. Domestic resource cost of cocoa processing……130
5.2.6.3. Social cost benefit of cocoa processing……131
5.3.0. Effects of policies on competitiveness and comparative
advantage in each of the stages of cocoa value chain……..133
5.3.1. Effects of government policies on cocoa cultivation……...133
5.3.1.1. Nominal protection coefficient of cocoa cultivation……133
5.3.1.2. Effective protection coefficient of cocoa cultivation……134
5.3.1.3. Profitability coefficient of cocoa cultivation……134
5.3.1.4. Output transfer for cocoa cultivation……....136
5.3.1.5. Tradable – input transfer for cocoa cultivation……136
5.3.1.6. Factor transfer for cocoa cultivation……136

5.3.1.7. Profit transfer for cocoa cultivation……..137
5.3.2. Effects of government policies on cocoa marketing……139
5.3.2.1. Nominal Protection Coefficient of cocoa marketing…….....139
5.3.2.2. Effective protection coefficient of cocoa marketing……..139
5.3.2.3. Profitability coefficient of cocoa marketing…….....139
5.3.2.4. Output transfer for cocoa marketing……141
5.3.2.5. Tradable input transfer for cocoa marketing……141
5.3.2.6. Factor transfer for cocoa marketing……141
5.3.2.7. Profit transfer for cocoa marketing……141
5.3.3. Effects of government policies on cocoa processing…….....143
5.3.3.1. Nominal protection coefficient……...143
5.3.3.2. Effective protection coefficient…….....143
5.3.3.3. Profitability coefficients…….....143
5.3.3.4. Output transfer for cocoa processing…….....146
5.3.3.5. Tradable input transfer for cocoa processing……..146
5.3.3.6. Factor transfer for cocoa processing…….....146
5.3.3.7. Profit transfer for cocoa processing……146
5.3.4. Competitiveness and comparative advantage of the entire cocoa value chain ……149
5.3.4.1. Private profitability of the entire cocoa value chain……..149
5.3.4.2. Private cost ratio of the entire cocoa value chain……...149
5.3.4.3. Social profitability of the entire cocoa value chain…….....151
5.3.4.4. Domestic resource cost of the entire cocoa value chain……151
5.3.4.5. Social cost benefit of the entire cocoa value chain…….....151
5.3.4.6. Nominal protection coefficient of the entire cocoa value chain…….....154
5.3.4.7. Effective protection coefficient of the entire cocoa value chain……154
5.3.4.8. Profitability coefficient of the entire cocoa value chain…….....154
5.3.4.9. Output transfer for the entire cocoa value chain……156
5.3.4.10. Tradable – input transfer for the entire cocoa value chain……156
5.3.4.11. Factor transfer for the entire cocoa value chain…….....156
5.3.4.12. Profit transfer for the entire cocoa value chain…….....156
5.3.5. Sensitivity analysis…….....158

5.3.5.1. Effect of changes in the domestic price of cocoa beans on cocoa cultivation….....158
5.3.5.2. Effects of changes in the domestic price of cocoa beans on cocoa marketing…….162
5.3.5.3. Effect of changes in the domestic price of black soap on black soap processing…….165
5.3.5.4. Effects of changes in the domestic price of cocoa
powder on cocoa powder processing…….....168
5.3.5.5. Effect of changes in the dom. price of cocoa butter on cocoa butter processing.....171
5.3.5.6. Effect of changes in the world price of cocoa beans on cocoa cultivation……...174
5.3.5.7. Effects of changes in the world price of cocoa on cocoa marketing……177
5.3.5.8. The effects of changes in the world price of black soap on
black soap processing……179
5.3.5.9. The effects of changes in the world price of cocoa
powder on cocoa powder processing…….....182
5.3.5.10. The Effects of changes in the world price of cocoa
butter on cocoa butter processing……186
5.3.5.11. Effect of changes in the exchange rate on cocoa cultivation…….....189
5.3.5.12. Effects of changes in the exchange rate on cocoa marketing…….....192
5.3.5.13. The effects of changes in the exchange rate on black soap processing……..195
5.3.5.14. The Effects of changes in the exchange rate on cocoa powder processing……198
5.3.5.15. The Effects of changes in the exchange rate on cocoa butter processing……..201
5.4.0. The effects of price distortions on producers' and consumers' welfare……..203
6.0. SUMMARY OF MAJOR FINDINGS, CONCLUSIONS
AND RECOMMENDATIONS……...207
6.1. Summary of major findings…….....207
6.1.1. Value chain mapping of cocoa value chain…….....207
6.1.2. Competitiveness and comparative advantage along cocoa value chain…….....207
6.1.3. Effects of policies on competitiveness and comparative advantage
at each stage of cocoa value chain……...209
6.1.4. Sensitivity Analysis……..…211
6.1.5. Effects of price distortions on consumers' and producers' welfare…….....211
6.2. Conclusion……..212
6.3. Policy recommendations……212

6.4. Contribution to knowledge…….213
6.4. Suggestions for further studies……...213
REFERENCES……..214
APPENDIX……....228

LIST OF TABLES

TABLE PAGE

Table 2.1. World production of cocoa beans (thousand tonnes)……...11

Table 4.1. Distribution of the respondents……47

Table 4.2. The Policy Analysis Matrix (PAM)……49

Table 5.1. Distribution of cocoa farmers by age……60

Table 5.2. Distribution of cocoa farmers by gender……62

Table 5.3. Distribution of cocoa farmers by marital status ……64

Table 5.4. Distribution of cocoa farmers by educational status ……66

Table 5.5. Distribution of cocoa farmers by household size ……68

Table 5.6. Distribution of cocoa farmers by socio-economic group membership ……70

Table 5.7. Distribution of cocoa farmers by farming experience……72

Table 5.8. Distribution of cocoa farmers by farm size ……74

Table 5.9. Distribution of cocoa farmers by age of farm ……76

Table 5.10. Distribution of cocoa marketers by age ……78

Table 5.11. Distribution of cocoa marketers by gender ……80

Table 5.12. Distribution of cocoa marketers by marital status……82

Table 5.13. Distribution of cocoa marketers by educational status ……84

Table 5.14. Distribution of cocoa marketers by marketing experience ……86

Table 5.15. Distribution of cocoa marketers by association membership ……88

Table 5.16. Distribution of black soap processors by age ……90

Table 5.17. Distribution of black soap processors by gender ……92

Table 5.18. Distribution of black soap processors by marital status ……94

Table 5.19. Distribution of black soap processors by educational status ……96

Table 5.20. Distribution of black soap processors by household size ……98

Table 5.21. Distribution of black soap processors by association membership ……100

Table 5.22. Nigerian cocoa value chain……102

Table 5.23. Estimated private and social budget of cocoa production management systems……109

Table 5.24. Competitiveness of cocoa production management systems……112

Table 5.25. Estimated private and social budget for cocoa marketing……115

Table 5.26. Competiveness of cocoa marketing ……..……...118
Table 5.27. Estimated private and social budget for cocoa processing…….....121
Table 5.28 Competitiveness of cocoa processing……123
Table 5.29. Comparative advantage of cocoa cultivation……..……126
Table 5.30. Comparative advantage of cocoa marketing…..……129
Table 5.31. Comparative advantage of cocoa processing……..132
Table 5.32. Protection coefficient on cocoa cultivation……..……135
Table 5.33. Transfer of government policies on cocoa cultivation……138
Table 5.34. Protection coefficients on cocoa marketing among cocoa marketing actors……...140
Table 5.35. Transfer of government policies on cocoa marketing……..142
Table 5.36. Protection coefficients on cocoa processing……145
Table 5.37. Transfer of government policies on cocoa processing…….....148
Table 5.38. Competitiveness of the entire cocoa value chain……..150
Table 5.39. Comparative advantage of the entire cocoa value chain……...153
Table 5.40. Protection coefficients of the entire cocoa value chain……155
Table 5.41. Transfer of government policies in the entire cocoa value chain…….....157
Table 5.42. Effect of changes in the domestic price of cocoa beans on cocoa cultivation…….....161
Table 5.43. Effect of changes in the domestic price of cocoa beans on cocoa marketing…...163
Table 5.44. Effect of changes in the domestic price of black soap on black soap processing…….....167
Table 5.45. Effect of changes in the domestic price of cocoa powder on cocoa powder processing…….....170
Table 5.46. Effect of changes in the domestic price of cocoa butter on cocoa butter processing…….....173
Table 5.47. Effect of changes in the world price of cocoa beans on cocoa cultivation……176
Table 5.48. Effect of changes in the world price of cocoa beans on cocoa marketing…….179
Table 5.49. Effect of changes in the world price of black soap on black soap processing……..182
Table 5.50. Effect of changes in the world price of cocoa powder on cocoa powder

Processing…….....185
Table 5.51. Effect of changes in the world price of cocoa butter on cocoa butter Processing…….....188
Table 5.52. Effect of changes in the exchange rate on cocoa cultivation……191
Table 5.53. Effect of changes in the exchange rate on cocoa marketing……...194
Table 5.54. Effect of changes in the exchange rate on black soap processing……197
Table 5.55. Effect of changes in the exchange rate on cocoa powder processing……200
Table 5.56. Effect of change in the exchange rate on cocoa butter processing…….....203
Table 5.57. Effects of price distortions on cocoa producers' and consumers' welfare….....206
Table A1. Software PAM result for the entire cocoa value chain (Owner-managed production management system)…….....228
Table A2. Software PAM Result for the entire cocoa value chain (Leased/Rented management system)…….....229
Table A3. Software PAM Result for the entire cocoa value chain (Sharecropped management system)……..230

LIST OF FIGURES

FIGURE PAGE

3.1. Conceptual framework on cocoa value chain……41

4.1. Map of Nigeria showing the study area……43

5.1. Mapping of linkages, actors, activities and volume of cocoa beans in the cocoa value chain……105

DEFINITION OF SOME TERMS USED IN THE TEXT

Export Parity Price (EPP): This is the price that a producer gets or can expect to get for his product if exported. It is equal to the Free on Board (FOB) price minus the costs of getting the product from the farm or factory to the border (this includes tarrif, tax, transportation costs etc).

Import Parity Price (IPP): This is the price that a purchaser pays or can expect to pay for imported goods. It is the Cost of Insurance and Freight (CIF) plus the tarrif and the cost of transportation to the purchaser's location. Hence, the IPP is the price at the border of a good that is imported which includes transport costs and tarrif.

Free on Board (FOB): This basically means the cost of delivering the goods to the exporting port. It includes the real value of the goods as well as the costs incurred in taking the goods from the seller's farm or factory to the border of the exporting country. However, buyer is responsible for the transportation from the port and all other costs to his destination.

Cost, Insurance and Freight (CIF): This is a trade term requiring the seller to arrange for the carriage of goods to the buyer's port of destination, and provide the buyer with the document necessary to obtain the goods from the carrier. Hence, the seller has responsibility for the cost of the goods in transit, providing minimum insurance and freight charges to move the goods to the importing designated port chosen by the buyer.

Social price: This is the price at which foreign suppliers would deliver the commodity to the domestic market. For the imported goods, it includes the CIF plus the cost of port charges and transportation costs from the port to the domestic market. For the exported goods, social price includes the FOB less the cost of port charges and transportation costs to the port.

Private (Domestic) price: Is the current domestic market price for a specific goods or service in an economy.

Competitiveness: Is the ability of a firm, sub-sector or country to outperform other firms, sub-sectors or countries in the same market.

Comparative advantage: This is the ability of a firm, sub-sector or country to produce goods at a minimum marginal costs than the other firms, sub-sectors or countries. They are able to produce at a minimum marginal costs because of the special attribute they possess.

CHAPTER ONE
INTRODUCTION

1.1 Background Information

Cocoa is a tree crop grown in tropical climates, with over 66 per cent of cocoa is produced by smallholder farmers in West Africa (Ogunlade *et al;* 2015). Since the introduction of the crop into Nigeria in about 1874, it has grown to be a major export crop (Ogunlade *et al;* 2015). Nigeria is the World's fourth largest cocoa producer after Ivory Coast, Ghana and Indonesia, producing about 12 percent of the total world production (Wilcox and Abbot, 2004). As at 2001, the production capacity of cocoa in Nigeria has reached about 385, 000 metric tons per annum, an increase of 215,000 metric tons over year 2000 production level (Nwachukwu *et al*, 2011). However, the production level stood at 248,000 metric tonnes in 2014 (International Cocoa Organisation, ICCO, 2015).

Cocoa contributes about 15 percent to the total Nigerian export in 1970 (Adebile and Amusan, 2011) and also contributes $900 million to Nigeria's economy in 2012 (Oluyole *et al,* 2016). Export of cocoa products from Nigeria was $822.8 million in 2010. This represents about 35 percent of the $2.32 billion earnings from non-oil exports in 2010 for Nigeria (Mejabi, 2012). The main importers of Nigeria's cocoa are Holland, United States of America, Brazil and Britain (Mejabi, 2012).

Since the introduction of cocoa into Nigeria in 1874, production and marketing activities in the cocoa industry have continued unabated and it becomes an important foreign exchange earner for the country (CBN, 1998). The cocoa industry has served as a means of providing employment for the populace. In fact, the crop has substantial impact on about ten million people who live and work in the cocoa belt (Sanusi and Oluyole, 2005). Apart from this, through value addition, cocoa is transformed into various by-products for the use of the populace. These include food (such as cocoa bread), drinks (such as beverage) and soap (especially black soap).

Cocoa as an agricultural produce is limited in utilization if value is not added to it. Hence, cocoa bean has been undergoing processing especially grinding which entails the transformation of dried cocoa beans into a variety of processed products such as cocoa powder. Therefore, cocoa has to undergo some stages of activities (value chain) before it gets to the hand of the final consumers. A value chain (VC) is a sequence of steps which involve the process of production to market delivery of product (Mejabi, 2012). It describes the productive processes around a

product from the provision of inputs to transformation, transportation, processing, marketing, retailing and final consumption. VC analysis extends the traditional supply chain analysis by locating values to each stage of the chain. It focuses on inter-firm relationships as an essential component in creating and maintaining industry competitiveness and it is based on the principle that cooperation is much better than confrontation (Mejabi, 2012). Therefore, VC methodology involves the coordination of all activities involved in the production of a good or service, for instance, the transformation of cocoa bean to chocolate. However, the sustainable production of cocoa and cocoa by-products will depend on domestic and international competitiveness and effects of policy intervention. Competitiveness is the set of factors, policies and institutions that determine the level of productivity of a country (Mejabi, 2012). Hence, competitive advantage occurs when a country or an organization acquires or develops an attribute or combination of attributes that allows it to outperform its competitors. The analysis of competitiveness provides information on the effects of policy on the production, marketing and processing of cocoa.

1.2 Problem Statement

The cocoa industry owes its development in the early days almost exclusively to the initiative and enterprise of the Nigerian farmers (Sanusi, 2006). The early growth of cocoa industry in Western Nigeria was phenomenal. From a total of only 183 hectares in 1900, total hectarage of cocoa planted increased to about 4082 hectares in 1912; 400,000 hectares in 1945; 408,613 hectares in 1958 and 639,348 hectares in 2007 (Olayemi, 1974, Aigbekaen, 2004; Sanusi and Oluyole, 2005; National Cocoa Development Committee, NCDC, 2008). However, since 2007 to date, no other cocoa hectarage measurement was carried out. The abundance of suitable land and availability of farm labour enabled the peasant farmers to expand their cocoa hectarage without having to give up the production of their traditional crops (Adegeye, 1977; Oni, 2000). All these efforts, however, contributed to the progressive increase in cocoa output. The output of 4000 tonnes per annum at the start in 1914, increased to about 80,000 tonnes per annum between 1914 and 1930. Nigeria's cocoa production continued to increase both in absolute quantity and as a proportion of total world production that by 1965, Nigeria became the second largest producer in the whole world with an annual output of about 270,000 tonnes (Olayemi, 1974; Olatunbosun, 1974; Aigbekaen, 2004). Her share of the total world production also increased from about 2 percent barely half a century earlier to about 18 percent (Sanusi and Oluyole, 2005). In fact, it was on record that Nigerian cocoa was too much in 1941. This made the Nigerian government to

destroy an excess of 1175.1 tonnes by sinking it in deep sea (extracted from file No. 36148/s.41 of National Archives, Ibadan Zonal Office). The same approach was used in 1943 in eliminating 2.43 tonnes (file No. 36148/s.41 of National Archives, Ibadan Zonal Office).

However, the fortune of cocoa turned negatively with the discovery of oil in commercial quantity and this has brought a downward trend in Nigerian cocoa production and position in the world market (Ayoola *et al*, 2000). It was reported that Nigerian cocoa output declined from over 300,000 tonnes to about 155, 000 tonnes during the 1997-2001 period (Daramola, 2004). Also, the travails of the Nigerian cocoa industry was further attributed to the old age of cocoa farmers and cocoa trees, land degradation, land tenure system as well as competition with food crops (Ojo, 2003; Oduwole, 2004). All these resulted in the reduction in cocoa production to the extent that Cote d'Ivoire which was placed at a distant third position in Africa with 143,000 tonnes behind Nigeria's 196,000 tonnes in 1970 is now the largest producer of cocoa in the whole world with 1.7 million tonnes per annum. Cote d'Ivoire presently accounts for about 39 percent of the total world production of 4.4 million tonnes while Nigeria with 248,000 tonnes is currently the fourth largest cocoa producer after Cote d'Ivoire, Ghana and Indonesia (ICCO, 2015).

Apart from production problem, there's also the problem of value addition in the cocoa sub-sector. There are few cocoa processing firms in Nigeria and this necessitates the exportation of cocoa in raw form (Ojo, 2003). The implication of this is that the importers of cocoa beans dictate cocoa price at will thus causing fluctuations in cocoa price (Sanusi, 2006). However, one of the proposals being considered as a way of achieving recovery in the prices of cocoa is limiting export by the world major producers and encouraging bean processing in origin countries (Sanusi, 2006). Furthermore, the International Cocoa Organisation (ICCO) advised the World Bank to encourage policies for cocoa processing locally in order to reduce the impact of price fluctuations on the economy of the origin countries (ICCO, 2000). Also, recently, the National Cocoa Development Committee (NCDC), through its sub-committee on the Alternative Uses of Cocoa, confirmed that local processing of cocoa will make Nigeria to get away from the era whereby cocoa consumers abroad determine prices resulting in cocoa farmers getting little or nothing from their produce (General Nigerian Best Forum Topics, 2010). Generally, prices of all agricultural crops can be improved by adding value to their primary produce. However, it is no more fashionable to export primary produce; emphasis is now changing to value addition from the raw form to the value added products. Hence, cocoa value addition will boost the income of

cocoa farmers in Nigeria. Apart from this, value addition will also provide employment for the populace.

To this end, some cocoa processing mills have sprang up and have started adding value to cocoa by way of producing cocoa powder, cocoa butter, cocoa beverage, cocoa cake, cocoa soap and a host of others. The overall objective of this value addition is to increase the revenue derivable from the cocoa sub-sector. This was substantiated by Oguntade *et al* (2011) in a study conducted on rice value addition. They observed that total value addition in the processing of paddy rice into basic milled rice was 20 percent of the output value while the total value addition in the processing of basic milled rice into value-added rice was 17 percent of the output value showing more income to the processor. The study went further to determine the competitiveness, comparative advantage as well as the effect of government policies on rice value addition. The study found out that government policies provided incentives to farmers as well as the processors of paddy rice. Also, there is a social cost attached to rice processing thus making Nigeria not to have comparative advantage in processing paddy rice into value-added rice as the Domestic Resource Cost (DRC) was 4.88. However, it is quite interesting that all these information are known about the crop (rice) but unfortunately, there is no such information on cocoa. There is therefore a dearth of information on the competitiveness and value chain analysis on the Nigerian cocoa economy. Information is also scanty on the effects of policies on cocoa production, marketing and processing. These and other related issues are what this study investigated.

Therefore, this study provided answers to the following questions.

(i) Who are the major actors in the cocoa value chain and what are their activities?

(ii) What is the degree of competitiveness in cultivating cocoa and producing its products in Nigeria?

(iii) What is the extent of comparative advantage in cultivating cocoa and producing its products in Nigeria?

(iv) What are the effects of policies on competitiveness and comparative advantage at each node of the cocoa value chain?

(v) What are the effects of price distortions on cocoa producers' and consumers' welfare in Nigeria?

1.3 Objectives of the study

The main objective of this study is to analyse the competitiveness of cocoa value chain in Southern Nigeria.

The specific objectives are to:

1. identify and describe the stages, actors and activities in cocoa value chain.
2. analyse the competitiveness at each stage of cocoa value chain.
3. analyse the comparative advantage at each stage of cocoa value chain.
4. determine the effects of policies on competitiveness and comparative advantage at each stage of cocoa value chain.
5. estimate the effects of price distortions on producers' and consumers' welfare.

1.4 Justification of the study

In Nigeria, cocoa has been the main agricultural cash crop of Nigerian economy, hence, it is justified that this study is carried out on cocoa because of the immense contribution of the crop to the mankind (Olayemi, 1973; Folayan *et al*, 2006). Cocoa has remained a valuable crop and a major foreign exchange earner among agricultural exports in Nigeria (Akinbobola, 2001). With respect to employment, the sub-sector provides employment for the populace both directly and indirectly. (Abong, 1984; Folayan, *et al*, 2006, Sanusi and Oluyole, 2005). This study is very important because of the significance of cocoa value addition. Value addition on cocoa from the raw form to the value added products will improve the price of cocoa thereby boosting the income of cocoa farmers. Apart from this, cocoa value added products (especially cocoa powder) has been reputed to be important health wise (Ebuehi and Disu, 2000; Hollenberg, 2006; Keen *et al*, 2005; Jayeola and Olubamiwa, 2010). This study is also very important because the result of the analysis of competitiveness will provide an indication of competitiveness/policy incentives at each of the nodes of cocoa value chain. This will include the provision of incentives (support) at each stage of cocoa value chain.

Furthermore, the value addition of this study is the use of Policy Analysis Matrix in determining the comparative advantage of cocoa and its products in the study area. The analysis of comparative advantage will give the indication whether it is worthwhile to produce cocoa in Nigeria or not.

This study is also important as the value chain analysis of cocoa will systematically map out the actors participating in the cultivation, distribution/marketing and processing of cocoa into

cocoa products. This allows for characterization of actors, flow of goods throughout the chain and the volume of domestic sales (Kaplinsky and Morris, 2001).

Furthermore, there is a need to know the effect of government policies such as liberalization, subsidy, tax and tariff which may bring about changes in prices and ultimately have effects on both the producers and consumers of cocoa and its products.

Methodologically, Policy Analysis Matrix (PAM) can provide decision makers and analysts with both a helpful conceptual construct for understanding the effects of policy and is a useful technique for measuring the magnitude of policy transfers (Oguntade, 2011). The major advantage of PAM is that its results can be communicated easily to policy makers, who might not be specialists in economics. Previous studies on value chain using PAM such as (Oguntade, 2011; Ogbe *et al*, 2011; Adeoye *et al*, 2013) focused on food crops such as rice, maize, plantain, cowpea and cassava. However, this particular study focused on cocoa (cash crops) as there has been little or no study on cocoa value chain analysis using PAM. Hence, the study is expected to contribute to the body of literature in the area of cocoa value chain.

Past studies on cocoa have been particularly focused on production and marketing separately (Oni, 2000; Olayemi, 1974; Opeke, 1984; Sanusi, 2006; Oluyole, 2005; Adegbola, 1990; Adegeye, 1977; Aigbekaen, 2004; Oduwole, 2000; Mejabi, 2012; Ogunlade *et al*; 2015). None of the studies has been able to examine cocoa value chain in its entirety. This particular study is different from those previous studies in that it examined the activities on cocoa from the cultivation to marketing and to processing.

Therefore, it becomes imperative to study cocoa value chain, as the result from the study shall be a guide for the policy makers to improve the cocoa sub-sector. The improvement efforts will ensure optimum allocation of resources thus improving the efficiency at the cultivation level and removing all the bottlenecks that are associated with marketing. This will bring about the effective and efficient cocoa processing in the country.

CHAPTER TWO

LITERATURE REVIEW

2.1 Origin of cocoa

Cocoa originated from around the headwaters of the Amazon in South America. Its cultivation and value spread in ancient times throughout Central and Eastern Amazonian and northwards to Central America. Originally, Cocoa was being used as a means of exchange to transfer various foodstuffs among the Columbus's voyages (Ayorinde, 1966). The Maya, Olmec, Toltec and Aztec peoples of Mexico and Central America also used cocoa (which was also referred to as "Fruit of God") as both a currency for trading purposes and payment of tribute to the king as well as a base for a bitter drink. The drink contained the bitter cocoa beans and red chili peppers. (It was an acquired taste). Cocoa beans were also used by the Native Americans to prepare a chocolate drink. After the conquest of Central America in 1521, Hernan Cortez and his Conquistadores took a small cargo of cocoa beans to Spain in 1528, together with utensils for making the chocolate drink. By 1580, the drink had been popularized in the country and consignments of cocoa were regularly shipped to Spain. The popularity of chocolate as a drink spread quickly throughout Europe, reaching Italy in 1606, France in 1615, Germany in 1641, Great Britain in 1657, Brazil in 17th century, Equatorial Guinea in 1840, West Africa in 19th century and Nigeria in 1874 (Ayorinde, 1966; Ghana Cocoa Board, 2010).

2.2 Cocoa production in Nigeria

Cocoa was actually introduced into Nigeria from Equitorial Guinea by Chief Squiss Ibaningo in 1874. Since the introduction of the crop into Nigeria, it has grown to be a major export crop (Oyedele, 2007). Its cultivation has spread to various parts of Nigeria through various sources such as trade agents, Ministries of Agriculture and Research Institutes (Opeke, 1987). Presently, cocoa is grown in most parts of Southern Nigeria extending from areas having 1100mm annual rainfall towards the North to the areas having 2500 mm rainfall towards the coast. These involve several states of the country namely Abia, Adamawa, Akwa-Ibom, Cross River, Edo, Ekiti, Imo, Kogi, Kwara, Ogun, Ondo, Osun, Oyo and Taraba States. Estimations put Nigerian cocoa hectarage at 4000 hectares in 1912, 120,000 hectares in 1930 (Olayemi, 1974). In 1945, the hectarage increased to 400,000 hectares (Adesimi and Ladipo, 1979). According to Fasina (1999) and Aigbekaen (2004), hectarage estimate was put at 600,000 hectares in 1990. Recently, the survey conducted by National Cocoa Development Committee (NCDC) in 2007 put cocoa

hectarage at 640,000 hectares (NCDC, 2008). In 2001, the production capacity of cocoa in Nigeria reached about 385,000 metric tons per annum, an increase of 215,000 metric tons from year 2000 production level (Nwachukwu *et al*, 2011). However, in 2014, Nigerian cocoa production reduced to 248,000 metric tons per annum. This performance puts Nigeria as the third largest producer of cocoa in Africa producing about 5.7 percent of the total world production behind Cote D'Ivoire which produces 40.1 percent and Ghana's 20.6 percent (ICCO, 2015). Nigeria is the World's 4th largest cocoa producer after Cote D'Ivoire, Ghana and Indonesia, producing around 250,000 metric tons out of the total world production of 4,355,000 metric tons a year (ICCO, 2015). As an important cash crop, cocoa plays a critical role in the economies of the major producers in Africa as a main export good and source of foreign exchange. In addition, smallholder farmers (farmers with less than five hectares of cocoa farm) typically grow cocoa, which generates work opportunities for an estimated 10.5 million Africans (Nwachukwu *et al*, 2011). Export of cocoa products from Nigeria was $822.8 million in 2010. This represents about 35% of the $2.32 billion earned from non-oil exports in 2010 (Mejabi, 2012). The main importers of cocoa from Nigeria are Holland, United States of America, Brazil and Britain.

However, the production of this export crop in Nigeria has suffered a reduction in recent years owing to a number of factors. Villalobos (1989) identified some of these factors as: low yield, inconsistent production pattern, disease incidence, pest attack and use of crude farm tools. In addition, Oduwole (2004) in his study identified aging cocoa farms as one of the factors responsible for the decline in cocoa production in South Western Nigeria. Many farms were over 40 years old and such farms constitute as much as 60 percent of the cocoa farms in Nigeria. Farms in the South – south and South east zones are relatively younger and mostly in their productive phase (Oluyole and Sanusi, 2009). In Nigeria, Cocoa is largely produced on smallholders. The average delivery per farmer is less than 5 bags (roughly 300kg per hectare of cocoa) per season. In terms of capacity, Ondo State is rated as the largest cocoa producing state in Nigeria (NCDC, 2006).

2.3 Government policies on cocoa production and marketing in Nigeria

Prior to the 1970's, the policy of government towards agricultural development in general and to cocoa production in particular in Nigeria was one of minimum government interventions (Idowu *et al*, 2007). Governments' involvement was mainly supportive of the activities of farmers and focused mainly in the areas of research, extension, export crop marketing and

pricing activities (Manyong *et al*., 2005). In order to consolidate this objective, by the mid-sixties, the Nigerian government like other developing countries, in realization of the relative importance of cocoa and other agricultural exports to the economy, brought the input supply and produce marketing systems under the state official monopoly. Marketing Boards were set up to intermediate between the farmers and the international market. The objectives then were to (i) stabilise prices paid to the producers (ii) ensure public access and control over foreign exchange earnings (iii) strengthen the marketing mechanisms (iv) impose constraints on multinational enterprises (Idowu *et al*, 2007). In spite of these laudable objectives, the monopolistic marketing structure erected in the name of Commodity Boards served as a great disincentive to cocoa farmers both in production and replanting (Idowu, 1986). As reported by several studies, the Commodity Boards represented agencies for taxation as the producer prices paid to the farmers were well below world prices (Oni, 1971; Olayide and Olatunbosun, 1974; Idachaba, 1990; Akanji and Ukeje, 1995; Oluyole and Usman, 2006).

In 1986, the government of Nigeria announced the adoption and implementation of a Structural Adjustment Programme (SAP) with four cardinal objectives as follows:

(i) Restructuring and diversifying the productive base of the economy in order to reduce dependence on oil exports; (ii) Reducing the dominance of unproductive investments in the public sector; (iii) Encouraging non-oil exports especially agricultural ones (of which cocoa is a major one); and (iv) Improving the sectors' efficiency and intensify the growth potential of the private sector. The SAP embraced exchange rate deregulation, liberalization of export trade (of which cocoa is one), reduction in extrabudgetary expenditure, withdrawal of subsidies and the privatization of public enterprises. Thus, deregulation placed much emphasis on the market forces in determining the prices of goods and services and allocating the resources within the economy. Therefore, the policy measures as they affected agriculture ensued as follows: (i) The abolition of commodity boards (Cocoa Marketing Board inclusive) and the privatization of many agricultural enterprises previously controlled by the government; (ii) Market liberalization of agricultural exports (in fact, Nigeria was the first West Africa Cocoa Producer to liberalize with reforms from producer and input level through the marketing chain to exporting the beans); (iii) Foreign exchange liberalization and currency devaluation (Idowu *et al*, 2007). However, the immediate effect of these policies was an increase in the cost of maintaining cocoa farms by about 300 percent while producer prices increased by about 800 percent (Idowu et al, 2007).

Also, the adoption of SAP gave an estimated positive gross margin of ₦1,585.00 per hectare in 1989 compared to negative gross margin of ₦105.00 per hectare in 1985 (Adegeye, 1991).

2.4 World outlook of cocoa production

According to Vingerhoets (1997), the world cocoa production was just over one million tonnes in 1960 and as at 2008, it was approaching three million tonnes. However, the growth in cocoa production was not evenly spread across the cocoa growing regions. Presently, Africa is the world's leading cocoa growing region, producing about 71.9 percent of the world output, with the remaining 28.1 percent shared between Asia and the Americas (Table 2.1). Cote D'Ivoire, with about 40 percent of world production is the world's leading cocoa producer, followed by Ghana and Indonesia while Nigeria takes the fourth position (ICCO, 2015). Independent and uncoordinated expansion policies pursued by these countries resulted in a sharp rise in world cocoa supply. For instance, officially-sponsored cocoa development and rehabilitation programmes were responsible for an increase in area under cultivation, most of which used modern hybrid planting material. It was also reported that expansion of cocoa production into new areas in Indonesia was also promoted, as a means of economic growth and development in rural areas. These efforts were intensified because the countries could only maintain export revenues from cocoa through higher production levels, as the potential for additional gains in productivity and reductions in costs was limited. However, the global implications of those policies were a further increase in the level of world production and thus further declines in prices (Cocoa Producers Alliance, CPA, 1999; Sanusi, 2006).

Table 2.1. World production of cocoa beans (thousand tonnes)

Countries/Continent	2012/2013	2013/2014	2014/2015 (Forecasts)
Africa	2836 (71.9%)	3194 (73.3%)	3061 (72.3%)
Cameroun	225	211	205
Cote d'voire	1449	1746	1720
Ghana	835	897	810
Nigeria	238	248	235
Others	89	92	91
America	622 (15.8%)	708 (16.2%)	708 (16.7%)
Brazil	185	228	215
Ecuador	192	220	230
Others	246	259	263
Asia & Oceania	487 (12.3%)	454 (10.4%)	464 (11.0%)
Indonesia	410	375	380
Papua New Guinea	41	40	42
Others	36	38	42
World total	3945 (100%)	4355 (100%)	4232 (100%)

Source: ICCO Quarterly Bulletin of Cocoa Statistics (2015).

Published: 27/02/2015.

2.5 Review of value chain analysis

In a VCA conducted on Ghana cocoa by Mohammed *et al.*,(2011), it was found that Ghana cocoa value chain is quite long with the main activities within Ghana being handling and transportation of the bean. Only a small fraction of cocoa bean is processed locally with a bulk exported in the raw bean form. On the issue of constraints, smallholder farmers are faced with the constraints of old age of farmers, high household size, high illiteracy level among smallholder farmers (48.4 percent had no formal education) and lack of access roads to cocoa growing communities compelling the farmers in those communities to observe long waiting times at the port for trucks due for takeover for shipment. The study however recommended that the Government of Ghana should make a conscious effort to add value to the cocoa bean rather than exporting the raw bean. In this wise, processing companies must be encouraged in the country and the existing ones must be assisted to produce at optimum capacity (Mohammed *et al;* 2011). The present study is similar to the study by Mohammed *et al*; (2011) in that it identified the main activities within each node of the VC. Also, the constraints to cocoa production in the study area were identified. However, the present study differs in that it analysed the effects of policy on competitiveness at each stage of cocoa VC. In addition, it estimated the effects of price distortions on producers' and consumers' welfare.

In a study conducted on VCA on Nigerian cocoa by Mejabi (2012), it was found that the challenges of cocoa VC in Nigeria included lack of coordination between different value chain actors, limited access to improved varieties, limited access to credit, limited use of fertilizer and other inputs, low productivity levels, low quality beans and low level of local consumption of cocoa products. The study however suggested the ways of improving cocoa value chain in Nigeria and these include increased land cultivation - between 650,000 and 1million hectares; increased demand for cocoa; increased local consumption of cocoa products; encouragement of youths into cocoa cultivation and increased planting and replanting. Other suggestions for improving cocoa cultivation include the use of improved varieties of cocoa to get higher yields; stronger participation by both international firms and development organizations; increased emphasis on sustainability including social and environmental responsibility; certification; more efficient process; establishment of Marketing Corporation which will play a dominant role in value chain development and control price volatility. The study (Mejabi, 2012) also observed that the Cocoa transformation agenda promises to restore the lost glory of cocoa industry in

Nigeria, reducing the level of the country's reliance on crude oil for its foreign exchange earnings, while enhancing the livelihood of thousands of Nigerian cocoa farmers who will transit from mere subsistence to medium and large scale farming. The proposed Marketing Corporation is expected to play a pivotal role in achieving this, while avoiding the pitfalls of the defunct Marketing Boards. It will also be responsible for coordinating the stakeholders of the Cocoa Value Chain for enhanced productivity of all actors. The study however did not examine the effect of policy at each stage of cocoa value chain as well as the effect of price distortions on producers' and consumers' welfare. The value addition of the present study is that it examined the effects of policy at each stage of cocoa value chain as well as the effect of price distortions on producers' and consumers' welfare.

In a study conducted by United States Agency for International Development USAID (2012) on participation of gender in value chain, findings revealed that women and men enter value chains as wage workers, farm managers, unpaid family workers, and entrepreneurs. Their opportunities are shaped by their physical, financial and human assets of which access to land and other productive assets (e.g., land, credit, extension, inputs) are key enabling factors. Human capital endowments and social beliefs and norms can also expand or limit the character and extent of men's and women's involvement. Women's formal participation in contract farming is mixed. Research by Masakure and Henson (2005) found that in Zimbabwe, 61 percent of contract farmers in vegetables were women, while Dolan (2001) found that women made up only 10 percent of the farmers in the fresh fruit and vegetable sectors in Kenya. Women's engagement is also constrained by lack of access to land and to credit. It is well-documented that women's control over and ownership of land lags behind men's and that their own plots are typically smaller and of poorer quality. Both customary and private property regimes tend to privilege men's land holdings (USAID, 2012). Since access to land often facilitates access to other inputs, hence, a lack of formal ownership of land by women results in inequities in the system. It could be observed that the study limited its scope to gender participation in VC. The value addition of the present work is that it looked beyond mere participation in VC to include the study on the competitiveness, comparative advantage as well as the effects of price changes on producers' and consumers' welfare in cocoa VC.

In a study conducted by Kaplinsky (2004), the study examined the activities in each of the stages of cocoa VC. The study found that the farming and harvesting of cocoa pods, and the

extraction, fermentation and drying of cocoa beans necessarily occurs on or very near the farm, and has few scale economies. According to the study, most cocoa growing occurs on small or medium-sized farms – for example, in the Ivory Coast during the 1980s, there were around 600,000 small and medium sized farmers with farms of between five and twenty hectares. After harvesting and preliminary processing, cocoa beans are then roasted and ground into liquor, before being converted into cocoa butter or cocoa powder. The butter is utilised in chocolate manufacture, whilst the powder is destined for the catering markets and for liquid drinks. Cocoa beans can be stored for around six months while cocoa butter, powder and even chocolate can also be stored. The present study is different in that in addition to examining the activities in each of the stages of cocoa value chain, it also examined the competitiveness and comparative advantage at each stage of the chain.

Also, a study on coffee VC was carried out by Kaplinsky (2004). The study was centered on the stages involved in coffee processing. It was revealed that coffee chain breaks down into a number of major stages. After the coffee cherries are harvested, they can enter one of two basic processing routes – the wet or the dry process. This is performed on or near the farm. The resulting parchment coffee is milled and milling tends to occur in the rural areas where coffee is grown, but on a more centralised basis. The value addition of the present study is that the study went further from identifying and describing the activities in each of the nodes to determine the comparative advantage of the nodes of cocoa VC and the effect of price distortions on producers' and consumers' welfare.

A study conducted by Perera *et al* (2004) compared the efficiency of different supply chains for vegetables in Sri Lanka. The findings revealed that supermarkets do create alternative supply chains of vegetables; however, these alternative supply chains are created only with respect to supermarkets with a large number of outlets. Such supply chains are deemed to be comparatively more efficient and effective than traditional supply chains in terms of paying a higher price for vegetables, having a higher degree of transparency, presence of quality consciousness and accountability, passing down of quality signals, involvement of less number of intermediaries and occurrence of comparatively low post harvest losses. In some locations, the emergence of the particular supermarket supply chain has contributed to increasing the level of competition among buyers leading to an increase in the farm gate price offered by the traditional supply chains. The

value addition of the present study is that apart from studying cocoa VC in its entirety, it also considered the competitiveness along the chain.

2.6 Methodological review

2.6.1 Policy Analysis Matrix (PAM)

The Policy Analysis Matrix (PAM) is an accounting identity used to reflect the private and social cost and prices of a representative business entity. The PAM framework uses detailed information from a production budget as well as other processing affiliated costs related to the production and marketing of commodities. PAM is a product of two accounting identities, profit, defined as the difference between revenue and cost while the other measures the effect of the divergencies (distorting policies and market failures) as the difference between observed parameters and parameters that would exist if the divergence were removed (Monke and Pearson, 1989). The PAM is a framework for presenting the effect of policy and policy changes on incentives applied to production or marketing alternatives (Shapiro and Staal, 1995). PAM is also used to measure input use efficiency, comparative advantage as well as competitiveness of production system given current technology, prices of input and output and policy (Nelson and Panggabean, 1991). PAM consists of three rows and four columns representing the budget for an activity. The first row of the matrix contains private prices. This captures production costs and revenues expressed in terms of the market prices that farmers face. Consequently, in private prices, profits are calculated by subtracting the two cost categories (tradable inputs and domestic factors) from revenues in terms of market prices. The second row shows the same information but at social (world) price. The third row indicates the differences between private prices and social prices and reflects the extent to which policy distortion (such as introduction of subsidy, taxes, tariff) and market failures have made prices not to be socially optimal.

2.6.2 Partial Equilibrium Model

Partial equilibrium model (PEM) is an economic model used for analyzing very small markets or individual products. The model was proposed by Luta and Scandizzo (1980). Partial equilibrium requires economists to ignore all markets outside of the one being studied, and to assume that changes in that particular market will have no effect outside of that market, and vice versa. Hence, partial equilibrium analysis consists of the analysis of a particular market in isolation, without attention to how events in that market may affect events in other markets, and these may in turn affect the situation in the original market. According to Ronnie and Alan (2002), PEM

concentrates on a particular subsection of the economy, with all other variables being treated as exogeneous to the model. It describes only part of the economic system capturing only the direct impact of (say) a policy shock on the relevant market, ignoring the impact on other areas of the economy as well as feedback effects from these to the original market. The partial equilibrium method can be used to trace the impact of shocks on the relationship between quantities (produced, imported, exported and consumed) and prices of a single commodity or group of commodities. Thus, for instance, one may assess how an increase in the protection of cereals affects production and consumption in the cereals market, without considering how changes in cereal production and consumption will impact on, say, land use or the demand for farm labour or the consumption of other foods, and how these will in turn affect conditions in the cereals market. PEM provides a useful model for research and analysis. The information derived from partial equilibrium analysis can be used by policy makers to estimate welfare effects (consumer and producer surpluses) associated with certain trade policies.

PEM analyzes welfare effects of import policies by comparing the world market (or border) price and the prices prevailing in the domestic market in the policy period. Under the free trade condition, the domestic market of the importing country will be in competitive equilibrium as the domestic market price will be equal to the border price and the social welfare will be at maximum. With free trade, the importing country will be able to import and export freely all sorts of goods and services. Production will become specialized in those goods in which the country has a comparative advantage, while production of inefficient goods will be forgone. Hence, domestic production will decrease while domestic consumption will increase. However, with the imposition of trade restrictions (such as ban and tariff) which often influence the relationship between world price and the price of the domestic producers in the importing country distort this equilibrium leading to a decline in social welfare (Akhtar, 1999). A tariff raises the price of imports to home consumers, increases government revenue, and tends to increase the price for domestic producers of the import-competing commodity, thus providing an incentive for them to increase production and replace imports. Tariffs, therefore, increase the income of producers and government at the expense of consumers. A ban is a situation in which a particular commodity is disallowed from being imported into the importing country. In such a case, the domestic price increases and the consumer social welfare decreases. Partial equilibrium makes it clear that there could be distortion between the domestic price and the international

(border) price. These two prices may differ because of market failures as well as policy interventions. Market failure is the inability of markets to operate properly due to factors such as monopolistic elements, asymmetric information, transaction costs, externalities, and to a certain extent uncertainty and risk (Janvry and Sadoulet, 1995).

2.7 Empirical Review

Ogbe *et al* (2011) conducted a study titled competitiveness of Nigerian rice and maize production ecologies using Policy Analysis Matrix (PAM). In the study, data were collected from 122 rice farmers in three States (Kano, Niger and Ekiti). The data collected were analysed so as to obtain Private Profitability, Private Cost Ratio (PCR), Nominal Protection Coefficient (NPC) and Effective Protection Coefficient (EPC). The study revealed that production of rice and maize were socially profitable in all the ecologies but earned private profit only in upland and irrigated (with the exception of irrigated maize) ecologies. The result showed that irrigated rice and maize ecology was more profitable than other systems/ecologies (upland and lowland). At the margin, the result indicated a positive private profit for upland rice, irrigated rice and upland maize, and negative private profit for lowland rice and irrigated maize. The positive private profit implies that upland rice, irrigated rice and upland maize ecologies were competitive given current technologies, prices of inputs and outputs, and policy and that producers are earning super normal returns. Conversely, lowland rice and irrigated maize ecologies were unprofitable and lack competitiveness given current technologies, inputs and output prices and policy due to their negative profitability and PCR that were greater than unity. The study also showed that an NPC values of less than unity indicating that domestic farm gate price was less than the international price for rice and that policies were decreasing the market price to a level of approximately 93 percent, 92 percent, 79 percent, 83 percent and 90 percent below the international price for rice and maize ecologies respectively. This suggests that production in the various ecologies was not protected by policy and that substantial output tax applied. The study further revealed that an EPC value of less than unity for all ecologies and as such so indicating that producers were not protected through policy intervention on value added processes, and that producers face the net tax of 79 percent, 92 percent and 94 percent for the respective rice ecologies and 84 percent and 92 percent for maize ecologies. Similarly, the Domestic Resource Cost (DRC) coefficients for all production ecologies were also less than unity, thereby indicating that the value of domestic resources used in production was lower than

the value added. This implies an efficient use of domestic resources in rice and maize production and that production in all the ecologies were socially profitable. Consequently, Nigeria has a comparative advantage in rice and maize production. For both crops, the upland ecology was relatively more profitable in terms of use of domestic factors owing to their lower DRC value of 0.0741 and 0.0681 for both rice and maize, respectively (Ogbe *et al*, 2011). It was however, discovered that the study utilized only PAM to analyse the competitiveness. The value addition of the present study is that it utilized both PAM and PEM for the analysis.

Similarly, in a study of assessment of protection and comparative advantage in rice processing in Nigeria using PAM by Oguntade (2011), it was revealed that the total value addition in the processing of paddy rice into basic milled rice was ₦20,000.00 or 20 percent of the output value while the total value addition in the processing of basic milled rice into value-added rice was about ₦21,500.00 or 17 percent of the output. The margin derived from the processing of paddy rice into basic milled rice was ₦1,660.00 per tonne of basic milled rice while further processing of basic milled rice into value-added rice yielded ₦7,667.00 as the margin per metric tonne of value-added rice. Financing and milling are major contributors to value-additions. PAM results show that the price of value-added rice has been kept higher than the world price through policy interventions as the NPC for output of rice was 1.74. Government policy has, therefore, provided incentives to processors of paddy rice into value-added rice. Farmers producing paddy rice also benefited from government protection as captured by NPC for tradable inputs, which was 1.27. Nigeria has no comparative advantage in processing paddy rice into value-added rice, as the DRC was 4.88. The present study is different from this study in that apart from the fact that PAM was used to measure the competitiveness at each stage of cocoa value chain, the study also utilized PEM to estimate the effects of price distortions on producer and consumer welfare.

In a study conducted by Reig-Martínez *et al;* (2008) on the evaluation of profitability in rice cultivation in Eastern Spain using Policy Analysis Matrix, it was found that profits are being made, both at private and social prices. Private revenue went up by 7.4 percent and social revenue by 11 percent. Private costs diminished by 18 percent and social costs by 24 percent. The main cost savings corresponded to the reduction in the use of herbicides and, particularly, to a sharp decrease in the use of labour. The study further discovered that the expenditures linked to the use of capital were also reduced when farms adopted the best cultivation practices of profit-

efficient farms. The value addition of the present study is that apart from the fact that profitability was be evaluated at each stage of cocoa value chain, the effect of policy at each stage of cocoa value chain was also examined.

The study by Reddy *et al* (2005) on global competitiveness of medium quality Indian rice in Karnataka State revealed that the state had a comparative advantage in rice production (DRC was below 1). The level of DRC showed that the value of domestic resources used in producing 1 ha of rice in Karnataka was less than the cost of its import. DRC level decreased in the post-liberalization period, which reveals an improvement in the comparative advantage of rice production in recent years. The subsidy ratio to producer coefficient (SRPC), which was computed to analyze the degree of state protection for the rice crop, was 0.07 for the state for the period 1996-97 to 2000-2001. This implies moderate state protection for rice production. However, the levels of incentives provided to farmers are very meagre compared to the magnitude of protection in developed countries.

Liverpool *et al* (2009) examined the Competitiveness of Agricultural Commodity Chains in Nigeria using PAM. They found that Nigerian cassava growers do not have comparative advantage in the production of cassava chips for export. They attributed this partially to low world price of cassava chips and maize and inefficiencies in the production and distribution system. However the study suggested that local and regional demand for production of cassava-based products and maize would create a current viable market for the products. Further, the study discovered that major hindrances to the profitability of crops to small-scale farmers include high transportation costs, high labour costs, and higher per unit costs due to lower yields. The PAM analysis also revealed that there is immense potential in the Nigerian cassava production system which can be harnessed through increasing farmers use of improved varieties, chemical fertilizers, and herbicides. It could be observed that the study only analysed the competitiveness of cassava and maize. The present study did not only analyse the competitiveness of cocoa but also analysed the comparative advantage as well as the effect of price changes on the producers' and consumers' welfare.

In a study on assessing the competitiveness of Indian cotton production using PAM approach by Mohanty *et al* (2002), it was found that DRC values for cotton were much larger than their respective competing crops. In Maharashtra state, the DRC value for cotton was estimated to be 1.35 as compared to 0.33 and 0.34 for sugarcane and groundnut, respectively,

suggesting that Maharashtra State had a comparative advantage in producing sugarcane and groundnut rather than cotton. Government cotton policies, however, have led to significant allocative inefficiency because much land in Maharashtra State was still planted to cotton. Similarly, in Haryana State, the DRC indicator for cotton was close to one and was the second largest behind rice out of the four crops included in the study. DRC values for Haryana State clearly indicated that it had a comparative advantage in producing wheat and groundnut as compared to cotton and rice. In the other three states (Punjab, Gujarat, and Andhra Pradesh), DRC values for cotton were found to be lower than one but not the lowest among the competing crops. In Punjab, the DRC value of wheat (0.41) was much lower than that of cotton (0.65), suggesting that Punjab had a comparative advantage in producing wheat. The value addition of the present study is that apart from using PAM to analyse the comparative advantage, PAM was also used to analyse the competitiveness as well as the effects of policies on the competitiveness.

In a study on the impact of liberalization on the competitiveness and efficiency of the cashew production systems in Nusa Tenggara Province in Indonesia by Ketut and Bambang (2002), it was shown that both the monoculture and inter-planted cashew systems in NTB Province were strongly competitive (relative to comparable commodity systems) and efficient (in resource use) because they generated very high positive private and social profits. The monoculture system earned a private profit of 11,764,556 Rupiah per hectare and social profit of 10,242,158 Rupiah per hectare, whereas the inter-cropping system earned a private profit of 20,194,868 Rupiah per hectare and a social profit of 18,434,768 Rupiah per hectare. These profits were calculated as the present value of total profits earned for 25 years. While the study carried out the competitiveness and comparative advantage of cashew production systems, the present study is different in that it analysed the competitiveness and comparative advantage along the entire value chain of cocoa, that is, production, marketing and processing.

In a study on assessing the competitiveness of Indian cotton production using PAM approach carried out by Samarendu *et al* (2003), it was reported that the protection coefficients, such as NPCI and EPC, changed with a rise and fall in farm gate prices, respectively. For states like Maharashtra and Haryana, a 20 percent decline in farm price causes the NPC to fall below one. Changes in the input prices also produce similar results. The inputs most likely to alter the comparative advantage in favour of cotton depend on the competing crops. For example, in

Maharashtra State, cost of irrigation is the variable likely to alter comparative advantage in favour of cotton over sugarcane.

The analysis on competitiveness of tobacco crop, a case study of PT Perkebunan Nusantara X production system and growers in Jember area by Dendi (2014) showed that the tobacco harvested under PTPN X production system and the one produced by farmers had good comparative advantage. DRC coefficients of both crops are less than 1, which are 0.2911 and 0.7844 for PTPN X production system and the one grown by farmers, respectively. The study also indicates that the crop had decent competitive advantage. The crop produced by PTPNX and farmers also had PCR coefficient below 1, which are 0.2872 and 0.8042, respectively. In addition, profitability coefficient (PC) for both producers are positive, which are 0.9511 and 0.9028. On the other hand, the EPCs were 0.9460 and 0.9938, respectively. Those coefficients indicate that tobacco production under state owned enterprise (PTPN X) and farmers were having fairly good competitive and comparative advantages.

In a study on the competitiveness of pineapple production in Osun State, Nigeria, by Adegbite *et al*, (2014), the PAM results revealed that the crown and sucker production techniques were privately profitable with private profit of ₦550,438/ha and ₦679, 138/ha, respectively. The result of PCR further showed that the two pineapple production techniques were competitive (with PCR ratios much less than one). However, the sucker production technique was more competitive (PCR = 0.31), than crown production technique (PCR = 0.40). Results of social profitability showed that the two techniques were socially profitable with social profit of ₦730,228/ha and ₦841,828/ha for crown and sucker production techniques, respectively. This implied that Nigeria could generate foreign exchange earnings through the export of fresh pineapple because the country has a comparative advantage in its production. The NPC on Input and Output and the EPCs for the two production systems indicated the presence of tax and the producers were not protected by policy with NPC of 0.93 for both producers. The EPC value for the two production techniques was 0.92 indicating that producers were not protected through policy intervention on value added processes.

The analysis of competitiveness of lowland rice farming in indonesia in Bolaang, Mongondow District, North Sulawesi Province of Indonesia by Zulkifli *et al* (2014) showed that the values of PCR and DRC of rice-based farming were 0.69 and 0.68, respectively. These results indicate that the rice farming in Bolaang, Mongondow had comparative and competitive

advantages. So, the crop can be developed as an export commodity. A PCR value 0.69 means that to obtain value-added output by one unit at the private price of rice farming in the region, requires additional domestic factor costs of 0.69 or less than one unit. So it can be argued that production costs may be covered with the actual sale price obtained by farmers. A DRC value of 0.68 means that to produce paddy (rice) in Bolaang Region, Mongondow only need the DRC of 68 percent to save US$ 1 foreign exchange, if produced in the region compared import with. So if there are opportunities to export rice to other regions or countries. The present study is different in that the competitiveness analysis was carried out on a tree crop (cocoa).

The study on assessing the competitiveness of sweet sorghum for ethanol production using a PAM approach in China by Basavaraj *et al* (2013) estimated the DRC value for sweet sorghum to be less than unity for Maharashtra and marginally higher at 1.23 in Andhra Pradesh. Both the private and social profits of sweet sorghum cultivation were negative in Andhra Pradesh, indicating inefficient production. A low DRC value in Maharashtra indicates that it has comparative advantage in the cultivation of sweet sorghum compared to Andhra Pradesh. However, EPC coefficient of 0.89 showed that the cultivation of sweet sorghum was not protected by policies. The value addition of the present study is that apart from using PAM to analyse the competitiveness and comparative advantage, PEM was also used to analyse the effect of price changes on the producers' and consumers' welfare.

The study on the comparative advantage of soybean production in Vietnam using PAM Approach by Huynh (2013) indicated that the DRC of soybean-farming system was 0.71. The result indicated that the soybean cultivation had a comparative advantage. The PCR of soybean cultivation was 0.42 indicating that soybean cultivation was profitable and thus competitive. The Nominal Protection Coefficients on Outputs (NPCOs) of soybean in Can Tho and An Giang Provinces within Vietnam were slightly different. The NPCOs of Can Tho and An Giang were 0.93 and 0.87, respectively. Both values of NPCO were less than 1 indicating that soybean farmers received slightly lower prices domestically than the world prices or that soybean cultivation was receiving very slight protection. The positive output transfers were caused mainly by indirect quantitative restriction (quotas) on soybean imports. Moreover, the value of NPCI is 1.06. This result indicates that soybean farmers were taxed when they buy tradable inputs. The study estimates the value of EPC to be 0.83 and this indicates that there was no subsidy on soybean production in the soybean output and tradable input markets from

government policies. The costs or profits of soybean producers are 17 percent less than they would have been in the absence of policy on output and tradable inputs. The present study is different in that the competitiveness, comparative advantage as well as the effect of policies were carried out on a tree crop (cocoa) rather than on arable crop.

The result of the PAM as obtained from the study entitled 'Competitiveness and effects of policies on plantain production systems in Southwestern Nigeria' by Adeoye, *et al.*, (2014) showed that plantain production was privately and socially profitable in all plantain production systems. Although, plantain/cocoyam production system was the most competitive out of the four evaluated production systems with a private profitability of ₦514,547/ha followed by plantain/cassava production systems (₦354,579), sole plantain (₦348,352/ha) while the least competitive production system was the plantain/cocoa (₦303,150/ha). Additionally, social profitability was highest in plantain/cocoyam production systems (₦1,593,610/ha) followed by sole plantain (₦1,533,489/ha), plantain/cocoa (₦1,492,691/ha) while the least net social profitability was obtained with plantain/cassava production systems (₦1,481,711/ha). Social Cost Benefit (SCB) ratio of 0.21 was obtained in sole plantain, plantain/cocoa (0.24), plantain/cocoyam (0.26) and plantain/cassava (0.23) respectively indicating comparative advantage in the production systems. There was absence of incentives in the production system and this was revealed by the result of the EPC that was less than one in the production system.

In a study on policy analysis and competitiveness of plantain processing in Southwestern Nigeria by Adeoye and Oni (2013), the result of the analysis indicated that plantain chips production has positive private profit of ₦434,543 per tonne while plantain flour had positive private profit of ₦425,588.79/ton. This implies that plantain flour and plantain chip processing were competitive given prevalent government policies and transfers. The PCR obtained for the two products ranged between 0.10 and 0.13 indicating that the enterprises were profitable. Plantain flour processing had positive social profit of ₦855,822.46/ton while plantain chips processing had positive social profit of ₦1,162,000/ton. This implies that processing of plantain into flour or chips is economically profitable under existing government policies and transfers. The result of the analysis of the DRC for plantain flour (0.06) and plantain chips (0.07) that were less than unity indicated that the study area had comparative advantage in the processing of the two products. It also implies that the cost of domestic factor was lower than value added in social prices. This was further confirmed by the SCB which was also less than unity for plantain flour

(0.32) and plantain chips (0.33) which connotes the existence of comparative advantage in processing of plantain flour and plantain chips. The result of NPCO of 0.83 and 0.72 were obtained for plantain flour and plantain chips which indicated that plantain flour and plantain chip market price were 17 percent and 28 percent below the world reference price. EPC values of 0.76 and 0.60 were obtained for plantain flour and plantain chips. The EPC values of less than one obtained indicated that value added at market prices were lower than value added at world reference price. While the study carried out the competitiveness and comparative advantage of plantain processing, the present study is different in that it analysed the competitiveness and comparative advantage along the entire value chain of cocoa.

A study on assessing the competitiveness of groundnut production in Malawi using PAM approach by Abiba *et al* (2012) indicated that farmers with traditional technology had private profit of MK17934 showing the actual profit that will be received by the farmers. The social profit of MK27481.60 shows that the system was profitable and had a comparative advantage. Even though the results showed that local groundnut production was profitable at both private and social prices, the net profit transfer indicates otherwise. Since the net profit transfer is negative (-MK9547.60), the net effect of the policies was to tax the local groundnut cultivation. These results showed that groundnut production, using traditional technology, does not require any protection or subsidy to yield substantial profit. However, for improved technology, the private profit was MK20167.56 while the social profit was MK30489.45. Both private and social profits are positive, again implying that groundnut production with improved technology was profitable at both private and social prices. The negative input transfer for inputs (MK -1580.50) was due to the fact that social prices are higher than private prices. This shows that farmers were buying subsidized inputs. This was caused in part by the local pricing of seed which might result from implicit subsidy on the distribution of tradable inputs from suppliers to farmers. The value addition of the present study is that apart from the fact that competitiveness was evaluated at each stage of cocoa value chain, the effect of policy at each stage of cocoa value chain was also examined.

The study on comparative advantage and competitiveness of cashew crop in Nigeria using PAM by Olagunju (2015) indicated that there was a private profit of ₦11,883.10 per tonne for cashew nut and social profit of ₦36,885.00 per tonne. These values indicates that the cashew farming has a comparative advantage during cashew nut season and the system is highly efficient

implying that the producers utilize scarce resources efficiently in the cashew nut production. The output transfer of –₦20,000 per tonne means there was a market failure. Tradable input transfer with a value of -₦683 showed that the government is supporting in terms of tradable inputs. In terms of tradable inputs such as seeds, fuel, herbicides, the cashew producers enjoy subsidy on input prices. Non-tradable input transfer was ₦5,684 which is as a result of distortion in government policies on factors of production. This highly affects the farmers more than the benefit the policies give in term of tradable inputs. There was however, a negative divergence between private and social profits (-₦25,001.90) indicating a tax effect for the producers. The tax effect can be from government intervention or market imperfection or both. The value addition of the present study is that apart from using PAM to analyse the competitiveness and comparative advantage, PEM was also used to analyse the effect of price changes on the producers' and consumers' welfare.

The study on analysing policy-induced effects on the performance of irrigated rice by Ali *et al* (2013) using PAM showed that the Private Coefficients (PCs) of irrigated rice varied from 0.38 to 0.85 indicating that, in most cases, the private revenues were less than the revenues evaluated at reference prices. A comparison of local rice with rice brands imported through Cotonou Port shows that, in the retail rice marketing system, the PC of the irrigated rice production was on average 0.63, compared with 0.73 in the wholesale market channels. Similarly, the comparison of local rice with rice brands imported through Tema Port gave PCs of 0.62 and 0.67 for retail and wholesale rice marketing channels respectively. In all cases, the PC was less than one, indicating that private profitability, even though positive, is less than the social profits (since PC is the ratio of private profit to social profit). Therefore, the net policy effect is negative, and it is expected that these profitability coefficients would also be low. Furthermore, on average, the Effective Profitability Coefficients (EPCs) were less than one, indicating that the system is not protected and that the prices received by producers are lower than comparable world market prices. The present study is different in that apart from analyzing the effects of policies, it also analysed the competitiveness and comparative advantage of cocoa value chain.

A study on the effect of the rice tariff policy in Minahasa Regency by Anapu *et al.*, (2003) showed that private profits were positive for all three rice farming systems, due largely to the effect of the government's import duty. Social profits were negative when land was included as a

cost because the profits of the next best alternative, peanuts, were greater than rice. Minahasa Regency clearly had a comparative advantage in producing peanuts and the current policy-induced incentives to grow rice are distorting resources away from their most efficient use. Although the production of peanuts is socially more profitable than rice production, farmers prefer to plant rice because of household food security concerns, lower perceived risk, and easier marketing arrangements. Government policies wanted to protect rice production by increasing rice prices to transfer incomes to rice producers. But protection of rice production harms poor consumers, worsens poverty, reduces human nutrition, raises labour costs, and wastes scarce resources.

In a study on the competitiveness of rice processing and marketing in Ebonyi State using a PAM approach by Ude (2013), it was revealed that private profit was positive (₦99,063.11) for processors and negative for marketers (-₦9,563.33) while social profit was negative (-₦4, 838.3) for processors and positive for marketers (₦8,473.22) for the output of a hectare of land. NPC for output and input were 1.52 and 0.92, respectively for processors and 1.5 and 1.4, respectively for marketers. Domestic resource cost coefficient was 1.41 and 0.53, respectively for processors and marketers. The EPC values of 10.33 and 0.17, respectively for processors and marketers, showed that rice processors were protected while marketers were not protected. The study recommends that the protection policy should be intensified since findings have shown that the enterprises were profitable. The value addition of the present study is that it analysed the competitiveness and the effect of policies on competitiveness for the entire cocoa value chain.

In a study conducted by Reddy *et al* (2005) on "global competitiveness of medium-quality Indian Rice in Karnataka State" using PEM, the study revealed the effect of price distortion on production and consumption of Indian rice in Karnataka State. International prices adjusted for transportation costs were higher by 21% than domestic prices during the post-liberalization period (2001-2002). These higher world prices resulted in increased domestic production of the crop to the extent of 0.453 million tonnes of rice. Higher international prices resulted in a decrease in rice consumption of 0.799 million tonnes. Furthermore, producers' welfare gains were much larger than the respective welfare losses. Results revealed that welfare gains to producers were 21.3 percent (Rs. 7,718.55 million) of the total value of production. Conversely, consumers in the state and region incurred substantial welfare losses because of the rise in rice prices (Rs 2,864.35 million) in 2001-2002.

In a study to determine the impact of a Southern African Customs Union-European Union Economic Partnership Agreement on Botswana's imports using PEM carried out by Buyani *et al* (2013), it was found that Botswana's total tariff revenue loss was BWP3.676 million. Out of this, BWP1.41 million (38 percent) was loss in tariff revenue due to not charging duty on current EU imports while BWP2.26 million (62 percent) was due to substituting rest of the world goods with tariff non-paying EU imports. The net welfare was estimated to improve by BWP54.52 million. This was due to cheaper or more accessible EU imports of BWP50,636 million. There was also an estimated welfare enhancement of BWP56.73 million from trade creation. However, the welfare was estimated to decrease by BWP2.26 million due to trade diversion. The results showed a net welfare increase of 0.06 percent of the 2008 GDP at 2008 prices. The value addition of the present study is that apart from the use of partial equilibrium model to analyse the welfare effects, PAM was also utilized to analyse the competitiveness and comparative advantage of cocoa value chain.

A study on India-Japan Free Trade Agreement (FTA) in goods using PEM by Shahid (2010) showed the results of welfare effects of India-Japan FTA on goods. The result showed that there were positive welfare gains for Japan while India had welfare loss from the FTA. Welfare loss for India was expected to be equal to US$-540.1million while Japan's welfare gain was US$814.1 million and net global welfare decreased by US$-365.1 million. Terms of trade improves significantly for Japan while India's large welfare loss might be due to 'allocative inefficiency' and deteriorating 'terms of trade'. India's welfare loss could also be explained by the fact that India likely faced a large negative trade diversion effect from the FTA which offset the positive trade creation effect.

A study on the impact of EU-accession on the Estonian trade with food products using PEM by Urmas *et al* (2002) found that the consumer surplus decreased by an average of 135−143 percent of total consumption expenditure of the analysed agricultural products per year, and the deadweight loss for the whole economy amounted to 0.7−1.4 percent of GDP per year. Therefore, the static effects from the change in import regime as a result of accession to the EU were negative. The present study is different in that it did not only utilized both PEM and PAM. for the analysis.

In a study on the calorie and revenue effects associated with a sugar-sweetened beverage tax using PEM by Senarath *et al.,* (2014), it was indicated that the impact on consumption and

caloric intake was smaller than what has been estimated in the past due to supply side responses as a result of the tax. A 10 percent increase in the tax rate brought about tax revenue of $500–$600 million range, but brought about a decrease in market revenue of $600–$620 million range. Also, it was found that the caloric reduction was within 60–300 calorie range. However, when the results were extrapolated to a 20 percent increase, then the tax revenue and caloric reduction estimates were lower than what was obtained with a 10 percent increase.

A study on food price changes and consumers' welfare in Ghana in the 1990s by Chales *et al,* (2003) found that rural consumers were the major beneficiaries from further tariff liberalization. This means that tariff liberalisation would tend to benefit the poor (6.4 percent) over the rich (5.7 percent) and thereby potentially reduce inequality. Rural households also stand to gain substantially (6.5 percent), compared to their urban counterparts (5.0 percent). These findings indicate that trade policy may not have been responsible for the welfare losses observed in the previous analysis. The role of other factors and policies, such as the removal of fertilizer subsidies, exchange rate depreciation and domestic supply constraints could be decisive. The value addition of the present study is that it did not only analyse the welfare effects but also analysed the competitiveness and comparative advantage.

A study conducted on 'evaluating the market and welfare impacts of agricultural policies in developed countries' using PEM by Alexandre and GianCarlo (2006) discovered that with the agricultural policies, European farmers lost $67.1, billion the taxpayer gained $50.1 billion, while consumer welfare increased by $22.5 billion. The change in disposable income which was estimated by the sum of the changes in producer surplus and tax payer surplus yields an aggregate welfare gain of $5.5 billion. However, the welfare results also contrast with those reported by past studies because the estimates never exceed 0.2 percent of initial GDP of the EU.

In a study carried out on trade policy simulation and welfare analysis using a PEM for bovine meat in Morocco by Oussama (2008), the welfare analysis was carried out under four policy scenarios; protectionist, free trade, import quota and tariff-rate quota (TRQ) policies. Under the protectionist policy scenario, the consumer surplus was USD236,766,067.00 and the producer surplus was USD463,967,700.00. Under the free trade policy scenario, the consumer surplus was USD789,288,100.00 while the producer surplus was USD 158,071,887.50. Also, the social welfare gain was USD246,626,220.00. Under import quota policy, the consumer surplus and the producer surplus was USD393,587,500.00 and USD312,070,587.50, respectively while

the social welfare gain was USD4,924,320.50. Under the TRQ Policy, the consumer surplus and the producer surplus was USD656,891,500.00 and USD 204,016,587.50, respectively while the social welfare gain was USD160,174,320.50. However, the government revenue gain was USD 45,944,700.00. The present study differs in that apart from the fact that it analysed the welfare effect, it also analysed the competitiveness and comparative advantage.

The findings of Umar *et al* (2015) in their study on the 'welfare implication of paddy price support withdrawal from Malaysian rice sector' using PEM showed that producer welfare loss as a result of paddy price support withdrawal was about RM189.31 million. This however aided saving of RM198.23 million in revenue, which would have been expended on the paddy support price by the government. Meanwhile, as a result of the amount saved, (RM198.23 million), the net gain (societal gain) was positive and stood at about RM9 million. The loss in the producer welfare was due to the withdrawal of producer price support scenario. As a result of the simulation, there was a cut in the rice producer price or farm price of about 10 percent. Since the rice production is dominated by smallholder farmers, this reduction in income can serve as a disincentive to rice production. However, this finding is in agreement with the general belief in the literature that liberalization of rice production can bring about net gain in the society.

A study carried out on the competitiveness and value chain analysis of plantain in Southwestern Nigeria using PEM by Adeoye (2015) revealed that the net social loss (that is losses in production efficiency) in plantain production was ₦6,552/ton. Net economic loss in production might be attributed to the low price being received by the farmers. Net social loss in consumption was estimated at ₦28,295/ton. The domestic consumers paid lower prices for plantain fruits during the peak season due to high supply in the market. The welfare loss of plantain producers due to policy distortion and market failures was estimated at –₦256,514.25 per ton while the consumers gained ₦234,771.55/ton during the cropping season. However, the overall analysis indicated distortions in the market and pricing of plantain in the Southwest zone of the Nigeria.

Lessons learnt from all the literatures reviewed are as follows:

1. From the methodological point of view, almost all the literatures reviewed utilized PAM and PEM separately. Ogbe *et al.,* (2011) utilized PAM to analyse the competitiveness of Nigerian rice and maize production ecologies; Oguntade (2011) used PAM to assess the protection and

comparative advantage in rice processing in Nigeria; Reig-Martínez *et al.,* (2008) utilized PAM to evaluate the profitability of rice cultivation in Eastern Spain; Liverpool *et al.,* (2009) examined the Competitiveness of Agricultural Commodity Chains in Nigeria using PAM; Adeoye and Oni (2013) examined the competitiveness of plantain processing in Southwestern Nigeria using PAM; Adegbite *et al*., (2014) utilized PAM to investigate the competitiveness of pineapple production in Osun State, Nigeria; Reddy *et al.,* (2005) utilized PEM to assess the Global competitiveness of medium-quality Indian Rice in Karnataka State; Alexandre and GianCarlo (2006) evaluated the market and welfare impacts of agricultural policies in developed countries using partial equilibrium model and Umar *et al.,* (2015) utilized PEM to examine the welfare implication of paddy price support withdrawal from Malaysian rice sector. The use of PAM by all these studies confirms that it is a right tool used in analyzing comparative advantage, competitiveness and profitability of crops along the value chain while the use of PEM confirms the use of the tool in analyzing the effect of price changes on producers' and consumers' welfare. 2. From the point of view, empirical analysis of most of the literatures reviewed worked on food crops. Oguntade (2011), Reig-Martínez *et al.,* (2008) and Reddy *et al.,* (2005) carried out their research work on rice, Ogbe *et al.,* (2011) worked on rice and maize, Liverpool *et al.,* (2009) researched on cassava and maize, Adeoye and Oni (2013) worked on plantain while Adegbite, *et al*., (2014) carried out their research work on pineapple. The use of PAM and PEM in analyzing comparative advantage, competitiveness, profitability and welfare gain and loss of cocoa presents a value addition to the body of knowledge through unraveling the factors that drive competitiveness, comparative advantage, profitability and welfare gain and loss.

Based on the above, therefore, the shortcomings/gap from all the literatures reviewed are (i) none of the literatures reviewed combined both PAM and PEM to carry out a value chain analysis, (ii) none of the literatures reviewed carried out its research work on cocoa and (iii) none of the studies reviewed carried out sensitivity analysis. Therefore, the value addition of the present study which of course filled the gap created by the literatures reviewed are (i) it combined the use of both the PAM and PEM to carry out value chain analysis of cocoa, (ii) the study was carried out on cocoa which is a tree crop, (iii) the study carried out sensitivity analysis and (iv) the study utilized PAM spreadsheet software to estimate PAM indices in addition to the conventional method of estimating PAM indices (which is arithmetic method). Apart from these, the study also gave the functional analysis of the actors in each of the nodes of cocoa value

chain. However, the reason for using PAM and PEM is to comprehensively (holistically) carry out value chain analysis that span from the production level through marketing and processing so as to understanding the welfare of the producers and consumers.

CHAPTER THREE

THEORETICAL AND CONCEPTUAL FRAMEWORK

3.1. Theoretical Framework

3.1.1 Theory of Trade

Trade occurs because of differences in prices and there are differences in prices because there are differences in supply of and demand for factors of production. Supply differs between countries because of technological differences and resource availabilities. However, the purpose of trade, the impact of trade on the domestic economy and the effects of different policies on trade, all are explained by the theories of trade. Trade theory is the body of economic thought that seeks to explain why and how countries engage in international trade and the welfare implication of that trade (Wikimedia, 2013). Trade theories in general attempted to explain three issues: the pattern of trade where the emphasis has been on explaining the basis of trading relations; the sources of gain from trade where the emphasis has been on explaining how the gains from the trade are distributed among trading partners; and the structure of production and returns to factors of production where the emphasis has been on explaining the implications of trade for the structure of production and returns to factors of production within each trading country (Wikimedia, 2013). Trade theory can be classified into two categories, namely traditional trade theories (which have neoclassical foundation) and new trade theories. Traditional trade theories incorporate the principles of perfect competition, homogeneous goods and constant returns to scale in production.

The new trade theories on the other hand would include theories characterized by product differentials, imperfect competition and increasing returns to scale. Neoclassical theories of trade assume that the world has two countries, country A's exports must be country's B's imports. The theories also assume that there are two commodities in international trade. Neoclassical theory is especially good at pointing out the links between different markets. Apart from these, other assumptions underlying neoclassical theories of trade include: trading relations are restricted to two countries each having a fixed stock of factors of production; factors of production are perfectly mobile among industries within a country but completely immobile internationally; all traded products are final products; both factor and product markets are characterized by perfect competition with producers maximizing profits and factor returns at a level that ensures full employment of all factors; technology is such that production is characterized by constant returns

to scale; and consumers everywhere have identical homothetic utility factors. However, the most important, and limiting, assumption is that firms produce under conditions of perfect competition. Any industry that is controlled by a small number of firms is not perfectly competitive. Examples of neoclassical theories of trade are as discussed hereunder.

3.1.1.1 Ricardian Theory

This theory was developed by the English political economist David Ricardo in the early 1800s. Historically, it is the earliest model of trade to have appeared in the writings of classical economists, at least among models that are still considered useful today (Alan, 2007). The Ricardian model is the simplest and most basic general equilibrium model of international trade that we have. In its most simple form, the theory assumes two countries producing two goods using labour as the only factor of production. The theory makes the point that trade should, in principle, benefit both parties even if one is more efficient. The Ricardian model focuses primarily on the amounts of labour used to produce traded goods and, from that, the concept of comparative advantage. The simple Ricardian model depicts a world of two countries, A and B, each using a single factor of production, labour L, to produce two goods, X and Y. Technologies display constant returns to scale, meaning that a fixed amount of labour, is needed to produce a unit of output of each good regardless of how much is produced in total. All markets are perfectly competitive, so that goods are priced at cost in countries that produce them. Labour is available in fixed supply in each country, it is immobile between countries but perfectly mobile within each. The Ricardian model typically leaves demands for goods much less fully specified than supplies. The essential features of a Ricardian model are two: that production uses only homogeneous labour as a primary input; and that comparative advantage arises from differences across goods and countries in the technology for producing goods from that labour. Both of these requirements distinguish a Ricardian model from the other principal models of trade theory such as Heckscher-Ohlin Theory and others. Ricardo explained that the differences in factor endowment such as labour and technology determine the goods in which a country has comparative advantage and this determines the country's international competitiveness (Alan, 2007).

3.1.1.2 Factor price equalization model

This is an economic theory, according to Samuelson (1948), which states that the prices of identical factors of production such as the wage rate, or the return to capital, will be equalized

across countries as a result of international trade in commodities. The theorem assumes that there are two goods and two factors of production, for example capital and labour. Other key assumptions of the theorem are that each country faces the same commodity prices, uses the same technology for production, and produces both goods. Crucially, these assumptions result in factor prices being equalized across countries without the need for factor mobility, such as migration of labor or capital flows. Whichever factor that receives the lowest price before the two countries integrate will tend to become more expensive relative to other factors in the economy, while those with the highest price will tend to become cheaper (Samuelson, 1948).

3.1.1.3 Heckscher–OhlinTheorem

The Heckscher–Ohlin Theorem is one of the four critical theorems of the Heckscher–Ohlin model. The theorem was first published in 1933. It states that a country will export goods that use its abundant factors intensively, and import goods that use its scarce factors intensively. In the two-factor case, it states: "*A capital-abundant country will export the capital-intensive good, while the labor-abundant country will export the labor-intensive good*." The critical assumption of the Heckscher–Ohlin model is that the two countries are identical, except for the difference in resource endowments. This also implies that the aggregate preferences are the same. The relative abundance in capital will cause the capital-abundant country to produce the capital-intensive good cheaper than the labour-abundant country and *vice versa*.

3.1.1.4 Stolper–Samuelson theorem

Stolper–Samuelson theorem is a basic theorem in Heckscher–Ohlin trade theory. It describes a relation between the relative prices of output goods and relative factor rewards, specifically, real wages and real returns to capital. The theorem states that—under some economic assumptions (constant returns, perfect competition, equality of the number of factors to the number of products)—a rise in the relative price of a good will lead to a rise in the returns to that factor which is used most intensively in the production of the good, and conversely, to a fall in the returns to the other factor. It was derived in 1941 from the framework of the Heckscher–Ohlin Model. Some research findings that actually compared output prices with changes in relative wages strongly supported the Stolper–Samuelson theorem.

3.1.1.5 Rybczynski theorem

The Rybczynski Theorem was developed in 1955 by the Poland-born English economist, Tadeusz Rybcznski (1923–1998). The theorem states that at constant relative goods prices, a rise

in the endowment of one factor will lead to a more than proportionate expansion of the output in the sector which uses that factor intensively, and an absolute decline of the output of the other good. The theory applies to the two countries, two goods, two factor model, an increase in one factor will result in an absolute rise in the output of the commodity which is relatively intensive in the increased factor, and to an absolute fall in the output of the other commodity. The theorem displays how changes in an endowment affect the outputs of the goods when full employment is sustained. It is useful in analyzing the effects of capital investment, immigration and emigration within the context of a Heckscher-Ohlin Model.

3.1.1.6 Michael Porter theory

Michael E. Porter is a leading authority on competitive strategy; the competitiveness and economic development of nations, states, and regions; and the application of competitive principles and strategic approaches to social needs, such as health care, innovation, and corporate responsibility. Porter believes that to get more than its fair share of profits, a company has to be able to do things that its competitors can not thus making such a company to have a competitive advantage over the others. There are two drivers of competitive advantage as far as Porter is concerned: *cost advantage* and *differentiation*. In cost advantage, one needs to incur lower costs than any other competitor. That advantage allows one to either price his/her products lower than anyone else or just to match prices and take the difference in profits. Differentiation just means meeting some customers' need better than any competitor and getting a premium price in return.

Of all these theories, the Theory of Comparative Advantage originated from Richadian theory. This is because, the Richadian theory believes that the maximum potential gains from trade tend to be realized if one specializes in that activity which he can do at the lowest cost relative to other people's costs. In a similar vein, the Theory of Competitiveness was proposed by Michael Porter's theory in 1985. Porter emphasizes productivity growth as the focus of national strategies and that competitive advantage occurs when an organization or a sector or a nation acquires or develops an attribute or combination of attributes that allows it to outperform its competitors. These attributes can include access to natural resources, such as high grade ores or inexpensive power, or access to highly trained and skilled personnel. The theories of comparative advantage and competitiveness are further discussed as follows.

3.1.1.7 Theory of Comparative Advantage

Comparative advantage is the ability of a party to produce a particular good or service at a lower marginal or opportunity cost over another. The theory of comparative advantage was first proposed by David Richado in 1817 when he focused on international trade and he generalized the idea into an economic law, the law of comparative advantage. Hence, the principle of comparative advantage according to Richado is that a nation will export the goods or services in which it has its greatest comparative advantage and import those in which it has the least comparative advantage. Comparative advantage is the ability to produce a product with the highest relative efficiency given all the other products that could be produced. Classical comparative advantage theory was extended in two directions, Richadian Theory and Heckscher-Ohlin Samulson (HOS) Theory. In both theories, comparative advantage concept is formulated for two- country, two- commodity case. It can easily be extended to the two-country, many-commodity case (Dornbusch *et al*, 1977).

Opportunity cost is the key to comparative advantage. Individuals and nations gain by producing goods at relatively low costs and exchanging their outputs for different goods produced by others at relatively low cost. Relative resource abundance is the driving force for comparative advantage. However, comparative advantage is also determined by government policies, climate, location, institutional and cultural factors, the skill and education of the populace, the vigour of internal competition, size of domestic markets, and the ability of domestic entrepreneurs to operate global markets (Dornbusch *et al*, 1977).

3.1.1.8 Theory of Competitiveness

The modern theory of competitiveness evolved from a long history of economic thinking rooted in the works of classical economists, including *Law of Comparative and Competitive Advantage* (Richardo, 1776), *An Inquiry into the Nature and Causes of the Wealth of Nations* (Smith, 1776) and *Competitive Advantage of Nations* (Porter, 1990). The World Economic Forum (WEF) defines competitiveness as the set of factors, policies and institutions that determine the level of productivity of a country (Lopez-Claros *et al*., 2006). Competitiveness depicts the ability of a country to achieve sustained high rates of growth in GDP per capita; a more competitive economy is one which is likely to grow faster in the medium to long-term. The Global Competitive Index provides a holistic overview of the factors that are critical to driving productivity and competitiveness. The factors are defined in terms of nine broad mutually

complementary pillars of competitiveness: (i) institution, (ii) infrastructure, (iii) macroeconomic, (iv) health and primary education, (v) higher education and training, (vi) market efficiency, (vii) technological readiness, (viii) business sophistication and (ix) innovation (Lopez-Claros *et al*., 2006). But none of these nine pillars can alone ensure competitiveness. Hence, countries which implement a wide range of factors and maximize their interconnection by developing framework policies in a comprehensive manner tend to be more competitive.

Also, pillars of competitiveness apply differently to different countries, depending on economic circumstances. Less developed countries can still improve their productivity by adopting existing technologies or making incremental improvements in other areas. Meanwhile, countries that have reached the innovation stage of development need frontier products and processes to retain their competitive edge. Hence, innovation is the only self-sustaining driver of growth (Lopez-Claros *et al*., 2006). Innovation is correlated with knowledge which is perhaps the most critical competitiveness factor in today's globalising world. As countries move up to the economic scale, they rely more on new knowledge to ensure their prosperity and to compete well in global market place.

Past studies on competitiveness point to a number of features for understanding and explaining the competitiveness of countries. Some of these features are that competitiveness is relative, not absolute. It includes both efficiency and effectiveness and encompasses the present, short- term and long- term. It is a dynamic phenomenon involving actions and feedbacks and includes both the ends and the means towards those ends and embodies elements of productivity, profitability and efficiency (Garelli, 2006). In short, competitiveness encompasses all the elements that can explain the success of a nation in creating wealth and achieving prosperity for its people (Garelli, 2006).

The theory of competitiveness also applies to industries. A competitive industry is one that possesses the sustained ability to profitably gain and maintain market share in domestic, regional and foreign markets (Martin *et al*, 1991). Competitive advantage is defined as the strategic advantage one business entity has over its rival entities within its competitive industry (Porter, 1985). Achieving competitive advantage strengthens and positions a business better within the business environment. The elements of competitiveness potential are price and cost (Notta, *et al*, 2010). Innovation, technological advancement, effective management of organizational

activities, brand, quality of products and services, and human capital are now widely recognized as vital sources of competitiveness for firms (Porter, 1985).

It should however, be realized that this study is pivoted by the theories of comparative advantage as well as competitiveness. This is because comparative advantage as proposed in Richardian model is the ability of a party to produce a particular good or service at a lower marginal or opportunity cost over another. Richardian theorem depicts a world of two countries using resources to produce the same commodity. The ability of a country to efficiently use its resources to produce such a commodity at a lower marginal cost gives such a country a comparative advantage to produce such a good over the other country. On the other hand, the theory of competitiveness which was proposed by Michael Porter operates when a country acquires or develops an attribute or combination of attributes that allows such a country to outperform its competitors in the production of a particular commodity. This study tries to find out if Nigeria has competitive advantage in growing cocoa and producing its value added products among her competitors.

3.2 Conceptual Framework

3.2.1 Concept of Value Chain and Value Chain Analysis (VCA)

Value chains provide the framework for designing and implementing many development programmes and projects. Given a multitude of different arenas of application, geographical locations, commodity types, target groups and desired outcomes, a variety of closely related conceptualizations of value chains (VC) has emerged. Hence, VC can be defined as "the full range of activities and services required to bring a product or service from its conception to sale in its final markets" (Hellin and Meijer, 2006). Also, according to Hellin and Meijer (2006), a VC can be defined as 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 producer services), delivery to final customers, and final disposal after use. A VC, thus, encompasses the entire network of actors involved in input supply, production, processing, marketing and consumption. Production *per se* is only one of a number of value added links. Hence, the chain actors who actually transact a particular product as it moves through the value chain include input (seed suppliers), farmers, traders, processors, transporters, wholesalers, retailers and final consumers. These VC actors operate within an institutional environment, which can either facilitate or hinder its performance (Gereffi *et al*,

2005). Laws, rules, regulations, policies, international trade agreements, social norms and customs all contribute to this institutional environment as do public goods such as infrastructure, research, extension, price information systems and business development services. Businesses that provide cross-cutting services such as finance and transport likewise contribute key elements to the institutional environment affecting the VC performance. The VCA framework examines the nature of the commodity flows to and from each stage and the geographic distribution of the flows.

Agricultural VC encompass a network of competing vertical supply channels that link input suppliers, farmers, processors, distributors and final consumers. Governance within VCs reflects the distribution of power and information among various actors. Alternative types of vertical coordination emerge depending on the distribution of market power (the ability to set prices, quality standards and minimum delivery quantities), political power and information (on standards and alternate market prices) (Gereffi *et al*, 2005). As a result, adjustments in vertical coordination mechanisms generally require investments in literacy, information and organization that modify the underlying power structure within the VC. VCA originally emerged as a tool for increasing competitiveness by pinpointing where and how participants could introduce efficiencies, reduce costs and maximize value. The implementation of competitive strategies, initially popularized by Porter (1985), aimed to promote behaviours that make value chains more competitive. Indeed, VCA provides useful information on structure linkages, actors, and dynamics. It helps to identify where, how, why, and by whom value is added and created along the chain, as well as how changes could result in improved performance. These improvements or "upgrades" in the competitiveness of VCs can occur in different ways, through process upgrading, product upgrading or functional upgrading (Kaplinsly and Morris, 2000).

Figure 3.1 shows the flow chart for cocoa value chain. The first stage which is input supply stage, involves in the sourcing for inputs such as seeds/seedlings, fertilizers, agro-chemicals as well as all other inputs used for cocoa cultivation. Here, input producing organizations such as fertilizer producing companies, agro-chemical companies, farm implement fabricators and research institute (e.g. Cocoa Research Institute of Nigeria) are very relevant. The inputs may be procured locally or internationally. The next stage of the chart is cocoa cultivation. The stage is undertaken by farmers and the final output at this stage is cocoa pods. From cocoa pods, cocoa beans and cocoa pod husks are produced. Cocoa beans undergo primary processing such as

fermentation, drying and bagging. The next stage after cocoa beans is the sale of the beans to local buyers or farmers' cooperatives. Local buyers and farmers' cooperatives in turn sell to bulk/Licensed Buying Agents (LBAs). LBAs either sells to multi-national processors and local processors or exporters who export the cocoa beans to international manufacturers who convert the beans to final products such as chocolate, beverage or cosmetics for final consumption. However, the multi-national processors operating in Nigeria also convert the beans to final products. The local processors convert the beans to intermediary products such as cocoa powder and cocoa butter which may also be exported outside the country to be converted to the final products. The cocoa pod husk on the other hand is dried properly and later be converted into potash. The potash is either exported or is used locally to manufacture soap. The soap manufactured can either be used locally or exported. However, Figure 3.1 shows that three distinct stages can be identified in cocoa value chain and these are production stage, marketing stage and processing stage. At the production stage, competitiveness, comparative advantage, effects of policies and producers' welfare gain/loss can be measured. Also, at the marketing and processing stages, competitiveness, comparative advantage, effects of policies and consumers' welfare gain/loss can be measured.

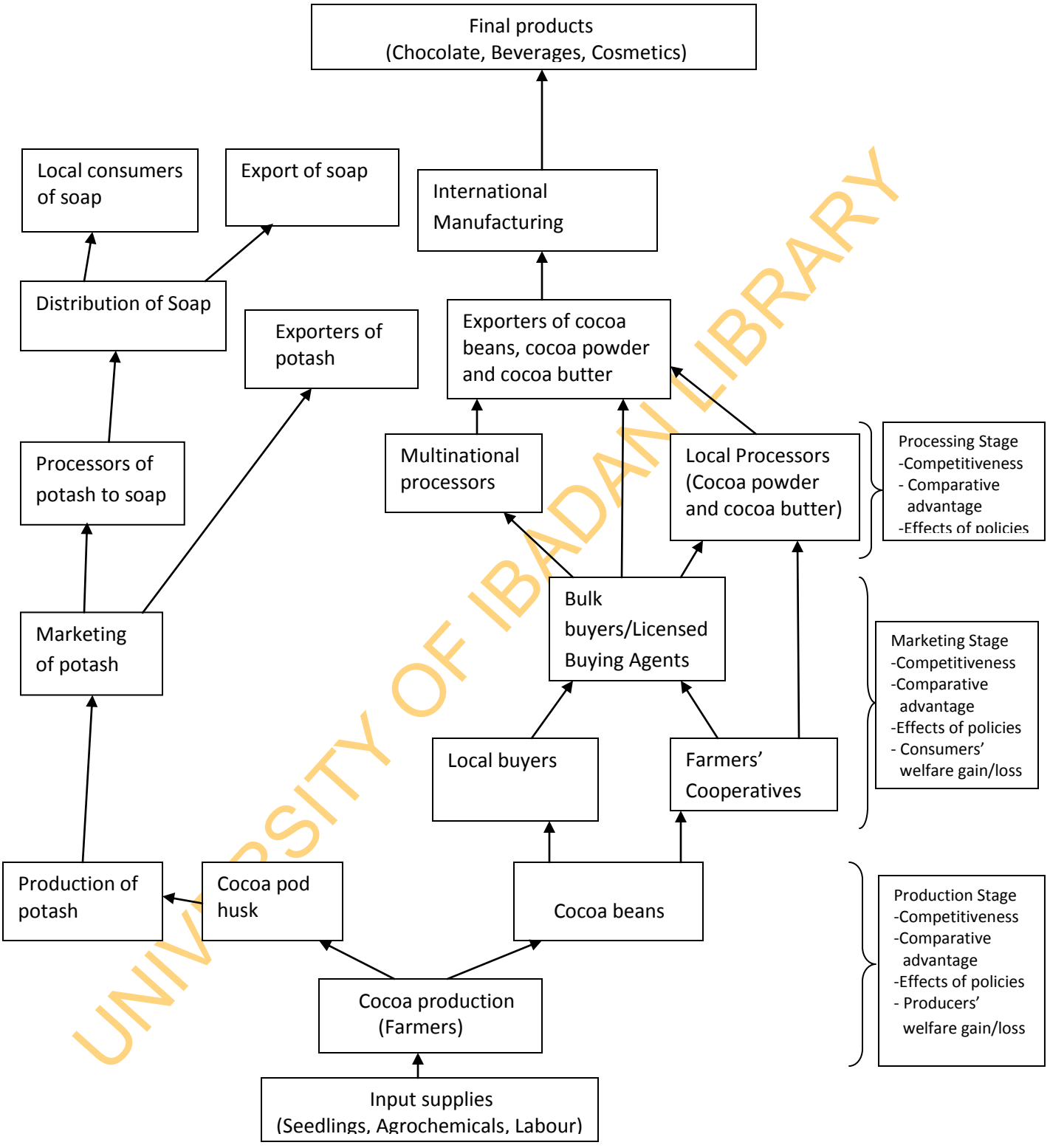
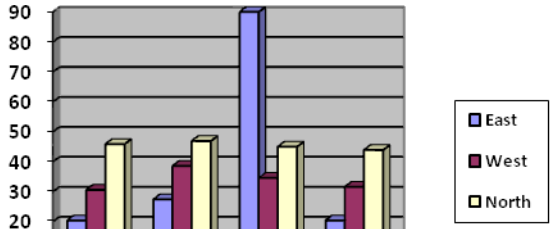


Figure 3.1: Conceptual framework on cocoa value chain (Author's construct).



CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Study Area

This study was carried out in the Southern part of Nigeria. In terms of cocoa production, Southern Nigeria can be taken as a proxy for Nigeria. This is because about 90 percent of the cocoa produced in Nigeria comes from the Southern Nigeria (NCDC, 2006). Southern Nigeria is divided into three geo-political zones namely South-west, South-east and South-south and is made up of eighteen states, which are Abia, Akwa-Ibom, Anambra, Bayelsa, Benue, Cross-River, Delta, Edo, Enugu, Ekiti, Ebonyi, Imo, Kogi, Kwara, Lagos, Ogun, Ondo, Osun, Oyo and Rivers, States. It is bounded in the North by and States, in the East by Republic of Cameroon, in the South by Atlantic Ocean and in the West by Republic of Benin (Sanusi, 2006). Southern Nigeria exhibits the typical tropical climate of the averagely high temperature and high relative humidity. There are two distinct seasons namely the rainy season which lasts from March/April to October/November and the dry season which takes place for the rest of the year, that is, October/November till March/April. The mean monthly temperature ranges between 18^0C-24^0C during the rainy season and 30^0C -35^0C during dry season. The distribution of rainfall varies from about 1000mm to 2000mm (Federal Ministry of Agriculture &Rural Development, FMA&RD, 1997). Southern Nigeria covers about 332,558.28 square kilometers land area. According to 2006 population census, the total population of the Southern Nigeria was 64,978,376. Agriculture forms the predominant occupation of the populace alongside other vocations like trading, crafts, fishing and agro-processing among others. Major food crops grown in the area include cassava, yam and maize while cash crops include cocoa, kolanut, cashew, oilpalm, orange and mango (Oduwole, 2004). The area is particularly known for cocoa production as more than 90 percent of the cocoa produced in Nigeria comes from the area (NCDC, 2006). The soil type is forest soil dominated with clayey loam (Ondo State, 2003; Aregheore, 2009). The type of vegetation in the area is tropical and rain forest. These vegetation types favour the growing of cocoa (Ondo, 2003). The potential of value addition is very high in the area due to the presence of some processing firms. Some of these processors are black soap processors (numerous in the area), Cocoa Products (Ile Oluji) limited, United Cocoa Processor, Stanmark Cocoa Processing Company, FNT Cocoa Processing Nigeria PLC, Tulip Cocoa Processing Company and Cadbury Nig. Limited (NBF, 2010).

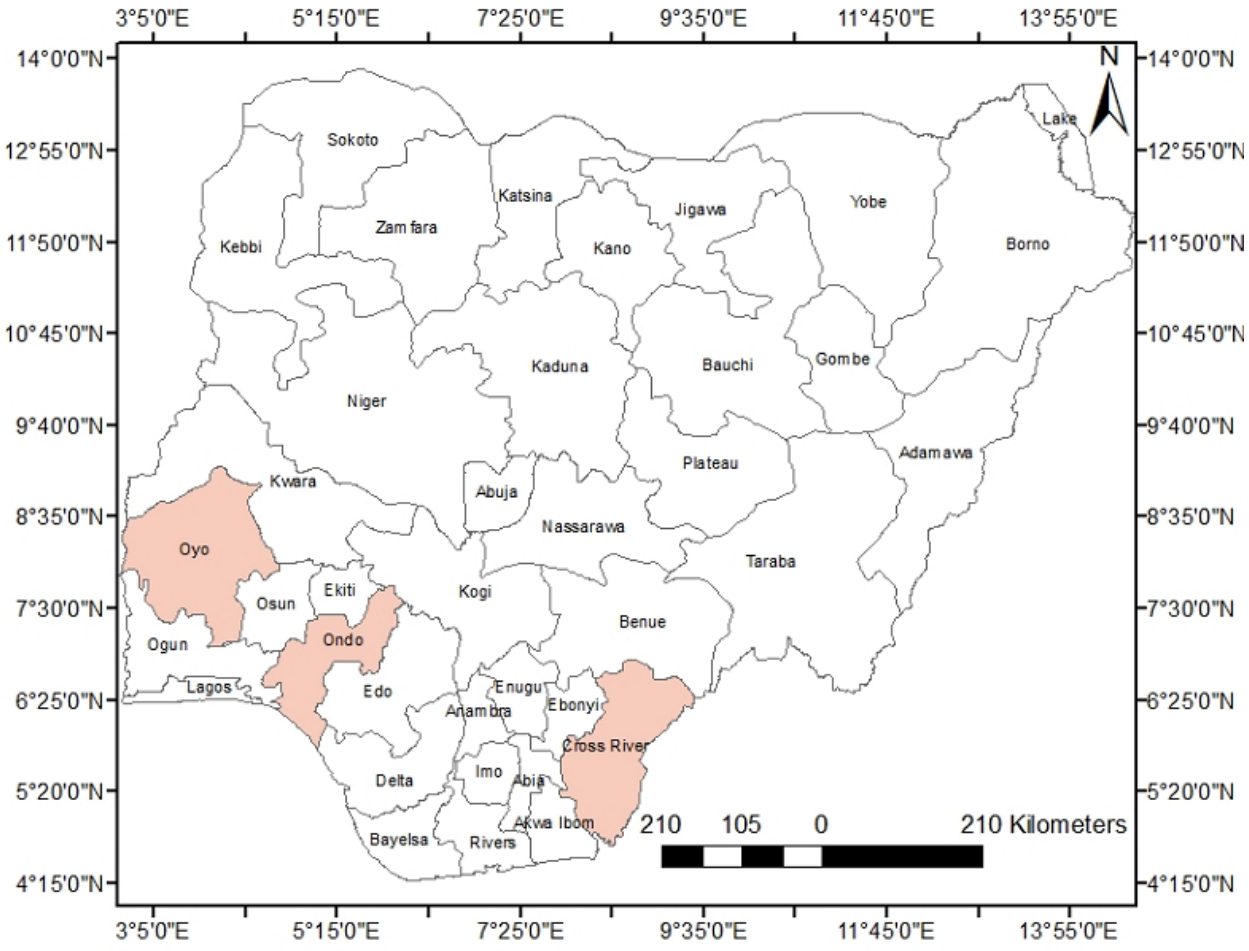


Figure 4.1: Map of Nigeria showing the study area

4.2 Sources and types of data

Primary and secondary data were utilized for the study. Primary data were obtained through the use of structured questionnaires. Primary data were collected from the actors on cocoa value chain. These included cocoa farmers, cocoa marketers and cocoa processors. The primary data collected included yield, inputs requirements, market prices for inputs and outputs, transportation costs and storage costs. Secondary data were sourced from secondary sources. These included port charges, tariffs and border prices of cocoa beans, cocoa products and tradable inputs from Nigeria Ports Authority (NPA), subsidy from National Bureau of Statistics and exchange rate from Central Bank of Nigeria.

4.3 Sampling procedure and sample size

The study employed multi-stage sampling procedure to select cocoa farmers and cocoa marketers. The first stage involved a purposive selection of three cocoa producing States from the cocoa producing States in Southern Nigeria. These include Ondo, Oyo and Cross-River States. These states were purposively selected because they are cocoa producing States. The second stage involved a purposive selection of two Local Government Areas (LGAs) from each randomly selected State making a total of 6 LGAs. The LGAs were selected because they are cocoa producing LGAs. The purposively selected LGAs included Idanre and Ondo-East from Ondo State; Ido and Ona-Ara from Oyo State, Ikom and Etung from Cross-River State. The third stage involved a purposive selection of two cocoa producing communities from each of the purposively selected LGAs thus making a total 12 selected communities for the study. A total of 250 cocoa farmers and 102 cocoa marketers were randomly selected from the selected 12 communities. They were randomly selected from the list of cocoa farmers and cocoa marketers in each of the communities. All the respondents randomly selected were selected proportionate to the size of the farmers and marketers in the communities (Table 4.1). The proportionate factor used is as follows:

$$S_i = \frac{P_i}{P_t}.N$$

Where:

S_i = Sample size

P_i = Population of (cocoa farmers and cocoa buyers) in community i

P_t = Total population of (cocoa farmers and cocoa buyers) in all the communities selected in the selected area

N = The pre-determined total sample size for the study.

However, purposive and random sampling techniques were used to select cocoa processors. Lagelu LGA of Oyo State was purposively selected because it is one of the black soap producing LGAs in the study area (Oluyole and Adeogun, 2005). A total of 52 black soap processors were randomly selected from Lagelu LGA of Oyo State. Apart from this, two corporate cocoa processing firms were purposively selected from the study area. The firms are Ile-Oluji cocoa processing mill in Ondo State and Tullip cocoa processing company in Ogun State. The major products from each of these companies were cocoa powder and cocoa butter.

However, for ease of comparism, cocoa farms were disaggregated into cocoa production management systems. According to Nkang *et al;* (2009), there are three cocoa production management systems in Nigeria. These are Owner-managed production management system, Leased/Rented production management system and Sharecropped production management system. These management systems are practiced across all cocoa producing States in Nigeria (Nkang *et al;* 2009). Owner managed production management system is the type of management system in which the farm is solely managed by the owner of the farm. The owner of the farm is the one that established the farm himself or he inherited/bought the farm. All the proceeds from the farm belong solely to the owner of the farm. Leased/Rented production management system is the one in which the manager of the farm rented or leased the farm. He is not the original owner of the farm. He pays certain amount on the farm periodically, usually yearly to the original owner of the farm. After paying the rent, all the proceeds from the farm belongs to him. In Sharecropping production management system, the management of the farm is usually shared between the sharecropper and the owner of the farm. Usually, the owner of the farm provides the inputs such as chemicals and fertilizer while the sharecropper provides labour. The proceed from the farm is shared in an agreed proportion, usually two parts to the owner and one part to the sharecropper. This study adopted the categorization of the production management systems in the analysis of the work.

Marketers were also categorized into three; local buying agents (LBAs), licensed buying agents (LiBA) and exporters. LBAs are the buyers that travel to the farm gate to buy cocoa directly from the farmers and they sell to the licensed buying agents, exporters or local

processors. Licensed Buying Agents buy cocoa from the LBAs and sell to exporters or local processors while exporters buy cocoa from the LBAs or LiBA and export it.

Table 4.1. Distribution of the respondents

State	LGAs	Communities	Number of cocoa farmers	Number of cocoa marketers	Number of black soap processors
Ondo	Idanre	Owena-Idanre	30	10	-
		Ipinlerere	22	08	-
	Ondo-East	Bolorunduro	25	10	-
		Owena-Bridge	23	11	-
Oyo	Ido	Elere-Adeogun	15	03	-
		Omi-Adio	12	12	-
	Ona-Ara	Alabidun	13	05	-
		Gbedun	10	04	-
	Lagelu	Apatere	-	-	32
		Oyedeji	-	-	08
		Aba Osun	-	-	12
Cross-River	Ikom	Ikom	31	12	-
		Bendeghe	15	09	-
	Etung	Ajassor	30	10	-
		Effraya	24	08	-
Total			250	102	52

Source: Field survey, 2014.

4.4 Method of data collection

Data were collected from the respondents with the aid of structured questionnaires. Three sets of questionnaires were used. A set of questionnaire was for cocoa farmers, one was for the marketers (cocoa buying agents) and one was used for cocoa processors. Apart from this, key informants among the respondents were selected and there was a lengthy discussion with them to be able to extract any additional useful information that would be needed for the study.

4.5 Analytical Techniques and Models

A number of analytical tools relevant to the objectives of the study were employed. These are Descriptive statistics, Policy Analysis Matrix (PAM) and Partial Equilibrium Model (PEM).

Descriptive statistics such as flow chart, frequency and percentage were used for objective 1, Policy Analysis Matrix was used for objectives 2, 3 and 4 while Partial Equilibrium model was used for objective 5.

4.5.1 Policy Analysis Matrix (PAM)

PAM is a product of two accounting identities, profit, defined as the difference between revenue and cost while the other measure the effect of the divergences (distorting policies and market failures) as the difference between observed parameters and parameters that would exist if the divergence were removed (Monke and Pearson, 1989).

Table 4.2 showed the basic format of PAM. PAM consists of three rows and four columns representing the budget for an activity. The first row of the matrix contains private prices. This captures production cost and revenues expressed in terms of the market prices that farmers face. Consequently, in private prices, profits are calculated by subtracting the two cost categories, cost of tradable inputs and cost of domestic factors (B and C) from revenues (A) in terms of market prices. The second row shows the same information but at social (world) price. The third row indicates the differences between private prices and social prices and reflects the extent to which policy distortion (such as introduction of subsidy, taxes, tariff) and market failures have made prices not to be socially optimal. Following Monke and Pearson (1989), the basic matrix format is shown in Table 4.2.

Table 4.2. The Policy Analysis Matrix (PAM)

Item	Revenues	Cost of tradable Inputs	Cost of Domestic factors	Profit
Private prices	$A= Y_i^p P_i^p$	$B= \Sigma a_{ij} P_j^p$	$C= \Sigma a_{ij} P_k^p$	D= A-(B+C)
Social prices	$E= Y_i^s P_i^s$	$F= \Sigma a_{ij} Pj^s$	$G= \Sigma a_{ij} P_k^s$	H= E-(F+G)
Divergencies	I= A-E	J= B-F	K= C-G	L= D-H = I-(J+K)

Source: Monke and Pearson, 1989.

Where:

P_i^p and P_i^s = Private prices and social prices for cocoa output (₦);

P_j^p and P_j^s = Private prices and social prices of tradable inputs for cocoa (₦);

P_k^p and P_k^s = Private prices and social prices of domestic factors for cocoa (₦);

Y_i^s and Y_i^p = Cocoa output (ton);

a_{ij} = Quantity of tradable inputs and domestic factors;

A = Revenue in private prices (₦); G = Cost of domestic factors in social prices (₦);

B = Cost of tradable inputs at private prices (₦); H = Social profit (₦);

C = Cost of domestic factors at private prices (₦); I = Output transfers (₦);

D = Private profit (₦); J = Input transfers (₦);

E = Revenue in social prices (₦); K= Factor transfers (₦);

F = Cost of tradable inputs in social prices (₦); L= Net transfers (₦).

Tradable inputs are the inputs that are traded internationally, examples are chemicals and fertilizers while domestic factors are the inputs that are traded locally and the examples are seedlings.

In this study, PAM was used to measure the competitiveness, comparative advantage as well as the effect of policy on cocoa cultivation, marketing and processing.

To measure the competitiveness at each stage of cocoa value chain (Objective 2).

Here, Private Profitability (PP) and Private Cost Ratio (PCR) were used to measure the competitiveness.

4.5.1.1 Private Profitability (PP) – This demonstrates the competitiveness of the agricultural system given current technologies, prices of input and output and policy

$$\prod = \sum Y_i{}^{P} P_i{}^{P} - (\sum a_{ij} P_j{}^{P} + \sum a_{ij} P_k{}^{P}) \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

$\prod$ = Private Profit;

$Y_i^P P_i^P$ = Value of output produced at private prices;

$\Sigma a_{ij} P_j^P$ = Cost of tradable inputs used at private prices;

$\Sigma a_{ij} P_k^P$ = Cost of domestic factors used at private prices.

If Private Profit < 0, which is negative private profit, this shows that the product is not competitive given current technologies, prices of inputs and outputs, and policy and that operators are earning subnormal rate of return when private profit = 0, operators are earning normal profit while when private profit > 0, that is positive private profit. The positive private profit implies that the product is competitive given current technologies, prices of inputs and outputs, and policy and the producers are earning positive returns and this should lead to expansion of the system.

4.5.1.2. Private Cost Ratio (PCR) - This shows the private efficiency of the farmers or the marketers and is an indication of how much one can afford to pay domestic factors (including a normal returns to capital) and still remain competitive.

$$PCR = \frac{\sum a_{ij} P_k{}^{p}}{Y_i{}^{p} P_i{}^{p} - \sum a_{ij} P_j{}^{p}} \quad \ldots\ldots\ldots\ldots\ldots (2)$$

Where:

$\Sigma a_{ij}P_k^p$ = Cost of domestic factors at private prices;

$Y_i^pP_i^p$ = Revenue at private prices;

$\Sigma a_{ij}P_j^p$ = Cost of tradable inputs at private prices.

PCR < 1 indicates that the product is highly competitive given current technologies, inputs and output prices and policy and that entrepreneurs are earning excess profits. It shows that the entrepreneur can pay for all the domestic factors including bank loan and its interest with the operation still remaining competitive. The PCR > 1 implies entrepreneurs are making losses, that is after paying for the domestic factors, the operation is no more competitive PCR = 1 indicates the breakeven point.

To measure the comparative advantage at each stage of cocoa value chain (Objective 3).

Here, Social Profitability (SP), Domestic Resource Cost (DRC) and Social Cost Benefit ratio (SCB) were used to measure comparative advantage.

4.5.1.3. Social Profitability (SP) – The social profit reflects social opportunity costs and it measures efficiency and comparative advantage. Here, the sum of the cost of tradable inputs at social price and cost of domestic factors at social price is subtracted from the revenue at social price. Hence, Social profit = Revenue at social price – (Cost of the tradable inputs at social price + Cost of domestic factors at social price).

$$SP = \sum Y_i^s P_i^s - (\sum a_{ij} P_j^s + \sum a_{ij} P_k^s) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where:

SP = Social profit; $\Sigma a_{ij}P_j^s$ = Cost of tradable inputs at social price;

$\Sigma Y_i^sP_i^s$ = Revenue at social price; $\Sigma a_{ij}P_k^s$ = Cost of domestic factors at social price.

A positive social profit indicates that the system uses scarce resources efficiently and contributes to national income (Nelson and Panggabean, 1991; Keyser, 2006). Hence, the commodity has a comparative advantage. A negative social profit indicates social inefficiencies and suggests that production at social costs exceeds the costs of import, thus indicating that the sector cannot sustain its current output without government intervention at the margin. The cost of domestic production exceeds the cost of importing at the margin.

4.5.1.4. Domestic Resource Cost (DRC) – The DRC indicates how much domestic resources are needed to generate an additional value of export revenue. It is a measure of relative efficiency of domestic production by comparing the opportunity of domestic production to the

value generated by the product (Tsakok, 1990). It is calculated as the ratio of the cost of domestic factors at social price to the difference between the revenue at social price and cost of tradable inputs at social price.

$$DRC = \frac{\sum a_{ij} P_k^{\,s}}{\sum Y_i P_i^{\,s} - \sum a_{ij} P_j^{\,s}} \quad \ldots\ldots\ldots (4)$$

Where:

$\Sigma a_{ij}P_k^{\,s}$ = Cost of domestic factors at social prices;

$\Sigma Y_i P_i^{\,s}$ = Revenue at social prices;

$\Sigma a_{ij}P_j^{\,s}$ = Cost of tradable inputs at social prices.

DRC of less than unity indicates efficiency of producing the goods domestically. It shows that the value of domestic resources used in production is lower than the value added. This implies an efficient use of domestic resources in production and that production is socially profitable. DRC of more than unity indicates inefficiency in domestic production while a DRC of unity indicates a balance, in which case the country neither gains nor loses foreign exchange through domestic production.

4.5.1.5. Social Cost Benefit (SCB)

The SCB indicates how much greater the value of output created relative to the associated cost of production estimated in social prices. It is calculated as the ratio of the sum of tradable input costs and domestic factor costs to the revenue, all valued at social price.

$$SCB = \frac{\sum a_{ij} P_j^{\,s} + \sum a_{ij} P_k^{\,s}}{\sum Y_i P_i^{\,s}} \quad \ldots\ldots\ldots\ldots (5)$$

Where:

$\Sigma Y_i P_i^{\,s}$ = Revenue at social price;

$\Sigma a_{ij}P_k^{\,s}$ = Cost of domestic factors at social price;

$\Sigma a_{ij}P_j^{\,s}$ = Cost of tradable inputs at social prices.

A ratio less than one indicates that an activity is profitable and the difference between the ratio and one indicates the rate of returns on an investment in this activity. However, a ratio that is greater than one shows that the activity is not profitable (Monke and Pearson, 1989).

To measure the effects of policies on competitiveness and comparative advantage at each stage of cocoa value chain (Objective 4). Here, protection coefficients and policy transfers were used to measure the effects of government policies at each stage of cocoa value chain. The protection coefficients used were Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Profitability Coefficient (PC) while the policy transfers used were Output transfer, Tradable input transfer, Factor transfer and Profit (Net) transfer.

4.5.1.6. Nominal Protection Coefficient (NPC).

The NPC is a measure of the extent to which domestic price policy protects the domestic producer from the direct input of foreign market (Tsakok, 1990). It is the ratio of domestic price to a comparable world (social) price.

$$NPC_o = \frac{P_o^{\ p}}{P_o^{\ s}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

Where:

P_o^p = Private (domestic) price on output; P_o^s = Social (world/border) price on output.

Nominal Protection Coefficient on output (NPCo) measures the effect of policy intervention on output prices. NPCo less than one indicates that domestic farm gate price is less than the international price for output and that policies were decreasing the market price. Hence, there is negative protection on output and this confirms the presence of taxes or any other policy that is detrimental to the realization of the maximum output. NPC greater than one indicates the presence of subsidy. It shows that the private price of the goods has been kept higher than the border price. This means that government policies provide incentives to the local producers of the goods thus enabling the producer to realize the maximum output.

4.5.1.7. Effective Protection Coefficient (EPC)

EPC is defined as the ratio of the difference between the revenue in private price and cost of tradable inputs in private price to the difference between the revenue in social price and the cost of tradable inputs in social price. Hence:

$$EPC = \frac{Y_i^{\,p} P_j^{\,p} - \sum a_{ij} P_j^{\,p}}{Y_i^{\,s} P_i^{\,s} - \sum a_{ij} P_J^{\,s}} \quad \ldots\ldots\ldots (7)$$

Where:

$Y_i^pP_i^p$ = Revenue in private price; $\Sigma a_{ij}P_j^p$ = Cost of tradable inputs in private price;

$Y_i^sP_i^s$ = Revenue in social price; $\Sigma a_{ij}P_j^s$ = Cost of tradable inputs in social price;

An EPC greater than one suggests that government policies provide positive incentives to producers and hence the production of such goods are encouraged through introduction of subsidies and reduction or an outright withdrawal of tax. EPC that is less than one implies producers are not protected through policy intervention, hence producers face high taxation. This normally occurs when government wants to discourage the production of some harmful commodities, especially tobacco products.

4.5.1.8. Profitability Coefficient (PC)

The PC shows the impact of all transfers on profitability. It is an extension of the EPC to include factor transfers. It measures the incentive effects of all policies and thus serves as a proxy for the net policy transfer. PC is the ratio of private profit to social profit, which is D/H

$$PC = \frac{Y_i^{\,p} P_i^{\,p} - (\sum a_{ij} P_i^{\,p} + \sum a_{ij} P_k^{\,p})}{Y_i^{\,s} P_i^{\,s} - (\sum a_{ij} P_i^{\,s} + \sum a_{ij} P_k^{\,s})} \quad \ldots\ldots\ldots\ldots (8)$$

Where:

$Y_i^pP_i^p$ = Revenue in private price;

$Y_i^sP_i^s$ = Revenue in social price;

$\Sigma a_{ij}P_j^s$ = Cost of tradable inputs in social price;

$\Sigma a_{ij}P_k^p$ = Cost of domestic factors in private prices;

$\Sigma a_{ij}P_j^p$ = Cost of tradable inputs in private price;

$\Sigma a_{ij}P_k^s$ = Cost of domestic factors in social price.

PC > 1 = Policy transfer income into the production system;

PC < 1 = Policy transfer income away from the production system.

4.5.1.9. Output Transfer

Output transfer is the difference between the revenue valued at the actual market price of a commodity and the revenue valued at the social price.

$$\text{Output transfer} = Y_iP_i^p - Y_iP_i^s \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (9)$$

Where:

$Y_iP_i^p$ = Revenue valued at private prices;

$Y_iP_i^s$ = Revenue valued at social prices.

If the output transfer is positive, then the private revenue exceeds the social revenue. This indicates that government is subsidizing output prices. However, if the output transfer is negative, social revenues are greater than private revenues. This means that government is taxing instead of subsidizing the producers.

4.5.1.10. Tradable-Input Transfer

The Tradable-input transfer is the difference between the total cost of tradable inputs valued at private prices and the total cost of the same inputs valued at social prices.

$$\text{Tradable input transfer} = \Sigma a_{ij}P_j^p - \Sigma a_{ij}Pj^s \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (10)$$

Where:

$\Sigma a_{ij}P_j^p$ = Total cost of tradable inputs valued at private prices;

$\Sigma a_{ij}Pj^s$ = Total cost of tradable inputs valued at social prices.

If the Tradable-input transfer is negative, this shows that the private costs of tradable inputs are lower than the social costs. This indicates that government is subsidizing the cost of inputs. Positive tradable-input transfer indicates that the private costs of tradable inputs are higher than the social costs, with the connotation that government is taxing the producers.

4.5.1.11. Factor Transfer

Factor transfer is the difference between the total costs of all factors of production (such as land, labour and capital) valued at private price and the social costs of these factors.

$$\text{Factor transfer} = \Sigma a_{ij}P_k^p - \Sigma a_{ij}P_k^s \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (11)$$

Where:

$\Sigma a_{ij}P_k^p$ = Total cost of domestic factors valued at private price;

$\Sigma a_{ij}P_k^s$ = Total cost of domestic factors valued at social price.

Negative factor transfer shows that domestic factors of production are subsidized; hence the costs of domestic factors at private price are lower than the cost of domestic factors at social price. However, positive factor transfer indicates that government taxes factors of production because the costs of domestic factors at private price are higher than the cost of domestic factors at social price.

4.5.1.12. Profit (Net) transfer

Profit transfer is the difference between the output transfer and the sum of the tradable input transfer and factor transfer.

$$\text{Profit Transfer} = Q_i^p - Q_i^s - (\Sigma a_{ij}P_j^p - \Sigma a_{ij}Pj^s + \Sigma a_{ij}P_k^p - \Sigma a_{ij}P_k^s) \quad \ldots\ldots(12)$$

Where:

$Q_i^p - Q_i^s$ = Output transfer;

$Q_i^p - Q_i^s$ = Output transfer;

$\Sigma a_{ij}P_j^p - \Sigma a_{ij}Pj^s$ = Tradable input transfer;

$\Sigma a_{ij}P_k^p - \Sigma a_{ij}P_k^s$ = Factor transfer.

If profit transfer is positive, then the overall effects of all policies on input and output prices are in favour of the producers. However, if the profit transfer is negative, this indicates that policies and market failures are working to the detriment of the producers.

The competitiveness, comparative advantage and the effects of policies on the entire cocoa value chain was also carried out with the use of PAM spreadsheet software. The essence of using PAM spreadsheet software is to validate the results obtained from manual computation and see whether the two results (that is, the one obtained manually and the one obtained from PAM spreadsheet software) would follow the same trend.

4.5.1.13. Sensitivity Analysis

Due to the static nature of the result of the PAM, sensitivity analysis was used to determine the earning capacity of the investment at each stage of the value chain with changes in dependent and independent factors. Sensitivity analysis is a way to predict the outcome of a decision if a situation turns out to be different compared to the key predictions. Hence, it is very useful when attempting to determine the impact the actual outcome of a particular variable will have if it differs from what was previously assumed. In this study, sensitivity analysis was carried out at production, marketing and processing levels and the variables that were varied were domestic price, border price and exchange rate.

4.5.2 Partial Equilibrium Model (PEM)

Partial equilibrium is an economic theory used for analyzing very small markets or individual products (Ronnie and Alan, 2002). This theory requires economists to ignore all markets outside of the one being studied, and to assume that changes in that particular market will have no effect outside of that market, and vice versa (Tsakok, 1990). Hence, Partial equilibrium analysis

consists of the analysis of a particular market in isolation, without attention to how events in that market may affect those in other markets, and these may in turn affect the situation in the original market (Tsakok, 1990). According to Ronnie and Alan (2002), PEM concentrates on a particular subsection of the economy, with all other variables being treated as exogeneous to the model. PEM analyzes the welfare effects of import policies by comparing the world market (or border) price and the prices prevailing in the domestic market in the policy period.

Objective five of this study, which determines the effect of price distortion on consumer's and producer's welfare was analysed with PEM as proposed by Luta and Scandizzo (1980). Distortion here is the variation between the domestic price and the international (border) price. These two prices may differ because of market failures as well as policy interventions. Market failure is the inability of markets to operate properly due to factors such as monopolistic elements, asymmetric information, transaction costs, externalities, and to a certain extent uncertainty and risk (Mashinini *et al*, 2005). The impact of price changes on the welfare of consumers and producers were evaluated based on the following measures as earlier utilized by Mashinini *et al*, (2005).

1. Net social loss in production (NSLp)

$NSLp = 0.5*e_s*t\hat{}2*V'$ ……. (13)

2. Net social loss in consumption (NSLc)

$NSLc = 0.5*n_d*t'\hat{}2*W'$…….(14)

3. Welfare gain of producers (Gp)

$Gp = t'V' - NSL_p$ ……(15)

4. Welfare gain of consumers (Gc)

$Gc = -(t'W' + NSL_c)$……... (16)

Where:

e_s = Price elasticity of supply;

n_d = Price elasticity of demand;

t = Implicit tarrif (NPC-1);

NPC = Nominal Protection Coefficient;

t' = tPb/Pd;

Pd = Domestic price for cocoa;

Pb = Border price for cocoa;

V' = Value of domestic production at domestic price (Pd*dom.prod.);

W' = Value of domestic consumption at domestic price (Pd*total supply).

Net social loss in production (NSLp): This is the loss to the society due to inefficiency in domestic production. The inefficiency in production may be due to sub-optimal allocation of

resources due to rise in prices and the rise in price might be as a result of imposition of import restrictions on raw materials (Perali, 2003). Net social loss in production can also occur in a situation of free trade (that is, a trade without any restriction to importation) between two countries. In such a situation, if the border price is far below the domestic price, this will force the domestic price down and the local producer may not be able to cope well with the development, thus reducing their production efficiency and in some cases, it may even lead to an outright closure of production.

Net social loss in consumption (NSLc): This is the loss to the society due to inefficiency in domestic consumption. The inefficiency arises due to low consumption as a result of higher prices of commodities (probably due to import restriction of such a commodity). The consumer pays a higher price for such a commodity thus reducing the efficiency of consumption of such a commodity.

Welfare gain of producers (Gp): This is the gain from producer trade. It is the amount by which producer's revenue exceeds variable production costs; hence it is the benefit accruing to producers in the market from selling goods. It is the amount producers actually receive for their output minus the minimum amount they would have willingly accepted for those units. In a demand-supply curve, welfare gain of producers is the area above supply curve up to the price received. The estimate of producer's gain depends on the quality of the estimated supply slope. It is expected that the higher the supply elasticity the higher the producer's welfare gain (Perali, 2003). If actual domestic price is higher than the estimated free trade price, then, producers are gaining but if the actual domestic price is lower than the estimated free trade price, producers are losing.

Welfare gain of consumers (Gc): This is the gain from consumer trade. It is the amount by which the value of consumer's purchases exceeds what is actually paid for the goods, hence it is the benefit accruing to consumers in the market from buying goods. In a demand-supply curve, welfare gain of consumers is the area under demand curve down to the price paid. The estimate of consumer's gain depends on the quality of the estimated demand slope, it is expected that the higher the demand elasticity, the higher the consumer's welfare gain (Perali, 2003). If estimated free trade price is higher than actual domestic price then consumers are gaining and vice versa.

CHAPTER FIVE

RESULTS AND DISCUSSION

This chapter discusses the socio-economic characteristics of the actors in the cocoa VC; stages and activities in cocoa VC; competitiveness and comparative advantage at each stage of cocoa VC; effects of policies on competitiveness and comparative advantage at each stage of cocoa VC and the effects of price distortions on producers' and consumers' welfare.

5.1. Socio-economic characteristics of the actors in cocoa value chain

This sub-section deals with the demographic and socio-economic characteristics of the actors in cocoa value chain. The main actors in cocoa value chain are cocoa farmers, cocoa marketers and cocoa processors.

5.1.1. Socio-economic characteristics of cocoa farmers

The demographic and socio-economic factors of cocoa farmers considered in this study include age, gender, educational status, marital status, religious status, household size, association membership, farming experience, farm size and age of cocoa farm.

5.1.1.1. Age of cocoa farmers

Results in Table 5.1 showed that the cocoa farmers that were between 41-50 years of age accounted for the highest proportion in both Owner-managed production management system (38.8 percent) and Leased/Rented production management system (50.0 percent). Conversely, the cocoa farmers that were between the age bracket 51-60 years of age constituted the highest proportion (29.3 percent) in Sharecropping production management system. The mean age for all cocoa farmers was 48.4 years while the Standard Deviation (SD) was ±11.50. About 38.0 percent of all the farmers interviewed had their age below the mean age, while about 50.0 percent had their age above the mean age of 48.4 years. Also, about 12.0 percent of the farmers fell within the mean age. Hence, there were older farmers than younger farmers in the study area. This finding is in line with that of Oluyole *et al*, (2010) which found that majority of cocoa farmers in Ondo State were relatively old. This may have negative impact on the farm size since young people are stronger and are expected to cultivate larger-sized farm than older respondents. It might also have negative implication on the productivity of the cocoa farmers.

Table 5.1. Distribution of cocoa farmers by age

Age (years)	Owner-managed Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
≤ 30	9 (4.9%)	0 (0%)	0 (0%)	9 (3.6%)
31-40	41 (22.4%)	10 (38.5%)	11 (26.8%)	62 (24.8%)
41-50	71 (38.8%)	13 (50.0%)	10 (24.4%)	94 (37.6%)
51-60	36 (19.7%)	3 (11.5%)	12 (29.3%)	51 (20.4%)
61-70	21 (11.5%)	0 (0%)	7 (17.1%)	28 (11.2%)
>70	5 (2.7%)	0 (0%)	1 (2.4%)	6 (2.4%)
Total	183 (100%)	26 (100%)	41 (100%)	250 (100%)
Mean	48.07	43.46	52.68	48.35
SD	11.7829	6.8948	11.2282	11.4956

Source: Field survey, 2014.

5.1.1.2 Gender of cocoa farmers

Findings from Table 5.2 showed that there were more male cocoa farmers than female cocoa farmers in Owner-managed (76.0 percent), Rented/Leased (84.6 percent) and Sharecropping (87.8 percent) production management systems. In the pooled data, male farmers were also more (78.8 percent) than their female counterpart (21.2 percent). This showed that majority of the cocoa farmers in the study area was male. The dominance of the male over the female may be attributed to the fact that male children are the first to be considered in the inheritance of farm land in the study area (Awolala, 2006). Also, females are more involved in off-farm activities such as buying and selling of farm produce, storage of crops and packaging of farm produce while their male counterparts are more involved in tree crop production most especially cocoa in the study area. This is in consonance with findings by Adamu *et al* (2006), who found that majority of rural women engaged in off-farm activities such as packing of farm produce, buying and selling of farm produce, storage of crops among others. Also cocoa production requires a number of routine management practices that are considered too strenuous for the females to cope with.

Table 5.2. Distribution of cocoa farmers by gender

Gender	Owner-managed Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
Male	139 (76.0%)	22 (84.6%)	36 (87.8%)	197 (78.8%)
Female	44 (24.0%)	4 (15.4%)	5 (12.2%)	53(21.2%)
Total	183 (100.0%)	26 (100.0%)	41(100.0%)	250 (100.0%)

Source: Field survey, 2014.

5.1.1.3 Marital status of cocoa farmers

It is observed in Table 5.3 that majority of the respondents in the Owner-managed production management system (90.2 percent) and Rented/Leased management system (96.1 percent) as well as all the farmers (100.0 percent) in the Sharecropping production management system was married. Furthermore, in the pooled data, 92.4 percent of the respondents were married. This showed that most of the farmers in the study area were married. The large percentage of married respondents connoted that marriage is a highly cherished institution by the people of the study area. Marriage leads to increase in household size which implies that there is the likelihood that there could be more family labour available to farming households. The finding is in consonance with the findings of Oduwole (2004) who reported that majority of the cocoa farmers in Ondo State were married.

Table 5.3. Distribution of cocoa farmers by marital status

Marital Status	Self-owned Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
Single	15 (8.20%)	1 (3.9%)	0 (0%)	16 (6.4%)
Married	165 (90.2%)	25 (96.1%)	41 (100.0%)	231 (92.4%)
Widow	3 (1.6%)	0 (0%)	0 (0%)	3 (1.2%)
Total	183 (100.0%)	26 (100.0%)	41(100.0%)	250 (100.0%)

Source: Field survey, 2014.

5.1.1.4 Educational status of cocoa farmers

Results in Table 5.4 showed that respondents with formal education were more (83.6 percent) in the Owner-managed production management system. In the Rented/Leased production management system, the farmers with formal education constituted the greater proportion (84.6 percent) while in the Sharecropping production management system, the greater percentage (65.8 percent) of the respondent farmers was formally educated. In the pooled data, the respondent farmers with formal education (80.8 percent) were more than those with no formal education. This showed that most of the farmers in the study area had formal education. Education is a form of human capital; hence it has been reported to positively impact farmer's ability to take good and well informed production decisions (Oluyole, 2005).

Table 5.4. Distribution of cocoa farmers by educational status

Educational Status	Owner-managed Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
No formal education	30 (16.4%)	4 (15.4%)	14 (34.2%)	48 (19.2%)
Primary school education	54 (29.5%)	2 (7.7%)	15 (36.6%)	71 (28.4%)
Secondary school education	55 (30.1%)	16 (61.5%)	11 (26.8%)	82 (32.8%)
Tertiary institution education	44 (24.0%)	4 (15.4%)	1 (2.4%)	49 (19.6%)
Total	183 (100.0%)	26 (100.0%)	41(100.0%)	250 (100.0%)

Source: Field survey, 2014.

5.1.1.5 Household size of cocoa farmers

It can be observed in Table 5.5 that the household size 5-7 persons had the highest proportion of the farmers in both the Owner-managed production management system (39.3 percent) and Sharecropping production management system (39.0 percent). However, the household size group that of more than 10 persons (>10) had the highest proportion of the farmers in Rented/Leased production management system (43.3 percent). The household group with the highest proportion of farmers (38.8 percent) in the pooled data was household size group 5-7. The mean household size for the pooled data was about seven members per household (7±3.61). Household size can have great implications for labour supply in farm work. A large household is expected to have more labour for the cultivation of larger farm sizes. This is in consonance with findings of Awolala (2006) that cocoa farmers with large household size are capable of adjusting to sudden changes in labour supply at peak periods of labour demand.

Table 5.5. Distribution of cocoa farmers by household size

Household Size	Owner-managed Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
≤ 4	43 (23.5%)	5 (19.2%)	13 (31.7%)	61 (24.4%)
5-7	72 (39.3%)	9 (34.6%)	16 (39.0%)	97 (38.8%)
8-10	41 (22.4%)	1 (3.9%)	8 (19.5%)	50 (20.0%)
>10	27 (14.8%)	11 (42.3%)	4 (9.8%)	42 (16.8%)
Total	183 (100%)	26 (100%)	41 (100%)	250 (100%)
Mean	7.14	7.54	6.51	7.06
SD	3.8011	3.1142	2.9506	3.6070

Source: Field survey, 2014.

5.1.1.6 Socio-economic group membership of cocoa farmers

The result in Table 5.6 revealed that majority (89.6 percent) of farmers in Owner-managed production management system belonged to socio-economic groups. Also, in Sharecropping production management system, 97.6 percent of the respondent farmers was members of one socio-economic groups. However, all the farmers in Rented/Leased production management system belonged to socio-economic groups. In the pooled data, 90.0 percent of the total respondent farmers belonged to socio-economic groups. The socio-economic groups that were predominant among the cocoa farmers in the study area are Cooperative societies, Cocoa Farmers Association of Nigeria (CFAN), Cocoa Association of Nigeria (CAN) and Cocoa Growers Association of Nigeria (COGAN). Out of all these, the socio-economic group that had the highest number of members (according to Table 5.6) was Cooperative society. This is followed by Cocoa Farmers Association of Nigeria and Cocoa Association of Nigeria. Cocoa Growers Association of Nigeria had the least number of memberships. Farmers that are members of socio-economic groups are more exposed to information that can assist in improving their productivity. They are also in a better position to disseminate agricultural information. This is in consonance with findings by Omo-Erighe (2004) that farmers in socio-economic group are potential innovators; therefore, information on modern farm practices would be easily disseminated to other farmers through them.

Table 5.6. Distribution of cocoa farmers by socio-economic group membership

Socio-economic groups	Owner-managed Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
Cooperatives	55 (30.1%)	9 (34.7%)	21 (51.2%)	85 (34.0%)
CFAN	52 (28.4%)	7 (26.9%)	11 (26.8%)	70 (28.0%)
CAN	50 (27.3%)	5 (19.2%)	6 (14.6%)	61 (24.4%)
COGAN	7 (3.8%)	5 (19.2%)	2 (5.0%)	14 (5.6%)
Non-member	19 (10.4%)	0 (0%)	1 (2.4%)	20 (8.0%)
Total	183 (100.0%)	26 (100.0%)	41(100.0%)	250 (100.0%)

Source: Field survey, 2014.

5.1.1.7 Farming experience of cocoa farmers

The distribution pattern of farming experience of farmers is shown in Table 5.7. The result of the analysis revealed that the highest proportion (31.1 percent) of the respondents in Owner-managed production management system had farming experience of between 11 and 20 years. The highest proportion (38.5 percent) of the respondent farmers in Rented/Leased production management system was recorded by farmers having 1 and 10 years of farming experience. The highest proportion (29.3 percent) of the respondent farmers in Sharecropping production management system had between 31 and 40 years of farming experience. However, the highest proportion (30.4 percent) of the pooled data had between 11 and 20 years of farming experience. The overall mean farming experience for all the farmers was 23 years with a standard deviation of ±14.07 showing that cocoa farmers in the study area were highly experienced and this could impact positively on the productivity of the farmers. This in line with Akanni and Dada (2012) that most cocoa farmers in Ondo State had high number of years of experience in cocoa farming.

Table 5.7. Distribution of cocoa farmers by farming experience

Farming Experience (years)	Owner-managed Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
≤ 10	43 (23.5%)	10 (38.5%)	2 (4.9%)	55 (22.0%)
11-20	57 (31.1%)	8 (30.7%)	11 (26.8%)	76 (30.4%)
21-30	44 (24.0%)	6 (23.1%)	10 (24.4%)	60 (24.0%)
31-40	20 (10.9%)	2 (7.7%)	12 (29.3%)	34 (13.6%)
> 40	19 (10.5%)	0 (0%)	6 (14.6%)	25 (10.0%)
Total	183 (100%)	26 (100%)	41 (100%)	250 (100%)
Mean	22.9	16.8	30.30	23.46
SD	13.9813	9.3779	14.4879	14.0704

Source: Field survey, 2014.

5.1.1.8. Farm size of cocoa farmers

Table 5.8 showed the farm size distribution of cocoa farmers. It was revealed in the table that majority of the farmers had maximum of 5 hectares of cocoa farm. In Owner-managed management system, 81.4 percent of the respondent farmers had maximum of 5 hectares; in Rented/Leased management system, 73.1 percent of the farmers had maximum of 5 hectares while in sharecropping management system, 70.8 percent of the farmers did not have more than 5 hectares. Also, in the pooled data, 78.8 percent of the farmers had maximum of 5 hectares. The table also showed that the mean farm size for all farmers was 4.04 hectares with standard deviation of ±4.0525. Hence, a substantial proportion of cocoa farmers in the study area are small scale farmers (having 5 hectares of farm size and below). This is a typical characteristic of Nigerian farmers. Most Nigerian farmers are small scale farm holders and this has been the bane of agricultural development in Nigeria. The result is in line with findings by Ogunleye and Oladeji (2007) that 80.0 percent of cocoa farmers in Osun State had less than 6 hectares of farm. One of the causes of small holding farms especially in the study area is the use of crude implements such as hoes and cutlass and lack of technical know-how that may be required to cultivate large farms (Akanni and Dada, 2012).

Table 5.8. Distribution of cocoa farmers by farm size

Farm Size (Ha)	Owner- managed Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
≤ 2	63 (34.4%)	5 (19.2%)	14 (34.2%)	82 (32.8%)
2.1-5	86 (47.0%)	14 (53.9%)	15 (36.6%)	115 (46.0%)
5.1-10	27 (14.8%)	7 (26.9%)	12 (29.2%)	46 (18.4%)
10.1-15	3 (1.6%)	0 (0%)	0 (0%)	3 (1.2%)
> 15	4 (2.2%)	0 (0%)	0 (0%)	4 (1.6%)
Total	183 (100%)	26 (100%)	41 (100%)	250 (100%)
Mean	4.20	4.19	3.79	4.04
SD	4.7111	2.2804	1.9917	4.0525

Source: Field survey, 2014.

5.1.1.9 Age of cocoa farm

The result of the distribution of farms by age is shown on Table 5.9. The table showed that about 32.2 percent of the farms in Owner-managed production management system were above 30 years old; about 19.2 percent of the farms in Leased/Rented production management system had more than 30 years of age. The mean age and the standard deviation for all the farms were 26.71 years and ±4.0525 respectively. About 38.8 percent of the respondents' farms were above 30 years of age. This connoted that a substantial proportion of the farms was too old and was due for rehabilitation. According to Oduwole (2004), diminishing returns sets in the yield of cocoa tree at the age of 25 years. Hence, after this age, the productivity of cocoa tree starts to decrease and will need to be replaced with the younger cocoa seedlings. Oduwole (2004) also identified ageing cocoa farms as one of the factors responsible for the decline in cocoa production in South Western Nigeria. It was further by Oduwole (2004) observed that many farms were over 40 years old and such farms constitute a considerable proportion of the cocoa farms in Nigeria. However, in another study conducted by Daramola *et al.* (2003), it was found out that most cocoa farms in Ondo and Osun States were very old with low productivity while farms in Cross River State were relatively younger and mostly in their productive phase.

Table 5.9. Distribution of cocoa farmers by age of farm

Age of farm (years)	Owner-managed Production Mgt system	Leased/Rented Production Mgt system	Sharecropping Production Mgt system	Pooled data
≤ 10	58 (31.7%)	8 (30.8%)	5 (12.2%)	71 (28.4%)
11-20	43 (23.5%)	5 (19.2%)	0 (0%)	48 (19.2%)
21-30	23 (12.6%)	8 (30.8%)	3 (7.3%)	34 (13.6%)
31-40	19 (10.4%)	2 (7.7%)	16 (39.0%)	37 (14.8%)
41-50	25 (13.7%)	3 (11.5%)	13 (31.7%)	41 (16.4%)
>50	15 (8.1%)	0 (0%)	4 (9.8%)	19 (7.6%)
Total	183 (100%)	26 (100%)	41 (100%)	250 (100%)
Mean	24.84	21.04	38.63	26.71
SD	18.6156	14.4596	15.2312	18.4752

Source: Field survey, 2014.

5.1.2 Socio-economic characteristics of cocoa marketers

5.1.2.1. Age of cocoa marketers

Table 5.10 showed the age distribution of cocoa marketers. The table showed that majority of the LBAs (38.2%), LiBAs (59.0%) were within the age range 41-50 years while that of exporters (62.5%) were within the age range 51-60 years. However, in the pooled data, the highest proportion of the marketers (43.1 percent) was within the age range 41-50 years. The mean age for cocoa marketers in the pooled data was 44.7 years and the standard deviation was ±8.99 years. About 50.0 percent of all the marketers had their age below the mean age, while about 40.2 percent had their age above the mean age. Meanwhile, about 8.8 percent of the marketers fell within the mean age. Hence, there were younger marketers than their older counterparts in the study area. It can therefore be said that cocoa marketers in the study area are still in their active age. This is a good pointer to the sustainability of the business and this can impact positively on the productivity of the marketers as younger marketers will have more vigour to work than the older ones thus promoting enhanced productivity.

Table 5.10. Distribution of cocoa marketers by age

Age (years)	Local Buying Agents	Licensed Buying Agents	Exporters	Pooled data
≤ 30	5 (9.1%)	1 (2.5%)	0 (0%)	6 (5.9%)
31-40	19 (34.5%)	9 (23.1%)	3 (37.5%)	31 (30.4%)
41-50	21 (38.2%)	23 (59.0%)	0 (0%)	44 (43.1%)
51-60	6 (10.9%)	3 (7.7%)	5 (62.5%)	14 (13.7%)
>60	4 (7.3%)	3 (7.7%)	0 (0%)	7 (6.9%)
Total	55 (100%)	39 (100%)	8 (100%)	102 (100%)
Mean	48.18	46.23	47.5	44.69
SD	9.2718	8.4057	8.8479	8.9862

Source: Field survey, 2014.

5.1.2.2. Gender of cocoa marketers

The result of gender distribution of cocoa marketers is shown on Table 5.11. It is shown on the table that there were more male cocoa marketers than their female counterparts among both LBAs (78.2 percent) and LiBAs (87.2 percent). The table also revealed that all the exporters were males. Among all cocoa marketers, male marketers were also more (83.3 percent) than their female counterparts (16.7 percent). This showed that majority of the cocoa marketers in the study area was males. The finding is in line with that of Oluyole and Usman (2006) that a substantial proportion (81.3%) of cocoa marketers in Ogun State was males. The larger proportion of males relative to females may probably be owing to the fact that the job involves travelling to different locations to buy cocoa and not many women will be able to do this because of their other obligations at the home front.

Table 5.11. Distribution of cocoa marketers by gender

Gender	Local Buying Agents	Licensed Buying Agents	Exporters	Pooled data
Male	43 (78.2%)	34 (87.18%)	8 (100%)	85 (83.3%)
Female	12 (21.8%)	5 (12.8%)	0 (0%)	17 (16.7%)
Total	55 (100%)	39 (100%)	8 (100%)	102 (100%)

Source: Field survey, 2014.

5.1.2.3. Marital status of cocoa marketers

Table 5.12 revealed that 85.5 percent of the LBAs was married while 92.3 percent of the LiBAs was also married. All the exporters were married. Also, 89.2 percent of all the marketers was married and 7.8 percent was single. Hence, there were more married cocoa marketers in the study area. Married marketers have the tendency of having larger household size which may be of assistance in the cocoa marketing business.

Table 5.12. Distribution of cocoa marketers by marital status

Marital Status	Local Buying Agents	Licensed Buying Agents	Exporters	Pooled data
Single	7 (12.7%)	1 (2.6%)	0 (0%)	8 (7.8%)
Married	47 (88.5%)	36 (92.3%)	8 (100%)	91 (89.2%)
Divorced	1 (1.8%)	0 (0%)	0 (0%)	1 (1.0%)
Widower	0 (0%)	2 (5.1%)	0 (0%)	2 (2.0%)
Total	55 (100%)	39 (100%)	8 (100%)	102 (100%)

Source: Field survey, 2014.

5.1.2.4. Educational status of cocoa marketers

Results presented in Table 5.13 showed that all the marketers had formal education. Majority (83.6 percent) of the LBAs had post-primary school education while 89.7 percent of the LiBAs had post primary education. All the exporters had tertiary education. In the overall, the marketers with post primary school education constituted 87.2 percent of the entire marketers. This showed that all cocoa marketers in the study area had formal education. This is imperative because cocoa buying activities requires a certain level of formal education for it to be easily and successfully carried out. Education is a form of human capital; hence it can impact positively on the marketer's ability to take good and well informed marketing decisions. Therefore, education can influence the efficiency of cocoa marketers' trading activities.

Table 5.13. Distribution of cocoa marketers by educational status

Educational Status	Local Buying Agents	Licensed Buying Agents	Exporters	Pooled data
Primary school education	9 (6.4%)	4 (10.3%)	0 (0%)	13 (12.7%)
Secondary school education	35 (63.6%)	14 (35.9%)	0 (0%)	49 (48.0%)
Tertiary institution education	11 (20.0%)	21 (53.8%)	8 (100%)	40 (39.2%)
Total	55 (100%)	39 (100%)	8 (100%)	102 (100%)

Source: Field survey, 2014.

5.1.2.5 Marketing experience of cocoa marketers

The distribution pattern of marketers' marketing experience is shown in Table 5.14. The result revealed that the highest proportion (47.3 percent) of the LBAs had marketing experience of between 11 and 20 years, the highest proportion (59.0 percent) of also had between 11 and 20 years of marketing experience. The highest proportion (62.5 percent) of the exporters had between 21 and 30 years of marketing experience. However, the highest proportion (50.0 percent) of all the overall marketers had between 11 and 20 years of marketing experience. Meanwhile, the overall mean marketing experience for all the marketers was 18 years with standard deviation of ±8.34 showing that cocoa marketers in the study area were highly experienced and this could have implications for resource use efficiency in cocoa marketing.

Table 5.14. Distribution of cocoa marketers by marketing experience

Marketing experience (years)	Local Buying Agents	Licensed Buying Agents	Exporters	Pooled data
≤ 10	15 (27.2%)	5 (12.8%)	1 (12.5%)	21 (20.6%)
11-20	26 (47.3%)	23 (59.0%)	2 (25.0%)	51 (50.0%)
21-30	11 (20.0%)	9 (23.1%)	5 (62.5%)	25 (24.5%)
31-40	3 (5.5%)	2 (5.1%)	0 (0%)	5 (4.9%)
Total	55 (100%)	39 (100%)	8 (100%)	102 (100%)
Mean	16.82	19.74	21.88	18.33
SD	8.8089	7.3188	8.3570	8.3362

Source: Field survey, 2014.

5.1.2.6 Association membership of cocoa marketers

The result on Table 5.15 revealed that majority (94.6 percent) of the LBAs belonged to socio-economic group. Also, 97.4 percent of the LiBAs were members of socio-economic group. However, all the exporters belonged to socio-economic groups. In the pooled data, 96.1 percent of the marketers belonged to socio-economic groups. It could be observed from the empirical results that majority of the marketers belonged to associations (Cocoa Association of Nigeria). This may have being so because the marketers in the study area were highly enlightened by virtue of their high level of formal education. Hence, they are aware of the relevance of joining associations. Marketers that are members of socio-economic association are more priviledged to information that can assist in improving their marketing businesses. They are also in a better position to adopt and spread marketing technologies. Apart from this, they also exposed to facilities such as soft loan, subsidized inputs and training.

Table 5.15. Distribution of cocoa marketers by association membership

Association Membership	Local Buying Agents	Licensed Buying Agents	Exporters	Pooled data
Member	52 (94.6%)	38 (97.4%)	8 (100.0%)	98 (96.1%)
Non-member	3 (5.4%)	1 (2.6%)	0 (0%)	4 (3.9%)
Total	55 (100%)	39 (100%)	8 (100%)	102 (100%)

Source: Field survey, 2014.

5.1.3 Socio-economic characteristics of cocoa processors

The cocoa processors considered in this study are black soap, cocoa butter and cocoa powder processors. However, since the cocoa butter processors and cocoa powder processors utilized in this study were corporate organizations (they are not owned by an individual), they do not possess demographic and socio-economic characteristics. Therefore, it is the socio-economic characteristics of only black soap processors that were presented in this report.

5.1.3.1 Age of black soap processors

The result of age distribution of black soap processors is shown on Table 5.16. The table showed that the highest proportion (38.5 percent) of the black soap processors fell within the age range 51-60 years. This was followed by the black soap processors within the age range 41-50 years which was 30.8 percent of the black soap processors. The lowest proportion (11.5 percent) was for the category of black soap processors that was above 70 years of age. The mean age for all the black soap processors was 58 years with standard deviation of ±11.4 years. Hence, most black soap processors in the study area are in their middle age in which case they still have the required strength to process soap. However, youths were completely absent in the enterprise. This was revealed on Table 5.16 in which there was no respondent falling in the age group 40 years and below. This result is in line with the findings of Oluyole and Adeogun (2005) which found that youths are not involved in black soap production.

Table 5.16. Distribution of black soap processors by age

Age (years)	Frequency	Relative Frequency
≤ 40	0	0
41-50	16	30.8
51-60	20	38.5
61-70	10	19.2
> 70	6	11.5
Total	52	100.0
Mean	58	
SD	11.39	

Source: Field survey, 2014.

5.1.3.2 Gender of black soap processors

Table 5.17 revealed that all the sampled black soap processors were females. Hence, females are mostly involved in black soap processing in the study area. Black soap processing is a kind of processing that does not require much strength for it to be carried out. Hence, women can carry out the process with ease. The result is in line with that reported by Oluyole and Adeogun (2005) which discovered that majority of the black soap processors in Lagelu Local Government Area of Oyo State were females.

Table 5.17. Distribution of black soap processors by gender

Gender	Frequency	Relative Frequency
Male	0	0
Female	52	100.0
Total	52	100.0

Source: Field survey, 2014.

5.1.3.3 Marital status of black soap processors

Table 5.18 showed the result of marital status distribution of black soap processors. The table revealed that majority (92.3 percent) of the processors was married while 7.7 percent was widowed. Hence, majority of the black soap processors in the study area was married. Married processors have the tendency of having larger household sizes which may be of assistance in black soap processing business. In return, the black soap production may be able to provide a means of livelihood for the family.

Table 5.18. Distribution of black soap processors by marital status

Marital status	Frequency	Relative Frequency
Single	0	0
Married	48	92.3
Widowed	4	7.7
Total	52	100.0

Source: Field survey, 2014.

5.1.3.4 Educational status of black soap processors

The result presented on Table 5.19 showed that most (61.5 percent) of the processors had no formal education while 38.5 percent had formal education. Out of all the processors, 30.8 percent had primary education. Meanwhile, 80.0 percent of the processors with formal education had primary school education. None of the respondents had tertiary education. Hence, as the level of education increases, fewer numbers of respondents were involved in black soap processing. The low literacy level of the processors clearly showed the poor human capital development and this suggests that the industry is run by knowledge transferred through indigenous knowledge. This could negatively affect the profitability level of the enterprise.

Table 5.19. Distribution of black soap processors by educational status

Educational level	Frequency	Relative frequency
No formal education	32	61.5
Primary school education	16	30.8
Secondary school education	4	7.7
Tertiary institution education	0	0
Total	52	100.0

Source: Field survey, 2014.

5.1.3.5 Household size of black soap processors

The result of household size disrtibution is shown on Table 5.20. The table showed that the household size group of 1-4 had the highest proportion of processors (61.5 percent). This was followed by the household size group 5-7 persons which had 26.9 percent of the processors. The household size group with the least proportion of processors (3.9 percent) was >10. The mean household size was about 4 and the standard deviation was ±2.30. Household size could have great implications for labour supply for processing work especially where family labour becomes the main source of labour for carrying out the processing activities. The larger the household size, the more labour the household can supply and the less the expenditure on hired labour (Akanni and Dada, 2012).

Table 5.20. Distribution of black soap processors by household size

Household size	Frequency	Relative Frequency
≤ 4	32	61.5
5-7	14	26.9
8-10	4	7.7
> 10	2	3.9
Total	52	100.0
Mean	4.54	
SD	2.2963	

Source: Field survey, 2014.

5.1.3.6 Association membership of black soap processors

Table 5.21 showed the distribution of processors by association membership. The table revealed that 42.3 percent of the processors were members of associations while 57.7 percent were non-members. It could be observed that the proportion of non-member was more than that of member. This might be due to the fact that majority of the processors are not enlightened by virtue of their low level of formal education. Hence, they do not know the relevance of joining associations. This may have negative impact on their productivity as they would not be privileged to receive information that can assist them in improving their productivity.

Table 5.21. Distribution of black soap processors by association membership

Association membership	Frequency	Relative Frequency
Member	22	42.3
Non-member	30	57.7
Total	52	100.0

Source: Field survey, 2014.

5.1.4. Mapping out the stages, actors and activities in cocoa value chain

5.1.4.1. Stages, Activities, Actors and Outputs from each stage in Cocoa Value Chain

Table 5.22 showed the stages, activities, actors and output in cocoa VC. The stages involved in cocoa VC are input supply, on-farm production, post-harvest handling, marketing, processing, exportation and consumption of processed products. The major activities within the chain are input procuring, production and marketing of agro-chemicals and tools, production and marketing of fertilizer and production and distribution of hybrid cocoa seedlings. Next to the procurement of input as an activity is the farm establishment, farm maintenance and management and harvesting. The next activity is the primary processing of the harvested cocoa pods. This includes removal of cocoa beans from cocoa pods, fermentation of cocoa beans, drying of cocoa beans and bagging of dried cocoa beans. The next activity in the cocoa VC is marketing and transportation of the processed cocoa beans from the warehouse to the processing firms or the point of export. Next is the processing of cocoa beans while the last activity is the exportation of cocoa beans, cocoa cake, cocoa powder and cocoa butter.

The major actors in cocoa value chain are input providers such as credit providers (e.g. cocoa buyers, banks, Non-Governmental Organisations (NGOs) and government), agrochemical companies, state institutions (such as Cocoa Development Unit, CDU) and research institutes (such as Cocoa Research Institute of Nigeria, CRIN). The next actor is farmer which could be Owner-managed farm manager, Leased/rented farm manager and Sharecropped farm manager. Next to the farmer is the marketer. Marketers include local buying agents, licensed buying agents and exporters. The next actors are cocoa processing firms (such as Ile-Oluji Cocoa Processing Mill and Tulip Cocoa Processing Company) and exporters. The outputs from each of the stages (that is, production, marketing and processing stages) are cocoa pod, cocoa beans and cocoa pod husks from production stage. Next to the above output is graded cocoa beans from the marketing stage delivered to be exported or crushed while the final outputs are cocoa soap, cocoa powder and cocoa butter from the processing stage. These findings are in line with the findings of Mejabi (2012), that reported that the major stages in cocoa value chain are input supply, production, marketing and processing.

Table 5.22. Nigerian Cocoa Value Chain

Stage of chain	Activities	Actor	Output
Input supply	Input procuring such as: -Granting of credit/soft loans -Production and marketing of agro-chemicals and tools -Production and marketing of fertilizer -Production and distribution of hybrid cocoa seedlings.	Input suppliers such as: -Credit providers e.g. government agencies, banks and cocoa buying agents -Agrochemical companies -Fertilizer companies -State institutions (e.g CDU) -Research Institutes (such as CRIN)	-soft loans -agro-chemicals -fertilizers -hybrid cocoa seedlings
On-farm cocoa production And Post-harvest handling	-farm establishment -farm maintenance and management -harvesting Primary processing of the harvested cocoa pods such as: -removal of cocoa beans from cocoa pods -fermentation of cocoa beans -drying of cocoa beans -parking of dried cocoa beans	Farmers	-cocoa pods -cocoa beans -cocoa pod husk -cocoa beans
Marketing	Marketing of the processed cocoa beans	Marketers such as -local buying agents -licensed buying agents -exporters	Graded cocoa beans delivered to exporters or crushers
Processing	Processing of cocoa beans and cocoa pod husk	-Black soap processors -Cocoa processing firms such as: ▪Ile-Oluji cocoa processing mill ▪Tullip cocoa processing mill	-cocoa cake -cocoa powder -cocoa butter -black soap
Exportation	Exportation of cocoa beans, black soap and cocoa intermediary products such as cocoa powder and cocoa butter	Export houses	-cocoa bean -cocoa powder -cocoa butter -black soap

Source: Field survey, 2014.

5.1.4.2. Key actors in cocoa value chain and their functions

The input suppliers in cocoa VC are responsible for producing, supplying and distributing inputs to farmers. The key input suppliers in cocoa VC are credit providers (such as banks, cooperative societies, cocoa buyers, non-governmental and governmental organisations), agro-allied companies that produce and distribute farm tools and agro-chemicals; fertilizer companies that produce and distributes fertilizers; State governmental institutions such as Cocoa Development Unit (CDU) that distribute cocoa seedlings to farmers and research institutes such as Cocoa Research Institute of Nigeria (CRIN) that carry out research on cocoa and hence produce and distribute hybrid cocoa seedlings to the farmers. Another key actor in the cocoa VC is the farmer. Farmers are responsible for the production of cocoa beans and process the beans to the marketable standard. Farmers could be owner-managed farmers, leased/rented farmers and sharecropped farmers. Marketers are also key actors in cocoa VC. Marketers are responsible for the buying of cocoa beans at the farm gate and transport it to the processing firms or point of export. Cocoa marketers are of three types viz: local buying agents, licensed buying agents and exporters. Local buying agents travel to the farmgate to buy cocoa directly from the farmers. Licensed buying agents buy from local buying agents while exporters buy from local buying agents as well as licensed buying agents. Also, local processing mills can also buy cocoa beans from local cocoa buyers as well as from licensed buying agents. Sometimes, there are some farmers' cooperative societies that buy cocoa beans from their members to sell directly to the LiBAs. The essence of doing this is to avoid exploitation from the local buying agents who buy cocoa at a very low price from the farmers. Farmers' cooperative societies buy cocoa beans from their members and later re-sell it to exporter. With this arrangement, the cooperative society would be able to buy the produce at a reasonable price from the members. Other major actors in the cocoa VC are cocoa processors. They are responsible for the crushing of cocoa beans and turning it to cocoa powder and cocoa butter. These are intermediary products obtained from cocoa beans. The exporting house is also an important actor. This is where cocoa beans and other intermediary products from cocoa beans are exported to be converted to final products such as chocolate, beverages and cosmetics. These findings are in consonance with what was reported by Mejabi (2012) which identified major cocoa VC actors as cocoa producers, cocoa marketers and cocoa processors.

5.1.4.3. Flow and volume mapping in cocoa value chain

Figure 5.1 showed the result of the analysis of cocoa value chain mapping. The analysis showed that out of the total cocoa beans produced by the producer (farmers), 75.0 percent of it was sold to LBAs, 5.6 percent was sold to LiBAs, 16.8 percent was sold to cooperative societies and 2.6 percent was sold to local processors.

Further analysis indicated that out of the 75.0 percent sold to LBAs by the farmers, 29.5 percent of it was sold by the LBAs to the LiBAs thus making the total volume of cocoa beans sold to LiBAs to be 35.1 percent. Local buying agents sold 2.7 percent to local processors and 42.8 percent to exporters (Figure 5.1). Out of 35.1 percent that was bought by LiBAs, 25.5 percent of it was sold to exporters while 9.6 percent of it was sold to local processors thus making the total volume of cocoa bought by local processors to be 14.9 percent. However, all the 16.8 percent of cocoa beans bought by cooperative societies was sold to exporters thus making the total volume of cocoa beans sold to the exporters to be 85.1 percent. Hence, from the entire quantity of cocoa produced in the study area, 85.1 percent was exported while 14.9 percent was utilized by local cocoa processors.

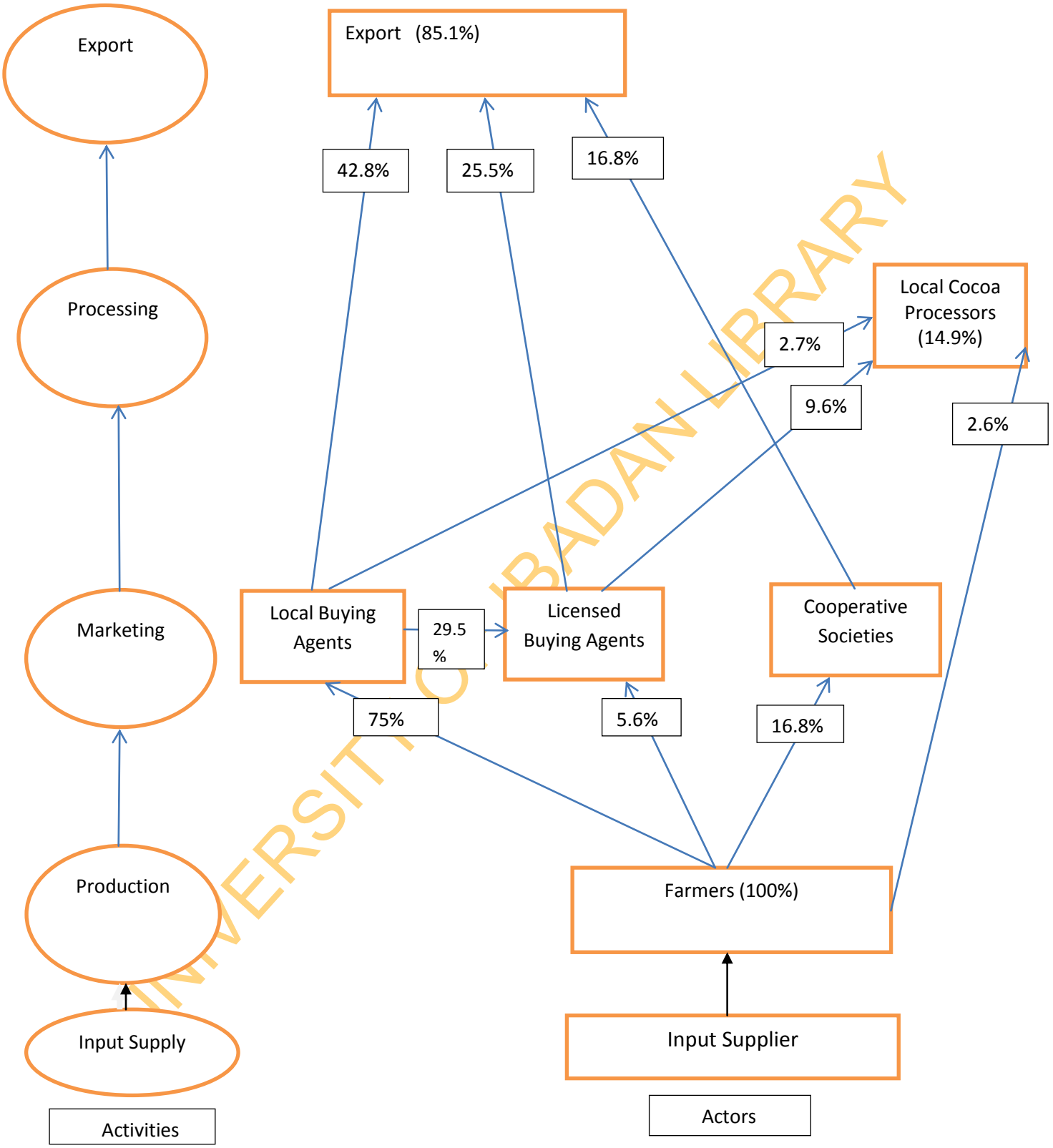


Figure 5.1: Mapping of linkages, actors, activities and volume of cocoa beans in cocoa value chain

Source: Author's construct (2014)

5.2.1. Competitiveness of cocoa cultivation in each of the stages of cocoa value chain

Competitiveness is calculated from the first row of PAM and it indicates the ability of an organization to earn profit at the market price (Rasmikayati and Nurasiyah, 2004). The competitiveness of cocoa production in this study was measured with private profitability and private cost ratio.

5.2.1.1. Private and social budget of cocoa production management systems

Private (market) prices were used for private budget while social (efficiency) prices were used for social budget. The cocoa production management systems being practiced among the farmers in the study area are Owner-managed management system, Leased/Rented management system and Sharecropping management system.

The private and social budget in the three production management systems is shown in Table 5.23. The table showed that the estimated total cost incurred in the Owner-managed production management system was ₦159,886.83 per hectare and ₦123,000.22 per hectare at private and social value, respectively. The components of the cost items included input cost, factor cost and labour cost. The value of input cost was ₦29,132.03 (18.2 percent) and ₦16,415.33 (13.35 percent) at private and social value, respectively. Factor cost was estimated at ₦33,500.44 (21.0 percent) and ₦33,644.12 (27.4 percent) at private and social value respectively while labour cost was ₦97,254.36 (60.8 percent) and ₦72,940.77 (59.3 percent) at private and social value, respectively. It could however be noticed that out of all the three cost items, labour cost constituted the highest percentage (60.8 percent) of cost at private value. This was followed by factor cost (21.0 percent) and the least was input cost (18.2 percent). The high value of labour cost is in agreement with the result of the study conducted by Alam *et al* (2013) who found out that labour cost constituted the highest percentage of costs in cotton production (which is also a tree crop like cocoa) in Taraba State, Nigeria. The average quantity of cocoa beans produced per hectare in Owner-managed production management system was 1.12 tonnes and this gave revenue of ₦444,393.52 and ₦524,160.00 per hectare at private and social value, respectively. Apart from cocoa, the revenue derived from other crops (plantain, oil palm and citrus) grown on the cocoa plantation by the farmers was ₦112,958.34 and ₦135,018.32 per hectare at private and social value, respectively. Hence, the total revenue derived by the farmers in Owner-managed production management system was ₦557,351.86 per hectare and ₦659,178.32 per hectare at private and social price, respectively. A net profit of ₦397,465.03 per hectare and ₦535,178.10

per hectare valued at private and social price, respectively was therefore obtained in the production management system.

Table 5.23 also showed the private and social budget for Leased/Rented production management system. The table indicated that the average total cost incurred in the production at private and social price was ₦129,706.18 and ₦98,582.31, respectively. In the distribution of the costs, the value of the input cost was ₦21,374.80 (16.5 percent) and ₦12,459.74 (12.6 percent) at private price and social price, respectively. Factor costs constituted ₦42,852.81 (33.0 percent) and ₦37,002.81 (37.6 percent) at private and social value, respectively while the share of labour cost was ₦65,478.57 (50.5 percent) and ₦49,119.76 (49.8 percent) at private and social value, respectively. The analysis also showed that labour cost had the highest proportion (50.5 percent at private value) of the total cost. This is also in consonance with Alam *et al* (2013) who found out that labour cost constituted the highest percentage of costs in cotton production in Taraba State, Nigeria. However, the average cocoa output per hectare among the farmers in Leased/Rented production management system was 0.947 tonne. This gave a revenue of ₦354,001.91 and ₦443,196.00 per hectare at private and social value respectively. Apart from the revenue from cocoa, revenue was also generated from other crops grown on the cocoa plantation and this amounted to ₦107,635.91 per hectare and ₦124,116.07 per hectare at private and social value, respectively. A total revenue of ₦461,637.40 and ₦567,312.07 at private and social value respectively was therefore generated per hectare in the management system. Hence, a net profit of ₦331,931.22 per hectare and ₦468,729.76 per hectare was obtained at private and social value in the Leased/Rented production management system.

Private and social budget of Sharecropping production management system was also shown on Table 5.23. The table revealed that the total cost incurred per hectare in the management system is ₦201,400.09 and ₦160,576.95 at private and social value respectively. The share of input cost was ₦53,053.13 (26.3 percent) and ₦34,585.64 (21.5 percent) at private and social value, respectively. Factor cost constituted ₦60,830.83 (30.2 percent) and ₦60,340.44 (37.6 percent) at private and social value, respectively and the value of labour cost was ₦87,516.13 (43.5 percent) and ₦65,650.87 (40.9 percent) at private and social price, respectively. It could also be observed that out of the three cost items, the proportion of labour cost was the highest as it was obtained in the other two management systems. The average cocoa output among the farmers in Sharecropping management system was 1.53 tonnes per hectare and this gave revenue

of ₦535,888.45 per hectare and ₦716,040.00 per hectare at private and social value, respectively from the crop (cocoa). The revenue derived from the other crops within the plantation per hectare was ₦205,342.61 and ₦238,317.03 at private and social value respectively. Therefore, the private and social value for the total revenue per hectare was ₦741,231.06 and ₦954,357.03 respectively. Hence, the net profit of ₦539,830.97 and ₦793,780.08 was obtained at private and social value in the sharecropping production management system.

Table 5.23. Estimated private and social budget of cocoa cultivation management systems

Items	Owner-managed		Leased/Rented		Sharecropping	
	Private price (₦)	Social price (₦)	Private price (₦)	Social price (₦)	Private price (₦)	Social price (₦)
Tradable inputs	29,132.03 (18.2%)	16,415.33 (13.3%)	21,394.80 (16.5%)	12,459.74 (12.6%)	53,053.13 (26.3%)	34,585.64 (21.5%)
Domestic factors	33,500.44 (21.0%)	33,644.12 (27.4%)	42,852.81 (33.0%)	37,002.81 (37.6%)	60,830.83 (30.2%)	60,340.44 (37.6%)
Labour	97,254.36 (60.8%)	72,940.77 (59.3%)	65,478.57 (50.5%)	49,119.76 (49.8%)	87,516.13 (43.5%)	65,650.87 (40.9%)
Grand Total Cost	159,886.83	123,000.22	129,706.18	98,582.31	201,400.09	160,576.95
Revenue from cocoa	444,393.52	524,160.00	354,001.49	443,196.00	535,888.45	716,040.00
Revenue from other crops	112,958.34	135,018.32	107,653.91	124,116.07	205,342.61	238,317.03
Total Revenue	557,351.86	659,178.32	461,637.40	567,312.07	741,231.06	954,357.03
Profit/Ha	397,465.03	536,178.10	331,931.22	468,729.76	539,830.97	793,780.08

Source: Field survey, 2014.

5.2.1.2. Private profitability of cocoa cultivation

Private profit is the difference between the output produced at private price and the input used at private prices. The result of private profitability of cocoa production in various cocoa production management systems is shown in Table 5.24. The result of the analysis showed that cocoa production in Owner-managed production management system gave a positive private profit of ₦397,465.03 per hectare; Leased/Rented production management system showed a positive private profit of ₦331,931.22 per hectare while cocoa production in the sharecropping production management system showed a positive private profit of ₦539,830.97 per hectare. It is clear from these results that private profits in the three production management systems were positive. This showed that cocoa production in the three management systems is competitive given current technologies, prices of input and output and policy. Hence, the cocoa producers in the three management systems are having financial gains and they can produce cocoa conveniently without any assistance from government. Table 5.24 further showed that sharecropping production management system is the most competitive out of the three management systems since it is having the highest private profit. Hence, it produced the highest financial gains at private price compared to the other systems. This may be due to the fact that cocoa production in sharecropping management system is jointly managed by the owner of the farms and the sharecropper and hence making the management system to be stronger and better than any of the other two production management systems. It is reasonable to think that the better the management, the higher the returns. It could also be observed that cocoa production in Leased/Rented production management system is the least competitive with the lowest private profit. This might be due to the fact that the cost of renting or leasing the farm is an additional cost which would have added to the overall cost of running the farm and thus reducing the profit level.

5.2.1.3. Private Cost Ratio (PCR) of cocoa cultivation

PCR is the ratio of the cost of domestic factors at private prices to the difference between the revenue at private price and the cost of tradable inputs at private prices. It is an indication of how much one can afford to pay domestic factors (including a normal return to capital) and still remain competitive. The result of the analysis of PCR of cocoa production in the cocoa production management systems is shown in Table 5.24. The table showed that cocoa production in Owner-managed production management systems is having a PCR of 0.24, Leased/Rented

production management systems had a PCR of 0.25 while sharecropping production management system had a PCR of 0.22. It could be observed that cocoa production in the three management systems had PCR of less than 1. This showed that cocoa production in the three management systems is highly competitive; given current technologies, inputs and output prices and policy. The PCR of less than 1 also indicates that the cocoa producers are earning profit at the market price and can pay for the domestic factors with the operations would still remain competitive. The farmers were able to achieve this because their private factors' costs were less than the value added in private price. The value added is the difference between the value of output and the cost of tradable inputs. However, out of the three production management system, sharecropping production management systems had the least PCR showing that cocoa production in sharecropping production management system was the most competitive since the lower the PCR, the higher the competitiveness. This result further confirmed what was obtained in private profit. Also, Leased/Rented production management system had the highest PCR ratio making it the least competitive of the three management systems. The results of the private profit and the private cost ratio are in consonance with findings by Amao *et al* (2014) that cocoa production is competitive in Ondo State.

Table 5.24. Competitiveness of Cocoa Production Management Systems

Production Management System	Private Profit/Ha ₦	Private Cost Ratio
Owner-managed	397,465.03	0.24
Leased/Rented	331,931.22	0.25
Sharecropping	468,729.76	0.22

Source: Field survey, 2014.

5.2.2. Competitiveness of cocoa marketing

5.2.2.1. Private and social budget in cocoa marketing

In cocoa marketing chain, the main actors that carried out the marketing activities were LBAs, LiBAs and exporters. LBAs travel to the farm gate and buy cocoa beans directly from the farmers. They in turn sell to the LiBAs. LiBAs buy from the LBAs and sell to the exporters while the exporters may in most cases buy from the LBAs. However, exporters may finance some LBAs in anticipation that whatever the LBAs buy from the farmers would be sold directly to them (the exporters). The exporters eventually export cocoa beans outside the country. In the pooled data for this study, LBAs constituted 53.9 percent, LiBAs constituted 38.2 percent while exporters constituted 7.9 percent.

The private and social budget in the cocoa marketing chain is shown in Table 5.25. The table showed that the estimated total cost incurred by LBAs was ₦21,175.29 per tonne and ₦16,402.20 per ton at private and social prices, respectively. The components of the costs include input cost (such as preservative chemicals), factor cost (such as cost of rentage, transportation cost, cost of electricity, cost of fueling and interest on loan) as well as labour cost. The value of input cost per ton was ₦4900.83 (23.1 percent) and ₦2194.43 (13.4 percent) at private and social price, respectively. The estimate for factor cost was ₦6,848.69 (32.3 percent) and ₦7,138.44 (43.5 percent) at private and social price, respectively while the labour cost was estimated at ₦9,425.77 (44.5 percent) and ₦7,069.33 (43.1 percent) valued at private and social price respectively. The estimated revenue for LBAs was ₦45,455.10 per tonne and ₦48,248.01 per tonne at private and social value, respectively. Hence, a net profit of ₦24,279.81 per tonne and ₦31,845.81 per tonne valued at private and social price, respectively was derived by LBAs.

The estimated budget for LiBAs is also shown in Table 5.25. The table showed that the estimated total cost for LiBAs was ₦20,356.57 per tonne and ₦13,152.29 per tonne at private and social value respectively. The breakdown of the cost include input cost which was ₦7,077.00 (34.8 percent) per tonne and ₦2,777.00 (21.1 percent) per tonne at private and social value, respectively. Factor cost was ₦4,156.44 (20.4 percent) per tonne and ₦3,480.44 (26.5 percent) per tonne valued at private and social price, respectively. Labour cost was ₦9,123.13 (44.8 percent) per tonne and ₦6,894.85 (52.4 percent) per tonne at private and social value, respectively. The average revenue derived per tonne by LiBAs was ₦56,461.55 and ₦56.816,11

per tonne valued at private and social price, respectively. Therefore, the average net profit per tonne was ₦36,104.98 and ₦43,663.82 at private and social value respectively.

Table 5.25 also showed the estimated private and social budget for exporters. It was revealed on the table that the total estimated costs for exporters was ₦17,106.99 per tonne and ₦10,559.21 per tonne valued at private and social price respectively. However, the components of the costs were as follows. Input cost was ₦7094.54 (41.5 percent) per tonne and ₦2194.54 (20.8 percent) per tonne at private and social value, factor cost was ₦3423.11 (20.0 percent) per tonne and ₦3423.11 (20.0 percent) per tonne at private and social value, respectively while labour cost was ₦6,589.34 (38.5 percent) per tonne and ₦4941.56 (46.8 percent) per tonne at private and social value. The estimated revenue per tonne for exporters was ₦60,125.00 and ₦61,718.25 at private and social value, respectively. The estimated net profit per tonne was ₦43,018.01 and ₦51,159.04 valued at private and social price respectively.

Table 5.25. Estimated private and social budget for cocoa marketing

Items	Local Buying Agents		Licensed Buying Agents		Exporters	
	Private Price (₦)	Social Price (₦)	Private Price (₦)	Social Price (₦)	Private Price (₦)	Social Price (₦)
Inputs	4900.83	2194.43	7077.00	2777.00	7094.54	2194.54
Factors	6848.69	7138.44	4156.44	3480.44	3423.11	3423.11
Labour	9425.77	7069.33	9123.13	6894.85	6589.34	4941.56
Grand Total Cost/ton	21175.29	16402.20	20356.57	13152.29	17106.99	10559.21
Revenue/ Ton	45455.10	48248.01	56461.55	56816.11	60125.00	61718.25
Profit/ton	24279.81	31845.81	36104.98	43663.82	43018.01	51159.04

Source: Field survey, 2014.

The competitiveness of cocoa marketing among the actors of cocoa marketing was determined with the use of Private profitability as well as Private Cost Ratio.

5.2.2.2. Private profit of cocoa marketing

Table 5.26 showed the result of the analysis of the profitability of cocoa marketing among cocoa marketing actors in the study area. The result showed that LBAs had positive private profit of ₦24,279.81 per tonne, LiBAs had positive private profit of ₦36,104.98 per tonne while exporters had a positive private profit of ₦43,018.01 per tonne. The result showed that all the private profits for the actors were positive. This implied that cocoa marketing by the three cocoa marketing actors was competitive given current technologies, prices of inputs and outputs and the prevailing policies. Also, the cocoa marketers were earning financial gains and could market cocoa without any assistance from the government. It could however be observed from the table that cocoa marketing by the exporters was the most competitive being the one with the highest private profit. This might be due to the fact that the exporters may sell the cocoa at a higher price when selling externally than when it is sold locally. Hence, selling at a higher price would increase the revenue and ultimately, the private profit. Apart from this, exporters bought and sold in large quantity thus enjoying the benefits of economies to scale. However, out of the three cocoa marketing actors, LBAs had the lowest private profit, hence they are the least competitive group. This is due to the fact that most of the LBAs are being financed by the exporters or LiBAs, hence the LBAs are compelled to sell their proceeds to their financiers and the financiers singularly dictated the prices they are willing to pay which are usually very low. The low price reduces the revenue thus reducing the private profit.

5.2.2.3. Private Cost Ratio (PCR) of cocoa marketing

The result of the analysis of PCR of cocoa marketing is shown in Table 5.26. The result indicated that cocoa marketing by LBAs had a PCR of 0.40; the PCR for LiBAs was 0.27 while that of exporters was 0.18. The result showed that cocoa marketing among the three actors had PCR less than one. This showed that cocoa marketing among the three actors is competitive given current technologies and the prevailing policies. Hence, the marketers are earning profit and can pay for the domestic factors and the marketing activities and still remain competitive. The marketers were able to achieve this because their private factor costs were less than the value added in private price. However, out of the three marketing actors, cocoa marketing by exporters was the most competitive. This is because exporters had the least PCR and the lower

the PCR, the higher the competitiveness. The result also confirmed what was obtained under private profit in which exporters were the most competitive out of the three marketing actors. The least competitive out of the three marketing agents was LBAs who had the highest PCR. This is because exporters sell at a higher price than the LBAs. The result is in line with the findings of Nwachukwu *et al*, (2011) which found that cocoa marketing in Nigeria is highly competitive. Also, the result is in consonance with the findings by Oluyole and Usman (2006) that cocoa marketing in Ogun State of Nigeria is competitive.

Table 5.26. Competitiveness of cocoa marketing

Cocoa Marketing Actors	Private Profit ₦	Private Cost Ratio
Local Buying Agents	24,279.81	0.40
Licensed Buying Agents	36,104.98	0.27
Exporters	43,018.01	0.18

Source: Field survey, 2014.

5.2.3. Competitiveness of cocoa processing

5.2.3.1. Private and social budget of cocoa processing

In cocoa VC, cocoa processing is a very important stage. This is the stage in which cocoa beans/cocoa pod husks were converted to the consumable cocoa products. The cocoa products considered in this study were black soap, cocoa powder and cocoa butter. Black soap is a final product obtained from cocoa pod husk while cocoa powder and cocoa butter are obtained from cocoa beans. Cocoa powder and cocoa butter are intermediary products which are further converted into final products. Cocoa powder, which can be consumed directly as cocoa powder drink can also be further processed into cocoa beverage after sugar and milk are added. Cocoa powder is also used in making of biscuits, and other products within the food industry. Cocoa butter is purely an intermediary product. It is further processed into chocolate by chocolate manufacturing companies. In cocoa producing countries, especially Nigeria, cocoa beans are mostly converted into these intermediary products and are exported for further conversion into final products such as beverage, chocolate and cosmetics.

The private and social budget in cocoa processing is shown in Table 5.27. The table showed that the estimated total cost incurred in the processing of black soap was ₦135,904.41 per tonne and ₦133,100.00 per tonne at private price and social price, respectively. As regards the components of the cost, the cost included input cost (such as cost of machines and the cost of raw cocoa beans used), factor cost (such as cost of maintenance, interest on loan and tax) and labour cost. The value of input cost was ₦101,923.00 (75.0 percent) per tonne and ₦99,144.00 (75.0 percent) per tonne at private and social value respectively. The value of factor cost was ₦30,881.57 (23.0 percent) per tonne and ₦30,895.57 (23.0 percent) per tonne at private and social value, respectively while labour was valued ₦3099.66 (2.0 percent) per tonne and ₦3060.75 (2.0 percent) per tonne at private and social value, respectively. The estimated revenue obtained from black soap processing was ₦230,166.67 per tonne and ₦291,600.00 per tonne at private and social value, respectively. Therefore, a net value of ₦94,262.26 per tonne and ₦158,499.68 per tonne at private and social value, respectively were obtained.

The estimated budget for processing cocoa powder was also shown on Table 5.27. The table revealed that the total cost incurred in the processing of cocoa powder was estimated at ₦500,291.87 per tonne and ₦482,247.22 per tonne valued at private and social price, respectively. The structure of the cost revealed that the input cost was ₦485,000.00 per tonne

and ₦468,000.00 per tonne at private and social prices, respectively. Factor cost was estimated at ₦11,155.62 per tonne and ₦11,145.04 per tonne at private and social value, respectively and labour cost valued at ₦4,136.25 per tonne and ₦3,102.18 per tonne at private and social value, respectively. The estimated revenue in the processing of cocoa powder was ₦810,000 per tonne and ₦865,000 per tonne valued as private and social prices, respectively. The net profit per tonne was ₦309,708.13 and ₦382,752.78 at private and social value, respectively.

Table 5.27 also showed the estimated private and social budget for processing cocoa butter. The table revealed that, the estimated total cost incurred in the processing of cocoa butter was ₦499,770.23 per tonne and ₦481,726.68 per tonne at private and social prices, respectively. The estimated revenue per tonne from processing of cocoa butter was ₦1,230,000 per tonne and ₦1,296,000 per tonne at private and social value, respectively. Therefore, the estimated profit per tonne was ₦730,229.77 and ₦814,273.32 at private and social value, respectively.

Table 5.27. Estimated private and social budget for cocoa processing

Items	Black Soap		Cocoa Powder		Cocoa Butter	
	Private Price (₦)	Social Price (₦)	Private Price (₦)	Social Price (₦)	Private Price (₦)	Social Price (₦)
Inputs	101923.00	99144.00	485000.00	468000.00	485000.00	468000.00
Factors	30881.57	30895.57	11155.62	11145.04	10634.98	10624.50
Labour	3099.66	3060.75	4136.25	3102.18	4135.25	3102.18
Grand Total Cost/ton	135904.41	133100.32	500291.87	482247.22	499770.23	481726.68
Revenue/ Ton	230166.67	291600.00	810000.00	865000.00	1230000.00	1296000.00
Profit/ton	94262.26	158499.68	309708.13	382752.78	730229.77	814273.32

Source: Field survey, 2014

5.2.3.2. Private profit of cocoa processing

The result of the analysis of the competitiveness of cocoa processing is shown on Table 5.28. The result showed that the private profit of black soap processing was ₦92,262.26 per tonne, the private profit for cocoa powder processing was ₦309,708.13 per tonne while the private profit for cocoa butter processing was ₦730,229.77 per tonne. It could be observed that the private profits for all the three cocoa products were positive indicating that the processing of the three products is competitive given current technologies, prices of inputs and outputs and the prevailing policies. Table 5.28 also showed that cocoa butter had the highest private profit out of the three cocoa products. The high private profit might be due to the fact that cocoa butter has the highest unit price out of the three products. In the same vein, the low private profit of black soap might be due to the fact that black soap had the lowest unit price out of the three products.

5.2.3.3. Private Cost Ratio (PCR) of cocoa processing

Table 5.28 showed the result of the analysis of PCR of cocoa processing. The result showed that the PCR obtained for black soap processing was 0.27. The PCR obtained for cocoa powder and cocoa butter was 0.05 and 0.02, respectively. The PCR for the three cocoa products was less than one. This indicated that the processing of the three cocoa products was competitive given current technologies and the prevailing policies. The processors of these products were earning profits and could pay for the domestic factors and the processing activities and still remained competitive. It could be observed that of all the three cocoa products considered, the PCR for cocoa butter was the least and hence the cocoa butter was the most competitive of the three products since the lower the PCR, the higher the competitiveness. On the other hand, the PCR for black soap production was the highest; therefore, black soap processing was the least competitive. This finding is in concurs with what was obtained under private profitability in which cocoa butter was found to be the most competitive of the three products. This might be due to the fact that cocoa butter had the highest unit price out of the three products while black soap had the lowest unit price. The result is in consonance with Sanusi (2006) findings that cocoa processing is competitive in Nigeria. Also, the result is in line with the findings by Yusuf and Okoruwa (1995) which discovered that given adequate processing resources, black soap processing in Nigeria is highly profitable.

Table 5.28 Competitiveness of cocoa processing

Cocoa Products	Private Profitability ₦	Private Cost Ratio
Black soap	94,262.26	0.27
Cocoa powder	309,708.13	0.05
Cocoa butter	730,229.77	0.02

Source: Field survey, 2014.

5.2.4. Comparative advantage of cocoa cultivation in cocoa production management systems

Comparative advantage is calculated from the second row of the PAM and it is measured using the following indices: Social Profitability, Domestic Resource Costs and Social Cost Benefit.

5.2.4.1. Social profitability of cocoa cultivation

The result of social profitability analysis in the three production management systems is shown in Table 5.29. The result showed that Owner-managed production management system had social profit of ₦536,178.10 per hectare, Leased/rented management had social profit of ₦468,729.76 per hectare while Sharecropping had social profit of ₦792,038.37 per hectare. The result showed that all the three production management systems had positive social profits. This showed that cocoa production in the study area is socially profitable. Hence, the cocoa producers in the study area are utilizing scarce resources efficiently in the production of cocoa. It also indicated that cocoa production in the three management systems can survive without government interventions. However, from the result, it could be observed that Sharecropping production management system had the highest social profit. This is followed by Owner-managed management system and then the Leased/Rented management system. The high social profitability in sharecropping management system might be due to the fact that cocoa production in this management system is jointly managed by the owner of the farm and the sharecropper. Hence, the management is better than any of the other two production management systems. The better the management, the higher the returns. The rewarding of the least value of social profit in the Leased/Rented production management system might be due to the fact that the cost of renting/leasing the farm adds to the overall cost of running the farm and hence reduces the profit. In general, the positive social profit in all the cocoa production management systems indicated that cocoa could be conveniently produced for export in the study area**.**

5.2.4.2. Domestic Resource Cost (DRC) of cocoa production

The result of the analysis of Domestic Resource Cost (DRC) for cocoa production in the three management systems is shown on Table 5.29. It was revealed in the table that Owner-managed management system had DRC of 0.16, Leased/Rented management system had DRC of 0.17 and Sharecropping production management system had DRC of 0.14. It could be observed that the value of DRC for cocoa production in all the management systems was less than one. This showed that the value of domestic resources (such as harvesting hook, basket and drying slab)

utilized in cocoa cultivation is lower than the value added and hence an efficient use of domestic resources in cocoa cultivation. Cocoa cultivation is therefore found to be economically profitable and having comparative advantage. It could also be observed from the result that the Sharecropping management system had the lowest DRC. Therefore, it is the system that had the highest comparative advantage since the lower the DRC, the greater is the degree of economic efficiency (Rasmikayati and Nurasiyah, 2004). The Leased/Rented management system had the lowest comparative advantage out of the three production management systems. This might be due to the fact that the cost of renting or leasing the farm becomes an additional cost which would have added to the overall cost of running the farm.

5.2.4.3. Social Cost Benefit (SCB) of cocoa production

Social Cost Benefit is the ratio of the sum of tradable input costs and domestic factor costs to the revenue, all valued at social price. The result of the analysis of SCB is shown on Table 5.29. The table showed that the value of SCB in Owner-managed cocoa production management system was 0.17. The SCB for Leased/Rented management system was 0.19 and that of Sharecropping management system was 0.17. The result showed that SCB for all the management systems was less than one indicating that the sum of both the cost of tradable inputs and domestic factors at social price is less than the revenue at social price under the prevailing market conditions. Cocoa production in the three management systems is therefore socially profitable and hence cocoa could be efficiently produced for export in the study area. The result is in line with the findings of Amao *et al*, (2014) which found that cocoa production in Ondo State has a comparative advantage.

Table 5.29. Comparative advantage of cocoa production

Production Management Systems	Social Profitability (₦/Ha)	Domestic Resource Cost	Social Cost Benefit
Owner-managed	536,178.10	0.16	0.17
Leased/Rented	468,729.76	0.17	0.19
Sharecropping	792,038.37	0.14	0.17

Source: Field survey, 2014.

5.2.5. Comparative advantage of cocoa marketing

Comparative advantage is measured with Social Profitability (SP), Domestic Resources Cost (DRC) and Social Cost Benefit (SCB).

5.2.5.1. Social profitability of cocoa marketing

The result of the analysis of social profitability is shown in Table 5.30. The result showed that LBAs had social profit of ₦32,025.81 per tonne, LiBAs had social profit of ₦43,663.82 per tonne while exporters had social profit of ₦51,159.04 per tonne. The result showed that all the three marketing actors had positive social profit. This showed that cocoa marketing in the study area was socially profitable. Hence, the cocoa marketers in the study area were utilizing scarce resources (such as labour and capital) efficiently in the marketing of cocoa. This also meant that cocoa marketing by the three cocoa marketing actors could survive without government interventions. The result of the analysis also showed that exporters had the highest social profit, followed by LiBAs while LBAs had the least social profit. The high social profitability by exporters might be due to the fact that they sold at a higher price, and also because they had enough capital to buy more cocoa stock than the others (especially LBAs)

5.2.5.2. Domestic Resource Cost (DRC) of cocoa marketing

Domestic resource cost is calculated as the ratio of the cost of domestic factors at social price to the difference between the revenue at social price and the cost of tradable inputs at social price. Table 5.30 showed the result of the analysis of DRC for cocoa marketing among the three cocoa marketing actors. The result showed that LBAs had DRC of 0.31; LiBAs had DRC of 0.19 while exporters had DRC of 0.14. From the result, it is obvious that the DRC for all the cocoa marketing actors were less than one. This indicated that there was efficiency in the marketing of cocoa domestically. It showed that the value of domestic resources utilized in cocoa marketing was lower than the value added and therefore there was an efficient use of domestic resources in cocoa marketing. Cocoa marketing can therefore be said to be economically profitable and is having a comparative advantage. The result further showed that exporters had the lowest DRC, hence, they had the highest comparative advantage while the LBAs had the least comparative advantage. This is so because the lower the DRC, the greater the comparative advantage and vice-versa.

5.2.5.3. Social Cost Benefit (SCB) of cocoa marketing

The result of the analysis of SCB for the three marketing actors is shown on Table 5.30. The result of the analysis showed that LBAs had SCB of 0.34; LiBAs had SCB of 0.23 while exporters had SCB of 0.17. The result showed that the SCB of cocoa marketing for all the marketing actors were less than one indicating that the sums of both the tradable inputs and domestic factors costs were less than the gross revenue under the prevailing marketing conditions. Cocoa marketing among the three marketing actors was therefore profitable. However, the lower the SCB, the higher the degree of efficiency of the system. Hence, cocoa marketing by exporters was more efficient than those of the other marketing actors while cocoa marketing by LBAs was the least efficient of the three marketing actors. The result is in line with the findings of Nwachukwu *et al*, (2011) which found that cocoa marketing in Nigeria has comparative advantage.

Table 5.30. Comparative advantage of cocoa marketing

Cocoa Marketing Actors	Social Profitability (₦/ton)	Domestic Resource Cost	Social Cost Benefit
Local Buying Agents	32,025.81	0.31	0.34
Licensed Buying Agents	43,663.82	0.19	0.23
Exporters	51,159.04	0.14	0.17

Source: Field survey, 2014.

5.2.6. Comparative advantage of cocoa processing

Comparative advantage for the processed cocoa products was measured with the use of Social Profitability, Domestic Resource Cost and Social Cost Benefit.

5.2.6.1. Social profitability of cocoa processing

Table 5.31 showed the result of the analysis of social profitability of cocoa processing. The result showed that the social profit for black soap processing was ₦158,499.68 per ton, the calculated social profit for cocoa powder was ₦382,752.78 per ton while that of cocoa butter was ₦814,273.32 per ton. It was revealed from the result that social profit for all the processed cocoa products were positive showing that cocoa processing in the study area is socially profitable. This indicated that the cocoa processors were using their scarce resources (such as raw materials, packaging materials, labour and capital) efficiently in the processing of cocoa. Hence, the processors could survive with their processing activities without the intervention of government. Result from Table 5.31 also revealed that processed cocoa butter had the highest social profit, followed by cocoa powder with black soap having the least social profit. The high social profit for cocoa butter and cocoa powder might be due to the high unit price of the products when compared with the unit price of black soap.

5.2.6.2. Domestic Resource Cost (DRC) of cocoa processing

The result of the analysis of DRC is shown in Table 5.31. The table revealed that the DRC for black soap processing was 0.18; the DRC for cocoa butter processing was 0.02 while the DRC for cocoa powder processing was 0.04. The result showed that the DRC for all the processed products were less than one indicating that there was efficiency in the processing of cocoa domestically. This meant that the value of domestic resources used in the processing of the products was lower than the value added. Cocoa processing in the study area was therefore economically profitable and had a comparative advantage. It could also be observed in the result that cocoa butter had the lowest DRC. This connoted that it was cocoa butter that had the highest comparative advantage out of the three processed products considered. However, black soap processing had the highest DRC hence the least comparative advantage. The least comparative advantage shown black soap might be due to the fact that it was the product that had the least unit price out of the three products considered.

5.2.6.3. Social Cost Benefit (SCB) of cocoa processing

Table 5.31 showed the result of the analysis of SCB for the three processed products. The result showed that processed black soap had SCB of 0.56; the SCB for cocoa powder processing was 0.46 while the SCB for cocoa butter was 0.37. It could be observed from the result that the SCB for all the processed products were less than one indicating that the sums of the tradable inputs and domestic factors at social price were less than the gross revenue of the products. Cocoa processing in the study area is therefore profitable and hence showing comparative advantage. The processed cocoa butter had the highest comparative advantage since it was the one that showed the least SCB because the lower the SCB, the higher the comparative advantage.

Table 5.31. Comparative advantage of cocoa processing

Cocoa Products	Social Profitability (₦/ton)	Domestic Resource Cost	Social Cost Benefit
Black Soap	158,499.68	0.18	0.56
Cocoa Powder	382,752.78	0.04	0.46
Cocoa Butter	814,273.32	0.02	0.37

Source: Field survey, 2014.

5.3.0. Effects of policies on competitiveness and comparative advantage in each of the stages of cocoa value chain

The effect of government policies on competitiveness and comparative advantage in each of the stages of cocoa value chain was measured with protection coefficients and policy transfers. Protection coefficients are the ratios that are free of currency or commodity distinctions. They are used to evaluate the protection offered by policy intervention (Pearson *et al*, 2003). The protection coefficients used in this study are Nominal Protection Coefficients (NPC), Effective Protection Coefficient (EPC) and Profitability Coefficients (PC).

Policy transfers were measured by the divergences in output, input, factors and profit in the third row of PAM. Divergences arise as a result of distorting policies and market failure thus causing private market price to diverge from the corresponding international price (Luta and Scandizzo, 1980). Divergences in PAM are differences between private and the social valuation of revenue, tradable inputs, domestic factors and profits (Khai and Yabe, 2013). The policy transfers considered in this study are Output transfer, Tradable-input transfer, Factor transfer and Profit transfer.

5.3.1. Effects of government policies on cocoa cultivation

The effects of government policies on cocoa cultivation were measured with protection coefficients (NPC, EPC and PC) as well as policy transfers (Output Transfer, Tradable Input Transfer, Factor Transfer and Profit Transfer).

5.3.1.1. Nominal Protection Coefficient (NPC) of cocoa cultivation

Nominal Protection Coefficient is the ratio of domestic price to the comparable world (social) price. The domestic price used to compute NPC in this study was farm gate price while the world price used was adjusted for transportation costs, processing costs and port charges. Table 5.32 showed the values of NPC for cocoa production in the three cocoa production management systems. The table showed that Owner-managed production management system had NPC of 0.85; Leased/Rented management system had NPC of 0.79 while Sharecropping management system had NPC of 0.75. The NPC in the three management systems was less than one showing that the domestic price for cocoa output was less than the corresponding international reference price for cocoa. Hence, there was negative protection on the domestic price of cocoa leading to a disincentive on output prices. This confirms the presence of taxes or any other policy that is detrimental to the realization of the maximum revenue from cocoa. Such policies might include

foreign exchange liberalization and currency devaluation which increased the cost of maintaining cocoa farms by about 300.0 percent (Idowu *et al*, 2007). However, out of the three management systems, Owner-managed production management system had the highest NPC (0.85), hence it is the management system that is closer to the ideal situation. Ideal situation is a situation in which the domestic price is equal to the corresponding international price. Owner-managed production management system was only 15.0 percent short of the ideal situation.

5.3.1.2. Effective Protection Coefficient (EPC) of cocoa cultivation

Effective Protection Coefficient is the ratio between the value added in private prices to the value added in social prices. Value added is the difference between the revenue generated and the costs of tradable inputs incurred. The EPC measures the degree of transfer brought about by product and tradable input policies but does not take into account the transfer effects of factor market policies. Table 5.32 showed the EPC for the three cocoa production management systems. The table showed that the EPC for Owner-managed production management systems was 0.82, Leased/Rented management system had EPC of 0.79 while Sharecropping management system had EPC of 0.75. The result showed that the EPC for the three cocoa production management systems was less than one. This meant that value added at market prices was lower than the value added at international price. Hence, the producers were not protected through policy intervention

5.3.1.3. Profitability Coefficient (PC) of cocoa cultivation

Profitability Coefficient measures the impact of policy transfer on private profits. It is measured by dividing the private profits by the social profit. Table 5.32 showed the values of PC obtained in the three cocoa production management systems. The result of the analysis showed that PC obtained for Self-owned production management system was 0.74; Leased/Rented production management systems had PC of 0.71 while Sharecropping production management system had PC of 0.68. The values of PC in the three production management systems were less than one indicating that private profits were less than the profits evaluated at the world reference price. This connoted a lack of incentives in the production systems and hence cocoa production was not protected by government policies. The findings are buttressed by Amao *et al;* (2015) which found that cocoa production in Ondo State was not protected by government policies, hence cocoa farmers were taxed.

Table 5.32. Protection coefficient on cocoa production

Production Management Systems	Nominal Protection Coefficient	Effective Protection Coefficient	Profitability Coefficient
Owner-managed	0.85	0.82	0.74
Leased/Rented	0.79	0.79	0.71
Sharecropping	0.75	0.75	0.65

Source: Field survey, 2014.

5.3.1.4. Output transfer

Output Transfer is the difference between the output valued at actual market price and the value at the corresponding international price. Positive output transfer implies an implicit subsidy on the output while negative output transfer shows an implicit tax on the output. Table 5.33 showed the output transfer for the three cocoa production management systems. The result showed that Owner-managed production management system had output transfer of –₦101,826.46, Leased/Rented production management system had output transfer of –₦105,674.67 while that of Sharecropping management system had –₦213,125.97. It could be observed from the result that all the three production management systems had negative output transfer. This was indicated that social revenue is higher than the private revenue and the current domestic price of cocoa is lower than the border price. Hence, there was a disincentive to cocoa output and government policies did not favour the private prices of cocoa.

5.3.1.5. Tradable – input transfer

Tradable Input Transfer is the difference between the total costs of tradable inputs valued at private prices and the total costs of the same inputs measured at social prices. Positive tradable input transfer indicates an implicit tax on the tradable inputs while negative tradable input transfer indicates an implicit subsidy on the tradable inputs (Alibaba, 2012). The result of the analysis of tradable input transfer is shown on Table 5.33. The result showed that the tradable input transfer for Owner-managed management system was ₦12,716.70/Ha, Leased/Rented management system was ₦8,915.06/Ha while that of Sharecropping production management system was ₦18,467.49/Ha. Result showed positive tradable input transfer for all the management systems indicating that market prices for tradable inputs are higher than their comparable world prices. This implied an implicit tax on the tradable inputs used in the production of cocoa.

5.3.1.6. Factor transfer

Factor transfers are the differences between the costs of all factors of production valued at actual market prices and the social costs of these factors. Positive factor transfer shows an implicit tax or transfer of resources away from the system. Negative factor transfer shows an implicit subsidy or transfer of resources in favour of the system (Pearson *et al*, 2003). The result of the analysis of factor transfer is shown on Table 5.33. Factor transfer of ₦24,169.91 was obtained for Owner-managed production management system, ₦22,208.81 was obtained for Leased/Rented

management system and ₦20,613.94 was obtained for Sharecropping production management system. The result of the analysis showed positive value for all the management systems. This means that there is an implicit tax on the factors used in the production of cocoa.

5.3.1.7. Profit transfer

Profit transfer is the net transfer and it shows the difference between private and social profits. Profit Transfer also can either be positive or negative. Positive profit transfer shows that the overall effects of all the policies on output and input prices are in favour of the producers while negative value shows that policies are working to the detriment of the producers. The result of the analysis of profit transfer is shown on Table 5.33. The result showed that Owner-managed production management system had profit transfer of -₦138,713.07, Leased/Rented management system had profit transfer of -₦136,798.54 while that of Sharecropping management system was -₦252,207.40. The result showed negative profit transfer for all the production management systems indicating that the net effect of all the policies was to the detriment of cocoa producers.

Table 5.33. Transfer of government policies on cocoa cultivation

Production Management Systems	Output Transfer (₦/Ha)	Tradable Input Transfer (₦/Ha)	Factor Transfer (₦/Ha)	Profit Transfer (₦/Ha)
Owner-managed	-101,826.46	12,716.70	24,169.91	-138,713.07
Leased/Rented	-105,674.67	8,915.06	22,208.81	-136,798.54
Sharecropping	-212,125.97	18,467.49	20,613.94	-252,207.40

Source: Field survey, 2014.

5.3.2. Effects of government policies on cocoa marketing

The effects of government policies on cocoa marketing were measured with protection coefficients (NPC, EPC and PC) as well as policy transfers (Output Transfer, Tradable Input Transfer, Factor Transfer and Profit Transfer).

5.3.2.1. Nominal Protection Coefficient of cocoa marketing

The result of the analysis of Nominal Protection Coefficient (NPC) of cocoa marketing among the three marketing actors is shown on Table 5.34. The result showed that the NPC for LBAs was 0.90; the NPC for LiBAs was 0.94 while the NPC for exporters was 0.98. It could be observed from the result that all the buying agents had NPC of less than one. This indicated that the domestic price of cocoa beans was less than the border price. Therefore, there was a negative protection on the domestic price of cocoa beans which was a disincentive on output prices. This confirmed the presence of taxes or any other policies that were detrimental to the realization of maximum revenue from cocoa marketing.

5.3.2.2. Effective Protection Coefficient (EPC) of cocoa marketing

Table 5.34 showed the empirical result for EPC of cocoa marketing among cocoa marketing actors. The result showed that the EPC for LBAs was 0.88; the EPC for LiBAs was 0.91 while that of exporters was 0.96. The result showed that the EPC for the three marketing actors was less than one. This showed that the value added at the market price was lower than the value added at the international price. Hence, the marketers were not protected through policy intervention.

5.3.2.3. Profitability Coefficient (PC) of cocoa marketing

Profitability Coefficient is an extension of EPC to include factor transfers. The result of the analysis of PC is presented in Table 5.34. The PC for local buying agents was 0.76; the PC for licensed buying agents was 0.83 while the PC for exporters was 0.92. The PC among the three marketing actors was less than one. This indicates that the private profit was less than the profits evaluated at the world reference price. Hence, there was a lack of incentive in the marketing system.

Table 5.34. Protection coefficients on cocoa marketing

Cocoa Marketing Actors	Nominal Protection Coefficient	Effective Protection Coefficient	Profitability Coefficient
Local Buying Agents	0.90	0.88	0.76
Licensed Buying Agents	0.94	0.91	0.83
Exporters	0.98	0.96	0.92

Source: Field survey, 2014.

5.3.2.4. Output Transfer

Table 5.35 showed the result of the analysis of output transfer for cocoa marketing among the cocoa marketing actors. The table showed that LBAs had an output transfer of –₦2,792.91 per tonne, LiBAs had output transfer of –₦354.56 per tonne while exporters had -₦1,593.25 per tonne as their output transfer. The result of the analysis showed that all the buying agents had negative output transfer. This showed that social revenue was greater than the private revenue and hence the current domestic price was lower than the border price. This indicated transfer of resources from the system and hence the system was taxed.

5.3.2.5. Tradable input transfer

The result of the analysis of tradable input transfer is shown on Table 5.35. The result showed that the tradable input transfer for LBAs was ₦2,706.40 per tonne; that of LiBAs was ₦4,300.00 per tonne while that of exporters was ₦4,900.00 per tonne. The result showed that the tradable input transfer for the three actors was positive. This indicated that the market prices for the tradable inputs are higher than the border price of the tradable inputs. This shows an implicit tax on the tradable inputs used in the marketing of cocoa.

5.3.2.6. Factor Transfer

Factor transfer of ₦2,066.69 was obtained for LBAs, the factor transfer for LiBAs was ₦2,904.28 while that of exporters was ₦1647.78 (Table 5.35). The result of the analysis showed that there was positive factor transfer for all the marketing actors. This indicated that there was an implicit tax on the factors (such as capital and labour) used in the marketing of cocoa.

5.3.2.7. Profit transfer

The result of the analysis of profit transfer for cocoa marketing is shown on Table 5.35. The result showed that a value of –₦7,566.00 was obtained for LBAs, -₦7,558.84 was obtained for licensed buying agents while a value of -₦8141.03 was obtained for exporters. The result showed that there was a negative value of profit transfer for all the actors in marketing of cocoa. This implies that social profit obtained in cocoa marketing system was greater than the private profit. This indicated an implicit tax and transfer of resources from the cocoa marketing system.

Table 5.35. Effects of government policies on cocoa marketing

Cocoa Marketing Actors	Output Transfer (₦/ton)	Tradable Input Transfer (₦/ton)	Factor Transfer (₦/ton)	Profit Transfer (₦/ton)
Local Buying Agents	-2792.91	2706.40	2066.69	-7566.00
Licensed Buying Agents	-354.56	4300.00	2904.28	-7558.84
Exporters	-1593.25	4900.00	1647.78	-8141.03

Source: Field survey, 2014.

5.3.3. Effects of government policies on cocoa processing

The effects of government policies on cocoa processing were measured with protection coefficients (NPC, EPC and PC) as well as policy transfers (Output transfer, Tradable-input transfer, Factor transfer and Profit transfer).

5.3.3.1. Nominal Protection Coefficient (NPC)

The result of the analysis of NPC for cocoa processing is shown on Table 5.36. The table revealed that the NPC for black soap processing was 0.79; the NPC for cocoa powder was 0.94 while that of cocoa butter was 0.95. The result showed that NPC for the three processed products were less than one. This indicated that the domestic prices of the processed products were less than the border price. Hence, there was negative protection on the domestic price of the cocoa products. This confirmed the presence of taxes or any other policies that were detrimental to the realization of maximum revenue from the processed cocoa products. Also, the result showed that cocoa butter had the highest NPC, followed by cocoa powder while the black soap had the least NPC. Hence, cocoa butter had the domestic price that was closest to the border price out of the three processed products considered. However the domestic price of black soap was the farthest from the boarder price. Black soap had low domestic (local) price because the consumption is most of the time local.

5.3.3.2. Effective Protection Coefficient (EPC)

The result of the analysis of the EPC for the three processed products is shown on Table 5.36. The result of the analysis showed that the EPC for black soap processing was 0.67; the EPC for cocoa powder was 0.82 while the EPC for cocoa butter was 0.90. The result revealed that the EPC for the three processed products was less than one. This indicated that the value added at the domestic price was lower than the value added at the international price. Therefore, the processors of the products are not protected through government policies. Hence, there was lack of incentive and the processors faced taxation.

5.3.3.3. Profitability Coefficients (PC)

Table 5.36 showed the result of the analysis of PC for the three processed cocoa products. The table showed that the PC for black soap processing was 0.72, the PC for cocoa powder processing was 0.81 while the PC for cocoa butter processing was 0.89. The result showed that the PC for the three processed products were less than one indicating that the profit evaluated at

the private price was less than the profits evaluated at the world reference price. Hence, there is lack of incentive in the processing of cocoa products.

Table 5.36. Protection coefficients on cocoa processing

Cocoa Products	Nominal Protection Coefficient	Effective Protection Coefficient	Profitability Coefficient
Black soap	0.79	0.67	0.72
Cocoa powder	0.94	0.82	0.81
Cocoa butter	0.95	0.90	0.89

Source: Field survey, 2014.

5.3.3.4. Output transfer

The result of the analysis of output transfer is shown on Table 5.37. The result showed that black soap processing had an output transfer of –₦61,433.33/ton, cocoa powder processing had an output transfer of –₦55,000.00/ton while cocoa butter processing had an output transfer of –₦66,000.00/ton. The result revealed that all the processed cocoa products had negative output transfer. This indicates that the social revenue of the products was more than the private revenue; hence the current domestic market price was less than the border price. This indicated an implicit tax and hence transfers of resources from the system.

5.3.3.5. Tradable input transfer

Table 5.37 showed the result of the analysis of tradable input transfer. The result indicated that a tradable input transfer of ₦2,779.00 per tonne was obtained for black soap processing, a tradable input transfer of ₦17,000.00 per tonne was obtained for cocoa powder processing and a value of ₦17,000.00 per tonne was obtained for cocoa butter processing. The analysis showed that the tradable input transfers for all the processed cocoa products were positive indicating that the private price for the tradable inputs used were higher than their border prices. This showed an implicit tax on the tradable inputs. This indicated no subsidy on the tradable inputs used in the processing of the cocoa products.

5.3.3.6. Factor transfer

The result of the analysis of factor transfer as shown on Table 5.37 indicated that the factor transfer for black soap processing was ₦24.91 per tonne, factor transfer of ₦1,044.65 per tonne was obtained for cocoa powder processing while a factor transfer of ₦1,044.55 was obtained for cocoa butter processing. The result showed that the factor transfer for all the processed products was positive indicating that the value of domestic factors at private price was higher than the value of domestic factors at border price. Hence, the private price of the factors was higher than the border price showing that there was an implicit tax on the factors and absence of incentives on the factors.

5.3.3.7. Profit transfer

Table 5.37 showed the result of the analysis of profit transfer for the three processed products. The result showed that the profit transfer for black soap processing was -₦64,237.24 per tonne. The profit transfer for cocoa powder processing was –₦73,044.65 per tonne while that of cocoa butter processing was -₦84,044.55 per tonne. Looking at the result, it showed that there was a

negative value for all the profit transfers showing that the social profit obtained in cocoa processing was greater than the private profit. This indicated an implicit tax and transfer of resources from cocoa processing system.

Table 5.37. Effects of government policies on cocoa processing

Cocoa Products	Output Transfer (₦/ton)	Tradable Input Transfer (₦/ton)	Factor Transfer (₦/ton)	Profit Transfer (₦/ton)
Black Soap	-61433.33	2779.00	24.91	-64237.24
Cocoa Powder	-55000.00	17000.00	1044.65	-73044.65
Cocoa Butter	-66000.00	17000.00	1044.55	-84044.55

Source: Field survey, 2014.

5.3.4. Competitiveness and comparative advantage of the entire cocoa value chain

5.3.4.1. Private profitability of the entire cocoa value chain

The result of private profitability of the entire cocoa value chain is shown in Table 5.38. The result of the analysis showed that the entire cocoa value chain in Owner-managed management system gave a positive private profit of ₦680,348.00 per hectare; Leased/Rented management system showed a positive private profit of ₦655,258.00 per hectare while Sharecropping management system showed a positive private profit of ₦734,409.00 per hectare. It can be seen that private profit in the three management systems were positive for the entire cocoa value. This shows that the entire cocoa value chain in the three management systems is competitive given current technologies, prices of inputs and output and policy. Hence, the cocoa value chain actors in the three management systems were having financial gains and they can produce cocoa/cocoa products conveniently without any assistance from government. The analysis however showed that the sharecropping management system was the most competitive since it was having the highest private profit while Leased/Rented management system is the least competitive being having the lowest private profit.

5.3.4.2. Private Cost Ratio (PCR) of the entire cocoa value chain

The result of the analysis of PCR of the entire cocoa value chain is shown in Table 5.38. The table showed that cocoa value chain in Owner-managed production management system had a PCR of 0.15; Leased/Rented management system had PCR of 0.14 while cocoa value chain in Sharecropping management system had a PCR of 0.11. The three management systems had PCR of less than 1. This showed that the entire cocoa value chain is highly competitive; given current technologies, inputs and output prices and policy. The PCR of less than 1 also indicated that the cocoa value chain actors were earning profit at the market price and can pay for the domestic factors with the operations still remaining competitive. The value chain actors were able to achieve this because their private factor costs were less than the value added at private price and the value added is the difference between the values of output. Out of the three management systems, sharecropping management system had the least PCR showing that the system was the most competitive.

Table 5.38. Competitiveness of the entire cocoa value chain

Management Systems	Private Profitability (₦/Ha)	Private Cost Ratio
Owner-managed	680,348.00	0.15
Leased/Rented	655,258.00	0.14
Sharecropping	734,409.00	0.11

Source: Field survey, 2014.

5.3.4.3. Social Profitability of the entire cocoa value chain

The result of social profitability for the entire cocoa value chain is shown in Table 5.39. The result showed that Owner-managed management system had social profit of ₦836,427.00 per hectare, Leased/rented management system had social profit of ₦812,930.00 per hectare while Sharecropping had social profit of ₦893,949.00 per hectare. The result showed that all the three management systems had positive social profits. This meant that the entire cocoa value chain in the study area is socially profitable. Hence, the cocoa value chain actors in the study area are utilizing scarce resources efficiently in the production of cocoa/cocoa products. It also indicates that the entire cocoa value chain can survive without government interventions. However, from the result, it could be observed that Sharecropping management system had the highest social profit. This is followed by Owner-managed management system and then the Leased/Rented management system. In general, the positive social profit in all the management systems indicated that cocoa could be conveniently produced in Southern Nigeria for export given the current macroeconomic conditions and policies**.**

5.3.4.4. Domestic Resource Cost (DRC) of the entire cocoa value chain

The result of the analysis of Domestic Resource Cost for the entire cocoa value chain is shown on Table 5.39. It was revealed in the table that Self-owned management system had a DRC of 0.12, Leased/Rented management system had a DRC of 0.12 and Sharecropping management system had DRC of 0.09. It could be observed that the value of DRC for the entire cocoa value chain was less than one. This shows that the value of domestic resources utilized in the entire cocoa value chain was lower than the value added and hence there was efficient use of domestic resources in the entire cocoa value chain. The entire cocoa value chain can therefore be said to be economically profitable with comparative advantage in the Southern Nigeria. It could also be observed from the result that Sharecropping management system had the lowest DRC making it the management system with the highest comparative advantage since the lower the DRC, the higher the comparative advantage and *vice versa*. The Owner-managed production management system had the lowest comparative advantage out of the three management systems.

5.3.4.5. Social Cost Benefit (SCB) of the entire cocoa value chain

The result of the analysis of SCB is shown on Table 5.39. The table showed that the value of SCB in the Owner-managed production management system was 0.19. The SCB for Leased/Rented management system was 0.21 and that of Sharecropping management system was

0.13. The result showed that SCB for all the management systems was less than one indicating that the sum of both the tradable inputs and domestic factor costs were less than the gross revenue at social cost under the prevailing output and input market conditions. The entire cocoa value chain can therefore be said to be profitable.

Table 5.39. Comparative advantage of the entire cocoa value chain

Management Systems	Social Profitability (₦/Ha)	Domestic Resource Cost	Social Cost Benefit
Owner-managed	836,427.00	0.12	0.19
Leased/Rented	812,930.00	0.12	0.21
Sharecropping	893,949.00	0.09	0.13

Source: Field survey, 2014.

Effects of government policies on the entire cocoa value chain

The effects of government policies on the entire cocoa value chain was also carried out with the use of PAM spreadsheet software and the effects were measured with relevant protection coefficients and policy transfers indices.

5.3.4.6. Nominal Protection Coefficient (NPC) of the entire cocoa value chain

Table 5.40 showed the values of NPC for the entire cocoa value chain in the three management systems. The table showed that all the management systems had NPC of 0.85. The NPC in the three management systems was less than one showing that the domestic price for cocoa output was less than the corresponding international reference price for cocoa. Hence, there was negative protection on the domestic price of cocoa/cocoa products and there was disincentive on output prices. This confirmed the presence of taxes or other policy that are detrimental to the realization of the maximum revenue from cocoa/cocoa products.

5.3.4.7. Effective Protection Coefficient (EPC) of the entire cocoa value chain

Table 5.40 showed the EPC for the entire cocoa value chain. The table showed that the EPC for Self-owned management system was 0.84, Leased/Rented management system had EPC of 0.83 while Sharecropping management system had EPC of 0.84. The result showed that the EPC for all the three management systems was less than one. This meant that value added at market prices was less than the value added at international price. Hence, the producers in the entire cocoa value chain were not protected through policy intervention

5.3.4.8. Profitability Coefficient (PC) of the entire cocoa value chain

Table 5.40 showed the values of PC obtained in the three management systems. The result of the analysis showed that PC for the Owner-managed production management system was 0.81; the Leased/Rented management system had PC of 0.81 while the Sharecropping management system had PC of 0.82. The values of PC in the three management systems were less than one indicating that private profits were less than the profits evaluated at the world reference price. This indicated lack of incentives in the entire cocoa value chain.

Table 5.40. Protection coefficients of the entire cocoa value chain

Management Systems	Nominal Protection Coefficient	Effective Protection Coefficient	Profitability Coefficient
Owner-managed	0.85	0.84	0.81
Leased/Rented	0.85	0.83	0.81
Sharecropping	0.85	0.84	0.82

Source: Field survey, 2014.

5.3.4.9. Output transfer

Table 5.41 showed the output transfers for the entire cocoa value chain. The result showed an output transfer of –₦155,245.00 in each of the management systems and the negative sign indicated that social revenue was higher than the private revenue. It also meant that the current domestic price of cocoa was lower than the border price. Hence, there was a disincentive for cocoa cultivation and government policies do not favour the private prices of cocoa outputs.

5.3.4.10. Tradable – input transfer

The result of the analysis of tradable input transfer is shown on Table 5.41 and it showed a tradable-input transfer of ₦50.00 for Owner-managed production management sysytem and ₦80.00 for each of Leased/Rented and Sharecropping management systems. The positive values indicated that the cost of tradable inputs at private price was more than the cost of tradable inputs at social price. Hence, the tradable input transfer was positive indicating that there was no incentive (such as subsidy) on the domestic price of tradable inputs.

5.3.4.11. Factor transfer

The result of the analysis of factor transfer is shown in Table 5.41. Factor transfer of ₦784.00 was obtained for Owner-managed management system, ₦2345.00 was obtained for Leased/Rented management system and ₦4213.00 was obtained for Sharecropping management system. The result of the analysis showed a positive value for all the management systems. This meant that there was an implicit tax on the factors used in the entire cocoa value chain.

5.3.4.12. Profit transfer

The result of the analysis of profit transfer for the entire cocoa value chain is shown on Table 5.41. The result showed that Self-owned management system had profit transfer of -₦156,079.00; Leased/Rented management system had profit transfer of -₦157,672.00 while that of sharecropping management system was -₦159,540.00. The result showed negative profit transfer for all the management systems indicating that the net effect of all the policies is to the detriment of cocoa producers.

Table 5.41. Effects of government policies in the entire cocoa value chain

Management Systems	Output Transfer (₦/Ha)	Tradable Input Transfer (₦/Ha)	Factor Transfer (₦/Ha)	Profit Transfer (₦/Ha)
Owner-managed	-155,245.00	50	784.00	-156,079.00
Leased/Rented	-155,245.00	82	2345.00	-157,672.00
Sharecropping	-155,245.00	82	4213.00	-159,540.00

Source: Field survey, 2014.

5.3.5. Sensitivity Analysis

In this study, sensitivity analysis was carried out at the production, marketing and processing levels and the parameters that were varied were:

(i) Domestic price +20 percent, +40 percent, +60 percent, -20 percent, -40 percent and -60 percent

(ii) World price +20 percent, +40 percent, +60 percent, -20 percent, -40 percent and -60 percent

(iii) Exchange rate +20 percent, +40 percent, +60 percent, -20 percent, -40 percent and -60 percent

These percentages figures were chosen because observations have shown from cocoa market statistics that the chosen variables (that is, domestic price and world price) changes with the chosen percentages and for uniformity, the same percentages were chosen for exchange rate.

5.3.5.1. Effect of changes in the domestic price of cocoa beans on cocoa production

Table 5.42 showed the effect of changes in the domestic price of cocoa beans on cocoa production. The table showed that 20 percent, 40 percent and 60 percent increase in the domestic price of cocoa would increase the private profitability of cocoa production from the base value of ₦284,955.83 to ₦374,655.87, ₦464,375.91 and ₦554,095.95 respectively. However, a decrease in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent would change private profitability of cocoa production from the base value of ₦284,955.83 to ₦195,215.79, ₦105,495.75 and ₦15,775.71 respectively. It could be seen that at all the levels of change of domestic price of cocoa, the private profit was positive showing that at all the levels of change of the domestic price of cocoa, cocoa production would still be competitive given current technologies and the prevailing policies. Table 5.42 also showed that an increase in domestic price of cocoa beans by 20 percent, 40 percent and 60 percent reduced the PCR from the base value of 0.31 to 0.25, 0.22 and 0.18, respectively. However, a decrease in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent would give the PCR values of 0.40, 0.55 and 0.89 respectively from the base value of 0.31. The result shows that at all the levels of changes in the domestic price of cocoa beans, the PCR ratio remained at less than one indicating that cocoa production would still be competitive at the levels of price changes in the domestic price of cocoa beans. In general, increased in domestic price makes cocoa production system to be more competitive while a decrease in domestic price makes it to be less competitive. For

instance, an increase in the domestic price by 60 percent increased the competitiveness by 194 percent while a decrease in the domestic price by 60 percent reduced the competitiveness by 94 percent.

As for NPC, increase in domestic price of cocoa beans by 20 percent, 40 percent and 60 percent changes the NPC ratio from the base value of 0.80 to 0.96, 1.12 and 1.28, respectively. Decrease in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent would resulted in NPC ratio of 0.64, 0.47 and 0.32, respectively. Meanwhile, with an increase in domestic price by 20 percent and decrease in domestic price by 20 percent, 40 percent and 60 percent, the NPC ratio was less than one showing that the domestic farm gate price of cocoa beans was less than the international price. Hence, there was negative protection on output and this confirmed the presence of taxes or any other policy that is detrimental to the realization of the maximum output. However, with increase in domestic price by 40 percent and 60 percent, the NPC was greater than one showing that domestic farm gate price of cocoa beans was greater than the international price. Hence, there was positive protection on output and this confirmed the presence of subsidy or any other policy that supports the realization of the maximum output.

Table 5.42 also shows that increase in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent increased the EPC from the base value of 0.77 to 0.93, 1.09 and 1.27, respectively. Decrease in the domestic price by 20 percent, 40 percent and 60 percent would result in the EPC ratio of 0.60, 0.43 and 0.27, respectively. With increase in domestic price by 20 percent and decrease in domestic price by 20 percent, 40 percent and 60 percent, the EPC ratio was less than one implying that producers were not protected through policy intervention. However, with increase in domestic price by 40 percent and 60 percent, the EPC was greater than one showing a positive protection on output and this confirmed the presence of subsidy or any other policy that supports of the realization of the maximum output.

As regards the PC, increase in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent changed the PC value from the base value of 0.66 to 0.86, 1.07 and 1.28, respectively. A decrease in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent resulted in the PC values of 0.45, 0.24 and 0.04 respectively from the base value of 0.66. However, the PC values of 1.07 and 1.28 showed that the ratios were higher than one indicating that at 40 percent and 60 percent increase in the domestic price of cocoa beans, the private profit would be more than the profits evaluated at the world reference price. This showed that there are

incentives in the production system. However, at the other levels of change of the domestic price, (that is +20 percent, -20 percent, -40 percent and -60 percent), the PC ratio was less than one, hence, there was a disincentive in the production system. In summary, increase in domestic price would increase the competitiveness of cocoa production and *vice versa*. Also, cocoa producers can earn maximum revenue if government policies protect the producers by way of providing incentives that would increase the domestic price of cocoa.

Table 5.42. Effect of changes in the domestic price of cocoa beans on cocoa production

	Effect of changes in the domestic price of cocoa beans						
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
PP (₦)	284955.83	374655.87	464375.91	554095.95	195215.79	105495.75	15775.71
PCR	0.31	0.25	0.22	0.18	0.40	0.55	0.89
NPC	0.80	0.96	1.12	1.28	0.64	0.47	0.32
EPC	0.77	0.93	1.09	1.27	0.60	0.43	0.27
PC	0.66	0.86	1.07	1.28	0.45	0.24	0.04
SP (₦)	598922.07	598982.07	598922.07	598922.07	598922.07	598922.07	598922.07
DRC	0.15	0.15	0.15	0.15	0.15	0.15	0.15
SCB	0.18	0.18	0.18	0.18	0.18	0.18	0.18

Source: Field survey, 2014.

5.3.5.2. Effects of changes in the domestic price of cocoa beans on cocoa marketing

Table 5.43 showed the effects of changes in the domestic price of cocoa beans on cocoa marketing. The table showed that increase in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent would change the private profitability of cocoa marketing from the base value of ₦35,800.94 per tonne to ₦46,870.38, ₦57,939.83 and ₦69,009.27 per tonne, respectively. A decrease in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent would change the private profitability of cocoa marketing from the base value of ₦35,800.94 to ₦24,731.50, ₦13,662.05 and ₦2,592.61, respectively. It could be observed that at all the levels of changes in the domestic price of cocoa beans, the private profitability of cocoa marketing was still positive showing that cocoa marketing was competitive given current technologies and the prevailing polices. However, cocoa marketing was more competitive when the domestic price increased by 60 percent and least competitive when the domestic price is decreased by 60 percent.

Table 5.43 also showed that increase in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent would change the PCR from the base value of 0.26 to 0.22, 0.19 and 0.16, respectively. Also, a decrease in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent would change the PCR to 0.35, 0.49 and 0.83, respectively. The result revealed that at all the levels of changes in the domestic price of cocoa beans, the PCR ratios were less than one indicating that cocoa marketing in the study area is competitive given current technologies and the prevailing policies. However, the lower the values of PCR, the higher the competitiveness. Hence, the competitiveness was highest at 60 percent increase in domestic price and is lowest at 60 percent decrease in the domestic price of cocoa beans.

As regards the NPC, increase in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent would resulted in the change of NPC from the base value of 0.99 to 1.19, 1.39 and 1.58, respectively. The NPC of greater than one indicated that the domestic farm gate price was higher than the international price showing that government policy provided incentives to local cocoa marketers to realize the maximum output. However, a decrease in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent changed the NPC of cocoa marketing to 0.79, 0.59 and 0.39 respectively. The NPC values were less than one indicating that the domestic market price was lower than the international price. Hence, there was negative

protection on local cocoa marketing and this confirmed the presence of taxes or any other policies that are detrimental to the realization of the maximum profit.

Table 5.43 also showed that changes in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent resulted in the change of EPC of cocoa marketing from the base value of 0.92 to 1.10, 1.29 and 1.47 respectively. The EPC greater than one at these levels of change in the domestic price indicated that government policies provide the incentives to marketers and hence cocoa marketing is encouraged through introduction of subsidies or a reduction in tax. However, a decrease in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent changed the EPC to 0.74, 0.55 and 0.37, respectively. These ratios were less than one and it indicated that marketers were not protected when domestic prices were reduced.

Increase in the domestic price of cocoa beans by 20 percent, 40 percent and 60 percent changed the PC of cocoa marketing from the base value of 0.96 to 1.25, 1.55 and 1.84, respectively. The PC value of greater than one indicated that at 20 percent, 40 percent or 60 percent increase in domestic market price of cocoa beans, the private profit would be more than the profits evaluated at the world reference price. Hence, there are incentives in the marketing system. On the other hand, a decrease in the domestic market price of cocoa beans by 20 percent, 40 percent and 60 percent changed the PC of cocoa marketing to 0.66, 0.36 and 0.07, respectively. The ratios were less than one indicating that there is a disincentive in the marketing system. The SP, DRC and SCB are not sensitive to changes in domestic prices, hence they all remain unchanged. This is because domestic price does not affect SP, DRC and SCB, rather, they are all affected by social price.

Table 5.43. Effect of changes in the domestic price of cocoa beans on cocoa marketing

		Effect of changes in the domestic price of cocoa beans					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
PP (₦)	35800.94	46870.30	57939.83	69009.27	24731.50	13662.05	2592.61
PCR	0.26	0.22	0.19	0.16	0.35	0.49	0.83
NPC	0.99	1.19	1.39	1.58	0.79	0.59	0.39
EPC	0.92	1.10	1.29	1.47	0.74	0.55	0.37
PC	0.96	1.25	1.55	1.84	0.66	0.36	0.07
SP (₦)	37445.57	37445.57	37445.57	37445.57	37445.57	37445.57	37445.57
DRC	0.23	0.23	0.23	0.23	0.23	0.23	0.23
SCB	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Source: Field survey, 2014.

5.3.5.3. Effect of changes in the domestic price of black soap on black soap processing

Table 5.44 showed the effect of changes in the domestic price of black soap on black soap processing. The table showed that an increase in the domestic price of black soap by 20 percent, 40 percent and 60 percent increased the PP from the base value of ₦94,262.26 to ₦140,295.59, ₦186,328.92 and ₦232,362.26, respectively. A decrease in the domestic price of black soap by 20 percent, 40 percent and 60 percent would reduced the PP of black soap processing from the base value of ₦94,262.26 to ₦48,228.93, ₦3,000 and -₦43,837.74 respectively. Hence, the results showed positive PP except a situation when the domestic price is reduced by 60 percent. Hence, black soap processing was competitive at all the levels of changes in the domestic price except at 60 percent reduction in which case the black soap processing was no more be competitive.

Increase in the domestic price of black soap by 20 percent, 40 percent and 60 percent resulted in the changes of PCR from the base value of 0.26 to 0.19, 0.15 and 0.13, respectively. A decrease in the domestic price by 20 percent, 40 percent and 60 percent changed the PCR to 0.41 0.94 and 3.45, respectively. The PCR were less than one except in a situation of 60 percent price reduction. Hence, black soap processing was competitive at the different levels of changes in domestic price expect at 60 percent reduction in domestic price.

Increase in domestic price by 20 percent, 40 percent and 60 percent changes the NPC from the base value of 0.79 to 0.94, 1.11 and 1.26, respectively. NPC of greater than one for 40 percent and 60 percent increase in domestic price indicates the provision of incentives to black soap processors. However, a decrease in the market price by 20 percent, 40 percent and 60 percent changed the NPC to 0.63, 0.47 and 0.32 respectively. The ratios were still less than one indicating negative protection on black soap processing when the domestic price of black soap was reduced by 20 percent, 40 percent and 60 percent.

Increase in the domestic price of black soap by 20 percent, 40 percent and 60 percent would changed the EPC from the base value of 0.67 to 0.91, 1.14 and 1.91 respectively. EPC greater than one indicates positive impact of government policies on black soap processing. However, a decrease of domestic price by 20 percent, 40 percent and 60 percent changed the EPC to 0.43, 0.26, and 0.18 respectively. EPC of less than one indicated that black soap processing is not protected by government policies. Increase in the domestic price of black soap by 20 percent, 40 percent and 60 percent changes the PC from the base value of 0.59 to 0.89, 1.17 and 1.47

respectively. On the other hand, a decrease in the domestic price by 20 percent, 40 percent and 60 percent changes the PC ratio to 0.30, 0.23 and 0.01 respectively. A Profitability Coefficient greater than one indicates that there are incentives on black soap processing while a PC lesser than one indicates disincentives in black soap processing. Meanwhile, SP, DRC and SCB are not sensitive to changes in domestic price and hence they all remain constant.

Table 5.44. Effect of changes in the domestic price of black soap on black soap processing

	Effect of changes in the domestic price of black soap						
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
PP (₦)	94262.26	140295.59	186328.92	232362.26	48228.93	3000.00	-43837.74
PCR	0.26	0.19	0.15	0.13	0.41	0.94	3.45
NPC	0.79	1.94	1.11	1.26	0.63	0.47	0.32
EPC	0.67	0.91	1.14	1.91	0.43	0.26	0.18
PC	0.59	0.89	1.17	1.47	0.30	0.23	0.01
SP (₦)	158499.68	158499.68	158499.68	158499.68	158499.68	158499.68	158499.68
DRC	0.18	0.18	0.18	0.18	0.18	0.18	0.18
SCB	0.46	0.46	0.46	0.46	0.46	0.46	0.46

Source: Field survey, 2014.

5.3.5.4. Effects of changes in the domestic price of cocoa powder on cocoa powder processing

Table 5.45 showed the effect of changes in the domestic price of cocoa powder processing. The table showed that an increase in the domestic price of cocoa powder by 20 percent, 40 percent, and 60 percent would increased the PP of cocoa powder processing from the base value of ₦309,708.13 to ₦471,708.13, ₦633,708.20 and ₦795,708.20, respectively. A decrease in the domestic price by 20 percent, 40 percent, and 60 percent decreased the PP to ₦147,708.13, -₦14,291.87 and –₦176,291.87, respectively. It could be observed that there was a positive PP at all the levels of changes in the domestic price except when the domestic price is reduced by 40 percent and 60 percent in which negative PP were obtained. Hence, cocoa powder processing would no more be competitive when the domestic price of cocoa powder is reduced by 40 percent and 60 percent.

Increase in the domestic price by 20 percent, 40 percent, and 60 percent changed the PCR of cocoa powder processing from the base value of 0.04 to 0.03, 0.02 and 0.01, respectively. However, a decrease in the domestic price at the stipulated percentages changed the PCR to 0.09, 15.29 and -0.11. Hence, cocoa powder processing would no more be competitive when the domestic price is reduced by 40 percent and 60 percent. A negative value (-0.11) was obtained when the domestic price was reduced by 60 percent. This was so because at a reduction of domestic price by 60 percent, the cost of tradable inputs at private price was higher than the revenue at private price. Therefore, at 60 percent reduction, the difference between the revenue and the cost of tradable inputs gave a negative figure and the cost of domestic factors over a negative figure would give a negative value.

Increase in the domestic price by 20 percent, 40 percent, and 60 percent changes the NPC from the base value of 0.94 to 1.12, 1.31 and 1.50 respectively. Decrease in the domestic price by 20 percent, 40 percent, and 60 percent changed the NPC to 0.75, 0.56 and 0.37, respectively. NPC of less than one indicated that there was negative protection on cocoa powder processing while NPC of greater than one indicates a positive protection on cocoa powder processing. Hence cocoa powder processing was only protected when the domestic price of cocoa powder is increased by 20 percent, 40 percent and 60 percent.

Increase in the domestic price of cocoa powder by 20 percent, 40 percent and 60 percent changed the EPC of cocoa powder processing from the base value of 0.82 to 1.23, 1.63 and 2.04

respectively. Decreasing the domestic price by 20 percent, 40 percent and 60 percent changed the EPC to 0.41, 0.03 and -0.40, respectively. EPC of greater than one indicated that cocoa powder processing was protected by government policies while EPC of less than one indicated that cocoa powder processing was not protected by government policies. Hence, cocoa powder processing is only protected when the domestic price of cocoa powder is increased by 20 percent, 40 percent and 60 percent.

Increase in the domestic price of cocoa powder by 20 percent, 40 percent and 60 percent changed the PC of cocoa powder processing from the base value of 0.81 to 1.23, 1.66 and 2.08 respectively while a decrease in the domestic price changed the PC to 0.39, -0.04 and -0.46, respectively. A PC greater than one indicated that there are incentives on cocoa powder processing while a PC of less than one indicated disincentives on cocoa powder processing. Hence, based on the values of PC obtained, cocoa powder processing will only receive government incentives when the domestic price of cocoa powder is increased by 20 percent, 40 percent and 60 percent. A negative value was obtained at 40 percent and 60 percent reduction because at these levels of reduction, the sum of the cost of tradable inputs and domestic factors is greater than the revenue.

Table 5.45. Effect of changes in the domestic price of cocoa powder on cocoa powder processing

		Effect of changes in the domestic price of cocoa powder					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
PP (₦)	309708.13	471708.13	633708.20	795708.20	147708.13	-14291.87	-176291.87
PCR	0.04	0.03	0.02	0.01	0.09	15.29	-0.11
NPC	0.94	1.12	1.31	1.50	0.75	0.56	0.37
EPC	0.82	1.23	1.63	2.04	0.41	0.003	-0.40
PC	0.81	1.23	1.66	2.08	0.39	0.04	-0.46
SP (₦)	382247.22	382247.22	382247.22	382247.22	382247.22	382247.22	382247.22
DRC	0.04	0.04	0.04	0.04	0.04	0.04	0.04
SCB	0.56	0.56	0.56	0.56	0.56	0.56	0.56

Source: Field survey, 2014.

5.3.5.5. Effect of changes in the domestic price of cocoa butter on cocoa butter processing

The effect of changes in the domestic price of cocoa butter on cocoa butter processing is shown in Table 5.46. It is shown on the table that increasing the domestic price of cocoa butter by 20 percent, 40 percent and 60 percent changed the PP of cocoa butter processing from the base value of ₦730,229.80 to ₦976,229.80, ₦1,222,229.80 and ₦1,468,229.80 respectively. Decreasing the domestic price by 20 percent, 40 percent and 60 percent changes the PP from the base value of ₦730,229.80 to ₦448,229.77, ₦238,229.77 and –₦7,770.23 respectively. The result showed that all the PP values were positive except the PP resulting from reducing the domestic price by 60 percent. Hence, cocoa butter processing would no more be competitive if the domestic price is reduced by 60 percent.

Increasing the domestic price by 20 percent, 40 percent and 60 percent changed the PCR from the base value of 0.019 to 0.015, 0.012 and 0.009, respectively. Decreasing the domestic price by 20 percent, 40 percent and 60 percent changed the PCR to 0.032, 0.058 and 2.11, respectively. Hence, cocoa butter processing is competitive except when the domestic price of cocoa butter is reduced by 60 percent.

Increasing the domestic price of cocoa butter by 20 percent, 40 percent and 60 percent changed the NPC from the base value of 0.95 to 1.14, 1.33 and 1.52, respectively. However, decreasing the domestic price by 20 percent, 40 percent and 60 percent change the NPC to 0.73, 0.57 and 0.38, respectively. NPC greater than one indicated a positive protection by way of government policies on cocoa butter processing while NPC that is less than one indicated a negative protection on cocoa butter processing.

An increase in the domestic price of cocoa butter by 20 percent, 40 percent and 60 percent changed the EPC of cocoa butter processing from the base value of 0.90 to 1.20, 1.49 and 1.79, respectively. On the other hand, a decrease in the domestic price by 20 percent, 40 percent and 60 percent changed the EPC to 0.56, 0.36 and 0.01, respectively. EPC of greater than one indicated that cocoa butter processing is protected by government policies while EPC of less than one indicated that cocoa butter processing is not protected by government policies. Hence, cocoa butter processing is not protected when the domestic price of cocoa butter is reduced by 20 percent, 40 percent and 60 percent.

With an increase in the domestic price of cocoa butter by 20 percent, 40 percent and 60 percent, the PC of cocoa butter processing increased from the base value of 0.98 to 1.20, 1.50

and 1.80, respectively. However, a decrease in the domestic price of cocoa butter change the PC to 0.55, 0.29 and -0.01, respectively. A PC of greater than one indicated the presence of incentive such as input subsidy on cocoa butter processing while a PC of less than one showed disincentive such as tax on cocoa butter processing.

Table 5.46. Effect of changes in the domestic price of cocoa butter on cocoa butter processing

		Effect of changes in the domestic price of cocoa butter					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
PP (₦)	730229.80	976229.80	1222229.80	1468229.80	448229.77	238229.77	-7770.23
PCR	0.019	0.015	0.012	0.009	0.032	0.058	2.110
NPC	0.95	1.14	1.33	1.52	0.73	0.57	0.38
EPC	0.90	1.20	1.49	1.79	0.56	0.36	0.01
PC	0.98	1.20	1.50	1.80	0.55	0.29	-0.01
SP (₦)	814273.40	814273.40	814273.40	814273.40	814273.40	814273.40	814273.40
DRC	0.02	0.02	0.02	0.02	0.02	0.02	0.02
SCB	0.37	0.37	0.37	0.37	0.37	0.37	0.37

Source: Field survey, 2014.

5.3.5.6. Effect of changes in the world price of cocoa beans on cocoa cultivation

The effect of changes in the world price of cocoa beans on cocoa production is shown on Table 5.47. It is revealed on the table that when the world price of cocoa is increased by 20 percent, 40 percent and 60 percent, the SP of cocoa production changed from the base value of ₦598,982.07 to ₦744,371.89, ₦889,761.70 and ₦1,035,151.60, respectively. Also, when the world price of cocoa was decreased by 20 percent, 40 percent and 60 percent, the SP changed to ₦453,592.25, ₦308,202.42 and ₦162,812.60, respectively. The result revealed that at all the levels of changes in the world price of cocoa, cocoa production is socially profitable and hence the system used scarce resources efficiently.

An increase in the world price of cocoa beans by 20 percent, 40 percent and 60 percent changed the DRC of cocoa cultivation from the base value of 0.15 to 0.13, 0.11 and 0.09, respectively. A decrease in the world price of cocoa by 20 percent, 40 percent and 60 percent changed the DRC to 0.19, 0.26 and 0.39, respectively. It could be observed that all the DRC values were less than unity showing that the value of domestic resources used in cultivation was lower than the value added. Hence, there is an efficient use of domestic resources in production and the production is socially profitable.

Increase in the world price of cocoa beans by 20 percent, 40 percent and 60 percent changed SCB of cocoa production from the base value of 0.18 to 0.15, 0.13 and 0.11, respectively. On the other hand, a decrease in the world price of cocoa beans changed the SCB of cocoa production to 1.01, 1.35 and 2.02, respectively. A ratio that is less than one indicates that the resources utilized for production are efficiently used; hence, cocoa production is profitable while a ratio that is more than one indicates that cocoa production is not profitable. Hence, cocoa production is not profitable when the world price of cocoa beans is reduced by 20 percent, 40 percent and 60 percent. Increase in the world price of cocoa beans changed the NPC of cocoa production from the base value of 0.81 to 0.67, 0.58 and 0.50, respectively.

Also, a decrease in the world price by 20 percent, 40 percent and 60 percent changed the NPC to 1.01, 1.35 and 2.02. NPC of less than one indicates that the domestic price is less than the world price in which case there is negative protection on cocoa production. NPC of greater than one indicates that the domestic price is more than the world price, hence there is positive protection on cocoa production. From the result of the NPC above, it could be discovered that government policies start to protect cocoa production positively when the world price of cocoa

starts to decrease thereby allowing the domestic price to be more than the world price. Hence, government policy starts to protect cocoa production when the world price of cocoa beans is reduced by 20 percent, 40 percent and 60 percent. However, there is negative protection on cocoa production as the world price of cocoa increases by 20 percent, 40 percent and 60 percent. This is because as the world price increased compared with the domestic price, the NPC was less than one since NPC is the ratio of domestic price to the world price. The more less the NPC from one indicates the more less the protection of government policy on cocoa production.

An increase in the world price of cocoa by 20 percent, 40 percent and 60 percent changed the EPC of cocoa production from the base value of 0.90 to 0.58, 0.55 and 0.48, respectively. On the other hand, a decrease in the world price of cocoa by 20 percent, 40 percent and 60 percent changed the EPC of cocoa production to 0.98, 1.33 and 2.05, respectively. EPC of greater than one suggests that government policies provide positive incentives to cocoa production while EPC of less than one suggests that government policies do not provide incentives to cocoa production. Hence, from the EPC values above, government policies start to provide incentives to cocoa production when the world price of cocoa decreases by 40 percent and 60 percent.

Increase in the world price of cocoa by 20 percent, 40 percent and 60 percent changed the PC of cocoa production from the base value of 0.71 to 0.57, 0.47 and 0.41 respectively. In comparison, a decrease in the world price changed the PC values to 0.93, 1.37 and 2.59, respectively. A PC of greater than one shows government incentives on cocoa production while a PC of less than one shows there are government disincentives on cocoa production. Hence, government incentives start to manifest when the world price of cocoa beans is reduced by 40 percent and 60 percent. Meanwhile, PP and PCR are not sensitive to changes in the world price and hence, they all remained constant. Private Profitability and Private Cost Ratio are only affected by the domestic price.

Table 5.47. Effect of changes in the world price of cocoa beans on cocoa production

		Effect of changes in the world price of cocoa beans					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	598982.07	744371.89	889761.70	1035151.60	453592.25	308202.42	162812.60
DRC	0.15	0.13	0.11	0.09	0.19	0.26	0.39
SCB	0.18	1.15	0.13	0.11	0.22	0.29	0.44
NPC	0.81	0.67	0.58	0.50	1.01	1.35	2.02
EPC	0.90	0.58	0.55	0.48	0.98	1.33	2.05
PC	0.90	0.57	0.47	0.41	0.93	1.37	2.59
PP (₦)	284955.83	284955.83	284955.83	284955.83	284955.83	284955.83	284955.83
PCR	0.31	0.31	0.31	0.31	0.31	0.31	0.31

Source: Field survey, 2014.

5.3.5.7. Effects of changes in the world price of cocoa on cocoa marketing

Table 5.48 showed the effects of changes in the world price of cocoa on cocoa marketing. It is revealed in the table that an increase in the world price of cocoa by 20 percent, 40 percent and 60 percent changed the SP of cocoa marketing from the base value of ₦37,445.57 to ₦48,564.39, ₦59,683.22 and ₦70,802.04, respectively. Also, a decrease in the world price by 20 percent, 40 percent and 60 percent changeg the SP to ₦26,326.75; ₦15,207.92 and ₦4,089.10 respectively. The result of the analysis showed that all the SP values were positive indicating that at all the levels of changes in the world price of cocoa, cocoa marketing is socially profitable and the marketing system can use scarce resources efficiently.

Increase in the world price of cocoa by 20 percent, 40 percent and 60 percent changed the DRC from the base value of 0.23 to 0.19, 0.16 and 0.13 respectively while a decrease in the world price by 20 percent, 40 percent and 60 percent changed the DRC from the base value of 0.23 to 0.29, 0.42 and 0.73 respectively. DRC of less than one indicates there is efficiency in marketing cocoa domestically. Hence, at all the levels of changes in the world price, there was efficiency in the use of domestic resources and cocoa marketing is socially profitable.

Increase in the world price of cocoa beans by 20 percent, 40 percent and 60 percent changed the SCB of cocoa marketing from the base value of 0.33 to 0.27, 0.23 and 0.20 respectively. Also, decrease in the world price of cocoa by 20 percent, 40 percent and 60 percent changed the SCB to 0.41, 0.54 and 0.81 respectively. SCB of less than one indicates that an activity is profitable. Hence, at all the levels of changes of world price of cocoa, the result of the SCB showed that cocoa marketing is profitable.

An increase in the world price of cocoa by 20 percent, 40 percent and 60 percent changed the NPC of cocoa marketing from the base value of 0.99 to 0.83, 0.71 and 0.63 respectively. However, a decrease in the world price by 20 percent, 40 percent and 60 percent changed the NPC to 1.25, 1.66 and 2.50 respectively. NPC of less than one indicates negative protection on cocoa marketing while NPC of greater than one indicates positive protection on cocoa marketing. Hence, from the result of the NPC, there is positive protection on cocoa marketing when the world price of cocoa beans is reduced by 20 percent, 40 percent and 60 percent. However, there is negative protection on cocoa marketing when the world price is increased by 20 percent, 40 percent and 60 percent.

An increase in the world price by 20 percent, 40 percent and 60 percent would change the EPC of cocoa marketing from the base value of 0.92 to 0.82, 0.69 and 0.59 respectively while a reduction in the world price by 20 percent, 40 percent and 60 percent changed the EPC from the base value of 0.92 to 1.31, 1.87 and 3.25 respectively. An EPC of greater than one suggests that government policies provide incentives to cocoa marketing while there is disincentive when the EPC is less than one. From the result of the EPC, cocoa marketing would start enjoying incentives from government if the world price is reduced by 20 percent, 40 percent and 60 percent.

Increasing the world price by 20 percent, 40 percent and 60 percent would shift the PC of cocoa marketing from its base value of 0.96 to 0.70, 0.59 and 0.49 respectively while decreasing the world price would shift the PC to 1.26, 2.35 and 7.04 respectively. A PC greater than one shows government incentive while a PC less than one shows disincentive. Therefore, cocoa marketing would receive government incentives when the world price of cocoa is reduced by 20 percent, 40 percent and 60 percent. This is because as the world price of cocoa is reducing, the social profit is lowered thus allowing the private profit to be more than social profit. Since the PC is the ratio of private profit to social profit, then the PC would be greater than one showing government incentives on cocoa marketing.

Table 5.48. Effect of changes in the world price of cocoa beans on cocoa marketing

		Effect of changes in the world price of cocoa beans					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	37445.57	48564.39	59683.22	70802.04	26326.75	15207.92	4089.10
DRC	0.23	0.19	0.16	0.13	0.79	0.42	0.73
SCB	0.33	1.27	0.23	0.20	0.41	0.54	0.81
NPC	0.99	0.83	0.71	0.63	1.25	1.66	2.50
EPC	1.01	0.82	0.69	0.59	1.31	1.87	3.25
PC	0.96	0.70	0.59	0.48	1.26	2.35	7.05
PP (₦)	35800.94	35800.94	35800.94	35800.94	35800.94	35800.94	35800.94
PCR	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Source: Field survey, 2014.

5.3.5.8. The effects of changes in the world price of black soap on black soap processing

Table 5.49 shows the effects of changes in the world price of black soap on black soap processing. An increase in the world price of black soap changed the SP of black soap processing from the base value of ₦158,499.68 to ₦216,819.68, ₦275,139.68 and ₦333,459.68, respectively. Also, a decrease in the world price of black soap changed the SP of black soap to ₦100,179.68, ₦41,859.68 and –₦16,460.32. The result showed that all the SP values were positive except the one that resulted from the reduction of world price by 60 percent. Apart from this, for the other levels of changes in the world price, SP are positive showing that black soap processing is socially profitable and the processing system used scarce resources efficiently. However, if the world price is reduced by 60 percent, black soap processing would no more be socially profitable.

An increase in the world price of black soap changed the DRC of black soap processing from the base value of 0.18 to 0.14, 0.11 and 0.09 respectively. On the other hand, decreasing the world price changed the DRC to 0.25, 0.45 and 1.94. All the DRC values were less than one except the one with 60 percent reduction in the world price which was greater than one. DRC of less than one indicates efficiency in processing of black soap domestically. Hence, at all levels of changes in world price (except the one at 60 percent reduction), there was efficiency in the use of domestic resources and black soap processing was socially profitable. However, black soap processing was not socially profitable when the world price of black soap was reduced by 60 percent. Increasing the world price of black soap by 20 percent, 40 percent and 60 percent changed the SCB of black soap processing from the base value of 0.46 to 0.38, 0.33 and 0.29, respectively. Also, decreasing the world price of black soap by 20 percent, 40 percent and 60 percent changes the SCB to 0.57, 0.76 and 1.14. SCB of less than one indicates that black soap processing is profitable and *vice versa*. Hence, black soap processing is profitable at all the levels of changes in the world price of black soap except when the world price is reduced by 60 percent during which black soap processing would no more be socially profitable.

Increasing the world price of black soap by 20 percent, 40 percent and 60 percent changed the Nominal Protection Coefficient (NPC) of black soap processing from the base value of 0.79 to 0.63, 0.54 and 0.47, respectively. Also, a decrease in the world price of black soap by 20 percent, 40 percent and 60 percent changed the NPC of black soap to 0.94, 1.58 and 2.38 respectively. Since NPC is the ratio of private price to the world price, therefore, as the world

price decreases NPC increases until it is greater than one. NPC of greater than one indicates government policies protect black soap processing while NPC of less than one indicates non-protection. Therefore, government policies start to protect black soap processing when the world price of black soap is reduced by 40 percent and 60 percent. However at the other levels of changes in the world price of black soap, there is no government policies' protection on black soap processing.

Increasing the world price of black soap by 20 percent, 40 percent and 60 percent changed the Effective Protection Coefficient (EPC) of black soap processing from the base value of 0.67 to 0.48, 0.39 and 0.33 respectively. Also, decreasing the world price of black soap by 20 percent, 40 percent and 60 percent changed the EPC to 0.88, 1.51 and 5.51 respectively. EPC of greater than one indicates that black soap processing is protected through policy intervention while EPC of lesser than one, black soap processing is not protected. Hence, government policies start to protect black soap processing when the world price of black soap is being reduced by 40 percent and 60 percent.

Increasing the world price of black soap by 20 percent, 40 percent and 60 percent changed the PC of black soap processing from the base value of 0.59 to 0.40, 0.32 and 0.26 respectively while decreasing the world price by 20 percent, 40 percent and 60 percent changed the PC to 0.84, 1.87 and 8.81 respectively. Therefore, black soap processing will receive government incentives when the world price of black soap is reduced by 40 percent.

Table 5.49. Effect of changes in the world price of black soap on black soap processing

		Effect of changes in the world price of black soap					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	158499.68	216819.68	275139.68	333459.68	100179.69	41859.68	-16460.32
DRC	0.18	0.14	0.11	0.09	0.25	0.45	1.94
SCB	0.46	1.38	0.33	0.29	0.57	0.76	1.14
NPC	0.79	0.63	0.54	0.47	1.94	1.58	2.38
EPC	1.67	0.48	0.39	0.33	1.88	1.51	5.51
PC	0.59	0.40	0.32	0.26	1.84	1.87	8.81
PP (₦)	94262.26	94262.26	94262.26	94262.26	94262.26	94262.26	94262.26
PCR	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Source: Field survey, 2014.

5.3.5.9. The effects of changes in the world price of cocoa powder on cocoa powder processing

The effect of changes in the world price of cocoa powder on cocoa powder processing is shown on Table 5.50. The table showed that increasing the world price of cocoa powder by 20 percent, 40 percent and 60 percent increased the SP of cocoa powder processing from the base value of ₦382,247.22 to ₦555,752.80, ₦728,752.80 and ₦901,752.78 respectively. Also, decreasing the world price of cocoa powder by 20 percent, 40 percent and 60 percent decreased the SP to ₦209,752.78, ₦36,752.78 and –₦136,247.22, respectively. At all the levels of change of world price of cocoa powder, cocoa powder processing is socially profitable except in a situation when the world price of cocoa powder is reduced by 60 percent. This is because at 60 percent reduction in the world price, the SP would give negative value (–₦136,247.22) and a negative SP shows that an activity is not socially profitable.

An increase in the world price of cocoa powder by 20 percent, 40 percent and 60 percent changed the DRC of cocoa powder processing from the base value of 0.04 to 0.03, 0.02 and 0.01 respectively. Decreasing the world price by 20 percent, 40 percent and 60 percent changed the DRC to 0.06, 0.27 and 1.20, respectively. DRC of less than one indicates efficiency. Hence, there is efficiency in cocoa powder processing at all the levels of changes of world price of cocoa powder except when the world price is reduced by 60 percent.

An increase in the world price of cocoa powder by 20 percent, 40 percent and 60 percent changed the SCB of cocoa powder processing from the base value of 0.56 to 0.47, 0.40 and 0.35 respectively. Also, decreasing the world price of cocoa powder by 20 percent, 40 percent and 60 percent changed the SCB of cocoa powder processing from the base value of 0.56 into 0.70, 0.93 and 1.39, respectively. SCB of less than one indicates that cocoa powder processing is socially profitable while SCB of greater than one indicates that cocoa powder processing is not socially profitable. Hence, cocoa powder processing is socially profitable at all the levels of changes in the world price except the situation in which the world price is reduced by 60 percent. This is because at 60 percent reduction in the world price of cocoa powder, the SCB would be more than one, that is, 1.39.

Increase in the world price of cocoa powder by 20 percent, 40 percent and 60 percent changed the NPC of cocoa powder processing from the base value of 0.93 to 0.83, 0.71 and 0.63, respectively. However, a decrease in the world price of cocoa powder changed the NPC to 1.25,

1.69 and 2.50, respectively. NPC of greater than one indicates government policies' protection and *vice versa.* Therefore, government policies would start to protect cocoa powder processing when the world price of cocoa powder is reduced by 40 percent and 60 percent.

An increase in the world price of cocoa powder by 20 percent, 40 percent and 60 percent changed the EPC of cocoa powder processing from the base value to 0.64, 0.49 and 0.39 respectively. On the other hand, a decrease in the world price of cocoa powder by 20 percent, 40 percent and 60 percent changed the EPC to 1.80, 6.37 and 8.66, respectively. EPC of greater than one indicates government incentives while EPC of less than one means government disincentives. Hence, cocoa powder processing starts to receive government incentives when the world price of cocoa powder is reduced by 20 percent, 40 percent and 60 percent.

Increase in the world price of cocoa powder by 20 percent, 40 percent and 60 percent changed the PC of cocoa powder processing from the base value of 0.80 to 0.55, 0.42 and 0.34, respectively while decreasing the world price of cocoa powder by 20 percent, 40 percent and 60 percent changed the PC to 1.47, 8.37 and 10.26, respectively. Hence, cocoa powder processing starts to enjoy government incentives when the world price is reduced by 20 percent, 40 percent and 60 percent. This is because as the world price of cocoa powder reduces, the social profit is lowered thus allowing the private profit to be more than the social profit. Since the PC is the ratio of the private profit to social profit, then the PC would be greater than one thus showing government incentives on domestic cocoa powder processing.

Table 5.50. Effect of changes in the world price of cocoa powder on cocoa powder processing

		Effect of changes in the world price of cocoa powder					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	382247.22	555752.80	728752.80	901752.80	209752.78	36752.78	-136247.22
DRC	0.04	0.03	0.02	0.01	0.06	0.27	1.20
SCB	0.56	0.47	0.40	0.35	0.70	0.93	1.30
NPC	0.93	0.83	0.71	0.63	1.25	1.67	2.50
EPC	0.82	0.64	0.49	0.39	1.80	6.37	8.66
PC	0.80	0.55	0.42	0.34	1.47	8.37	10.26
PP (₦)	309708.13	309708.13	309708.13	309708.13	309708.13	309708.13	309708.13
PCR	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Source: Field survey, 2014.

5.3.5.10. The Effects of changes in the world price of cocoa butter on cocoa butter processing

The effect of changes in the world price of cocoa butter on cocoa butter processing is shown on Table 5.51. The table showed that increasing the world price of cocoa butter by 20 percent, 40 percent and 60 percent increases the SP of cocoa butter processing from the base value of ₦814,273.40 to ₦1,073,473.40, ₦1,322,673.40 and ₦1,591,873.40, respectively. Also, decreasing the world price of cocoa butter by 20 percent, 40 percent and 60 percent decreased the SP to ₦555,073.40, ₦295,873.32 and ₦36,673.32, respectively. At all the levels of changed in the world price of cocoa butter, cocoa butter processing is socially profitable.

An increase in the world price of cocoa butter by 20 percent, 40 percent and 60 percent would change the DRC of cocoa butter processing from the base value of 0.020 to 0.012, 0.010 and 0.008, respectively. On the other hand, decreasing the world price of cocoa butter by 20 percent, 40 percent and 60 percent changed the DRC to 0.024, 0.044 and 0.272 respectively. DRC of less than one indicates efficiency. Hence, there is efficiency in cocoa butter processing at all the levels of changes in the world price of cocoa butter.

An increase in the world price of cocoa butter by 20 percent, 40 percent and 60 percent changes the Social Cost Benefit (SCB) of cocoa butter processing from the base value of 0.37 to 0.31, 0.27 and 0.23 respectively. Also, decreasing the world price of cocoa butter by 20 percent, 40 percent and 60 percent would change the SCB of cocoa butter processing from the base value of 0.37 to 0.46, 0.62 and 0.92, respectively. SCB of less than one indicates that cocoa butter processing is socially profitable and vice versa. Hence, cocoa butter processing is socially profitable at all the levels of changes in the world price of cocoa butter.

Increase in the world price of cocoa butter by 20 percent, 40 percent and 60 percent changed the NPC of cocoa butter processing from the base value of 0.94 to 0.79, 0.67 and 0.59, respectively. However, decreasing the world price of cocoa butter by 20 percent, 40 percent and 60 percent changes the NPC into 1.19, 1.58 and 2.37 respectively. NPC of greater than one indicates government policies' positive protection while NPC of less than one indicates government policies do not protect cocoa butter processing. Therefore, government policies would start to protect cocoa butter processing positively when the world price of cocoa butter is reduced by 20 percent, 40 percent and 60 percent. This is because at these levels of reduction in the world price of cocoa butter, NPC would be greater than one.

An increase in the world price of cocoa butter by 20 percent, 40 percent and 60 percent would change the EPC of cocoa butter processing from the base value of 0.90 to 0.69, 0.55 and 0.46, respectively. Also, a decrease in the world price of cocoa butter by 20 percent, 40 percent and 60 percent changed EPC to 1.31, 2.40 and 14.78 respectively. EPC of greater than one indicates presence of government incentives while EPC of less than one indicates no government incentives. Hence, cocoa butter processing would start to enjoy government incentives when the world price of cocoa butter is reduced by 20 percent, 40 percent and 60 percent.

Increasing the world price of cocoa butter by 20 percent, 40 percent and 60 percent changed the PC of cocoa butter processing from the base value of 0.89 to 0.68, 0.54 and 0.45, respectively. However, decreasing the world price of cocoa butter by 20 percent, 40 percent and 60 percent changed the PC to 1.32, 2.46 and 19.80, respectively. A PC of greater than one shows government incentives while a PC of less than one shows disincentives. Therefore cocoa butter processing would receive government incentives when the world price of cocoa butter is reduced by 20 percent, 40 percent and 60 percent.

Table 5.51. Effect of changes in the world price of cocoa butter on cocoa butter processing

	Effect of changes in the world price of cocoa butter						
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	814273.40	1073473.40	1322673.40	1591873.40	555073.40	295873.32	36673.32
DRC	0.020	0.012	0.010	0.008	0.024	0.044	0.272
SCB	0.37	0.31	0.27	0.23	0.46	0.62	0.92
NPC	0.94	0.79	0.67	0.59	1.19	1.58	2.37
EPC	0.90	0.69	0.55	0.46	1.31	2.40	14.78
PC	0.89	0.68	0.54	0.45	1.32	2.46	19.80
PP (₦)	730229.80	730229.80	730229.80	730229.80	730229.80	730229.80	730229.80
PCR	0.019	0.019	0.019	0.019	0.019	0.019	0.019

Source: Field survey, 2014.

5.3.5.11. Effect of changes in the exchange rate on cocoa cultivation

The effect of changes in the exchange rate on cocoa cultivation is shown on Table 5.52. It is revealed on the table that when the exchange rate is increased by 20 percent, 40 percent and 60 percent, the SP of cocoa cultivation changed from the base value of ₦598,982.07 to ₦711,208.91, ₦823,435.38 and ₦935,661.90 respectively. Also, when the exchange rate is decreased by 20 percent, 40 percent and 60 percent, the social profitability also changed to ₦486,755.96 ₦374,529.49 and ₦262,303.02, respectively. The results revealed that at all the levels of change in the exchange rate, cocoa cultivation is socially profitable and hence the system uses scarce resources efficiently.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the DRC of cocoa cultivation from the base value of 0.15 to 0.13, 0.11 and 0.10, respectively. A decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed the DRC to 0.18, 0.22 and 0.28, respectively. It could be observed that all the DRC values were less than unity showing that the value of domestic resources used in production is lower than the value added. Hence, there is an efficient use of domestic resources in cultivation meaning that cultivation is socially profitable.

Increase in the exchange rate by 20 percent, 40 percent and 60 percent changes the SCB of cocoa cultivation from the base value of 0.18 to 0.15, 0.13 and 0.11 respectively. On the other hand, a decrease in the exchange rate changed the SCB of cocoa cultivation to 0.21, 0.25 and 0.33 respectively. A ratio that is less than one indicates that cocoa production is profitable while a ratio that is more than one indicates that cocoa cultivation is not profitable. Hence, cocoa cultivation is profitable at all the levels of changes of exchange rate. Increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the NPC of cocoa cultivation from the base value of 0.81 to 0.70, 0.62 and 0.55, respectively. Also, decrease in the exchange rate by 20 percent, 40 percent and 60 percent changes the NPC to 0.95, 1.17 and 1.50, respectively. NPC of less than one indicates that the domestic price is less than the world price in which case there is negative protection on cocoa cultivation. NPC of greater than one indicates that the domestic price is more than the world price, hence there is positive protection on cocoa cultivation. From the result of the NPC above, it could be seen that government policies start to protect cocoa cultivation positively when the exchange rate is decreased by 40 percent and 60 percent thereby allowing the domestic price to be more than the world price. This is because decrease in

exchange rate reduces the world price relative to the domestic price. Since NPC is the ratio of domestic price to world price, then as exchange rate is decreased by 40 percent and 60 percent, the world price would be lower than the domestic price thus making the NPC to be greater than one. However, there is negative protection on cocoa cultivation as the exchange rate increases by 20 percent, 40 percent and 60 percent and is decreased by 20 percent since at these levels of exchange rate, the NPC is less than one.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the EPC of cocoa production from the base value of 0.90 to 0.67, 0.59 and 0.52, respectively. On the other hand, a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed the EPC of cocoa cultivation to 0.93, 1.14 and 1.43, respectively. EPC of greater than one suggests that government policies provide positive incentives to cocoa cultivation while EPC of less than one suggests that government policies do not provide incentives to cocoa cultivation. Hence, from the EPC values above, government policies start to provide incentives to cocoa cultivation when the exchange rate starts to decrease by 40 percent and 60 percent.

Increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the PC of cocoa cultivation from the base value of 0.71 to 0.59, 0.51 and 0.45, respectively. However, a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changes the PC values to 0.87, 1.12 and 1.61, respectively. A PC of greater than one shows that there are government incentives on cocoa cultivation while a PC of less than one shows that there are government disincentives on cocoa production. Hence, government incentives start to manifest when the exchange rate is reduced by 40 percent and 60 percent.

Table 5.52. Effect of changes in the exchange rate on cocoa production

		Effect of changes in the exchange rate					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	598982.07	711208.91	823435.38	935661.90	486755.96	374529.49	262,303.02
DRC	0.15	0.13	0.11	0.10	0.18	0.22	0.28
SCB	0.18	1.15	0.13	0.11	0.21	0.25	0.33
NPC	0.81	0.70	0.62	0.55	0.95	1.17	1.50
EPC	0.90	0.67	0.59	0.52	0.93	1.14	1.43
PC	0.71	0.59	0.51	0.45	0.87	1.12	1.61
PP (₦)	284955.83	284955.83	284955.83	284955.83	284955.83	284955.83	284955.83
PCR	0.31	0.31	0.31	0.31	0.31	0.31	0.31

Source: Field survey, 2014.

5.3.5.12. Effects of changes in the exchange rate on cocoa marketing

Table 5.53 showed the effects of changes in the exchange rate on cocoa marketing. It is revealed in the table that an increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the SP of cocoa marketing from the base value of ₦37,445.57 to ₦51,415.45, ₦63,164.15 and ₦74,780.25, respectively. Also, a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed the SP to ₦28,315.85, ₦16,699.75 and ₦5,083.65, respectively. The result showed that all the SP were positive indicating that at all the levels of change in the exchange rate, cocoa marketing is socially profitable and the marketing system can use scarce resources efficiently.

Increase in the exchange rate by 20 percent, 40 percent and 60 percent changes the DRC from the base value of 0.23 to 0.18, 0.15 and 0.13 respectively while a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed the DRC to 0.28, 0.40 and 0.68, respectively. DRC of less than one indicates efficiency in marketing of cocoa domestically. Hence, at all the levels of change in the exchange rate, there was efficiency in the use of domestic resources and cocoa marketing is socially profitable.

Increase in the exchange rate by 20 percent, 40 percent and 60 percent changes the SCB of cocoa marketing to 0.26, 0.22 and 0.20 respectively. Also, a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed the SCB to 0.39, 0.52 and 0.78, respectively. SCB of less than one indicates an activity is profitable. Hence, at all the levels of change in exchange rate, the result of the SCB showed that cocoa marketing is profitable. An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the NPC of cocoa marketing from the base value of 0.99 to 0.80, 0.68 and 0.59, respectively. However, a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed the NPC to 1.19, 1.58 and 2.38, respectively. NPC of less than one indicates negative protection on cocoa marketing while NPC of greater than one indicates positive protection on cocoa marketing. Hence, from the result of the NPC, there is positive protection on cocoa marketing when the exchange rate is reduced by 20 percent, 40 percent and 60 percent. In contrast, there is negative protection on cocoa marketing when the exchange rate is increased by 20 percent, 40 percent and 60 percent.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the EPC of cocoa marketing from the base value of 0.91 to 0.79, 0.66 and 0.57, respectively while a reduction in the exchange rate by 20 percent, 40 percent and 60 percent would change the EPC to

1.25, 1.51 and 3.05, respectively. An EPC of greater than one suggests that government policies provide incentives to cocoa marketers while there is a disincentive in the case of EPC less than one. From the result of the EPC, cocoa marketing would start enjoying incentives from government if the exchange rate is reduced by 20 percent, 40 percent and 60 percent.

Increasing the exchange rate by 20 percent, 40 percent and 60 percent shifted the PC of cocoa marketing from its base value of 0.96 to 0.70, 0.57 and 0.48 respectively while decreasing the exchange rate shifted the PC to 1.26, 2.14 and 7.04, respectively. A PC greater than one shows government incentives while a PC less than one shows disincentives. Therefore, cocoa marketing would receive government incentives when the exchange rate is reduced by 20 percent, 40 percent and 60 percent.

Table 5.53. Effect of changes in the exchange rate on cocoa marketing

	Effect of changes in the exchange rate						
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	37445.57	51415.45	63164.15	74780.25	28315.85	16699.75	5083.65
DRC	0.23	0.18	0.15	0.13	0.28	0.40	0.68
SCB	0.33	0.26	0.22	0.20	0.39	0.52	0.78
NPC	0.99	0.80	0.68	0.59	1.19	1.58	2.38
EPC	0.91	0.79	0.66	0.57	1.25	1.51	3.05
PC	0.96	0.70	0.57	0.48	1.26	2.14	7.04
PP (₦)	35800.94	35800.94	35800.94	35800.94	35800.94	35800.94	35800.94
PCR	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Source: Field survey, 2014.

5.3.5.13. The effects of changes in the exchange rate on black soap processing

Table 5.54 showed the effects of changes in the exchange rate on black soap processing. An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the SP of black soap processing from the base value of ₦158,499.68 to ₦234,099.68 ₦295,299.68 and ₦356,499.68 respectively. Also, a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed the SP of black soap processing to ₦111,699.68, ₦50,499.68 and –₦10,700.32, respectively. The result showed that all the SP values were positive except the one that resulted from the reduction of exchange rate by 60 percent which gave negative SP. Apart from this, for the other levels of changes in the exchange rate, SP was positive showing that black soap processing is socially profitable with the processing system used scarce resources efficiently. However, if the exchange rate is reduced by 60 percent, black soap processing would no more be socially profitable.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the DRC of black soap processing from the base value of 0.18 to 0.13, 0.10 and 0.09 respectively. On the other hand, decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the DRC to 0.23, 0.40 and 1.46, respectively. All the DRC values were less than one except the one with 60 percent reduction in the exchange rate which was greater than one. A DRC of less than one indicates efficiency in the processing of black soap domestically. Hence, at all the levels of changes in exchange rate (except the one at 60 percent reduction), there is efficiency in the use of domestic resources and black soap processing is socially profitable. However, black soap processing was no more socially profitable when the exchange rate was reduced by 60 percent.

Increasing the exchange rate by 20 percent, 40 percent and 60 percent changed the SCB of black soap processing from the base value of 0.46 to 0.36, 0.31 and 0.27, respectively. Also, decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the SCB to 0.54, 0.72 and 1.09, respectively. SCB of less than one indicates that black soap processing is profitable and *vice versa*. Hence, black soap processing is profitable at all the levels of changes in the exchange rate except when the exchange rate is reduced by 60 percent during which black soap processing was no more be socially profitable.

Increasing the exchange rate by 20 percent, 40 percent and 60 percent changed the NPC of black soap processing from the base value of 0.79 to 0.63, 0.54 and 0.47 respectively. Also,

decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the NPC of black soap processing to 1.19, 1.25 and 1.88, respectively. NPC of greater than one indicates government policies' protection while NPC of less than one indicates non-protection. Therefore, government policies start to protect black soap processing when the exchange rate is reduced by 20 percent, 40 percent and 60 percent. However, at the other levels of change in the exchange rate, there is no government policies' protection on black soap processing.

Increasing the exchange rate by 20 percent, 40 percent and 60 percent changed the EPC of black soap processing from the base value of 0.67 to 0.49, 0.40 and 0.34, respectively. Also, decreasing the exchange rate by 20 percent, 40 percent and 60 percent changes the EPC to 0.90, 1.55 and 5.63, respectively. EPC of greater than one indicates that black soap processing is protected through policy intervention while EPC of less than one indicates black soap processing is not protected. Hence, government policies start to protect black soap processing when the exchange rate is reduced by 40 percent and 60 percent.

Increasing the exchange rate by 20 percent, 40 percent and 60 percent changes the PC of black soap processing to 0.40, 0.32 and 0.26 respectively while decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the PC to 0.84, 1.87 and 8.81. Therefore, black soap processing would receive government incentives when the exchange rate is reduced by 40 percent and 60 percent.

Table 5.54. Effect of changes in the exchange rate on black soap processing

	Effect of changes in the exchange rate						
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	158499.68	234099.68	295299.68	356499.68	111699.68	50499.68	-10700.32
DRC	0.18	0.13	0.10	0.09	0.23	0.40	1.46
SCB	0.46	0.36	0.31	0.27	0.54	0.72	1.09
NPC	0.79	0.63	0.54	0.47	1.19	1.25	1.88
EPC	0.67	0.49	0.40	0.34	0.90	1.55	5.63
PC	0.59	0.40	0.32	0.26	0.84	1.87	8.81
PP (₦)	94262.26	94262.26	94262.26	94262.26	94262.26	94262.26	94262.26
PCR	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Source: Field survey, 2014.

5.3.5.14. The effects of changes in the exchange rate on cocoa powder processing

The effect of changes in the exchange rate on cocoa powder processing is shown in Table 5.55. The table showed that increasing the exchange rate by 20 percent, 40 percent and 60 percent increased the SP of cocoa powder processing from the base value of ₦382,247.22 to ₦489,751.58, ₦651,751.40 and ₦813,751.20, respectively. Also, decreasing the exchange rate by 20 percent, 40 percent and 60 percent decreases the SP to ₦165,744.98, ₦3,752.18 and –₦158,247.62, respectively. At the levels of changes of exchange rate, cocoa powder processing was socially profitable except in a situation in which the exchange rate was reduced by 60 percent during which cocoa powder processing is no more socially profitable.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changes the DRC of cocoa powder processing from the base value of 0.04 to 0.03, 0.02 and 0.01, respectively. Decreasing the exchange rate by 20 percent, 40 percent and 60 percent changes the DRC to 0.08, 0.79 and 1.09, respectively. DRC of less than one indicates efficiency. Hence, there was efficiency in cocoa powder processing at all the levels of changes of exchange rate except when the exchange rate was reduced by 60 percent in which case the DRC was more than one. This is because at 60 percent reduction in exchange rate, the cost of domestic factors used for cocoa powder processing was more than the revenue generated.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the SCB of cocoa powder processing from the base value of 0.56 to 0.50, 0.42 and 0.37, respectively. Also, decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the SCB of cocoa powder processing into 0.74, 0.99 and 1.48, respectively. SCB of less than one indicated that cocoa powder processing was socially profitable and vice versa. Hence, cocoa powder processing is socially profitable at all the levels of changes in the exchange rate except in a situation in which the exchange rate is reduced by 60 percent.

Increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the NPC of cocoa powder processing from the base value of 0.93 to 0.90, 0.71 and 0.63 respectively. However, a decrease in the exchange rate changed the NPC to 1.25, 1.67 and 2.50, respectively. NPC of greater than one indicated government policies protection and *vice versa*. Therefore, government policies would start to protect cocoa powder processing when the exchange rate is reduced by 20 percent, 40 percent and 60 percent.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the EPC of cocoa powder processing from the base value to 0.64, 0.41 and 0.39, respectively. On the other hand, a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed the EPC to 1.80, 18.05 and 22.26 respectively. EPC of greater than one indicated government incentives while EPC of lesser than one means government disincentives. Hence, cocoa powder processing starts to receive government incentives when the exchange rate is reduced by 20 percent, 40 percent and 60 percent.

Increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the PC of cocoa powder processing from the base value of 0.80 to 0.63, 0.48 and 0.38 respectively, while decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the PC to 1.87, 18.41 and 21.95 respectively. Hence, cocoa powder processing starts to enjoy government incentives when the exchange rate is reduced by 20 percent, 40 percent and 60 percent.

Table 5.55. Effect of changes in the exchange rate on cocoa powder processing

		Effect of changes in the exchange rate					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	382247.22	489751.58	651751.40	813751.20	165744.98	3752.18	-158247.62
DRC	0.04	0.03	0.02	0.01	0.08	0.79	1.09
SCB	0.56	0.50	0.42	0.37	0.74	0.99	1.48
NPC	0.93	0.90	0.71	0.63	1.25	1.67	2.50
EPC	0.82	0.64	0.49	0.39	1.80	18.05	22.26
PC	0.80	0.63	0.48	0.38	1.87	18.41	21.95
PP (₦)	309708.13	309708.13	309708.13	309708.13	309708.13	309708.13	309708.13
PCR	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Source: Field survey, 2014.

5.3.5.15. The effects of changes in the exchange rate on cocoa butter processing

The effect of changes in the exchange rate on cocoa butter processing is shown in Table 5.56. The table showed that increasing the exchange rate by 20 percent, 40 percent and 60 percent increased the SP of cocoa butter processing from the base value of ₦814,273.40 to ₦1,032,673.50, ₦1,285,073.50 and ₦1,537,473.50, respectively. Also, decreasing the exchange rate by 20 percent, 40 percent and 60 percent decreases the SP to ₦527,873.40, ₦275,473.38 and ₦23,073.36, respectively. At all the levels of changes in the exchange rate, cocoa butter processing is socially profitable.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the DRC of cocoa butter processing from the base value of 0.020 to 0.013, 0.011 and 0.008, respectively. On the other hand, decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the DRC to 0.030, 0.050 and 0.373, respectively. DRC of less than one indicates efficiency. Hence, there is efficiency in cocoa butter processing at all the levels of changes in exchange rate.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the SCB of cocoa butter processing from the base value of 0.37 to 0.32, 0.27 and 0.24, respectively. Also, decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the SCB of cocoa butter processing into 0.48, 0.64 and 0.95, respectively. SCB of less than one indicates that cocoa butter processing is socially profitable and *vice versa*. Hence, cocoa butter processing was socially profitable at all the levels of changed in exchange rate.

Increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the NPC of cocoa butter processing from the base value of 0.94 to 0.81, 0.70 and 0.61, respectively. However, decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the NPC into 1.22, 1.62 and 2.43, respectively. NPC of greater than one indicates positive government policies protection while NPC of less than one indicates no government policies protection. Therefore, government policies will start to protect cocoa butter processing positively when the exchange rate is reduced by 20 percent, 40 percent and 60 percent.

An increase in the exchange rate by 20 percent, 40 percent and 60 percent changed the EPC of cocoa butter processing from the base value of 0.90 to 0.71, 0.57 and 0.48, respectively. Also, a decrease in the exchange rate by 20 percent, 40 percent and 60 percent changed EPC to 1.38, 2.57 and 20.24 respectively. EPC of greater than one indicates government incentives while EPC

of less than one indicates government disincentives. Hence, cocoa butter processing will start to enjoy government incentives when the exchange rate is reduced by 20 percent, 40 percent and 60 percent. This is because at these levels of reduction of exchange rate, the revenue at world price would be lower than the revenue at the domestic price. Hence, when the exchange rate was reduced by 20 percent, 40 percent and 60 percent, the EPC was greater than one.

Increasing the exchange rate by 20 percent, 40 percent and 60 percent changes the PC of cocoa butter processing from the base value of 0.89 to 0.71, 0.56 and 0.47, respectively. However, decreasing the exchange rate by 20 percent, 40 percent and 60 percent changed the PC to 1.38, 2.65 and 31.65 respectively. A PC of greater than one shows government incentives while a PC less than one shows disincentives. Therefore cocoa butter processing would receive government incentives when the exchange rate is reduced by 20 percent, 40 percent and 60 percent.

Table 5.56. Effect of changes in the exchange rate on cocoa butter processing

		Effect of changes in the exchange rate					
Indicator	Base value	+20%	+40%	+60%	-20%	-40%	-60%
SP (₦)	814273.40	1032673.50	1285073.50	1537473.50	527873.40	275473.38	23073.36
DRC	0.020	0.013	0.011	0.008	0.030	0.050	0.373
SCB	0.37	0.32	0.27	0.24	0.48	0.64	0.95
NPC	0.94	0.81	0.70	0.61	1.22	1.62	2.43
EPC	0.90	0.71	0.57	0.48	1.38	2.57	20.24
PC	0.89	0.71	0.56	0.47	1.38	2.65	31.65
PP (₦)	730229.80	730229.80	730229.80	730229.80	730229.80	730229.80	730229.80
PCR	0.019	0.019	0.019	0.019	0.019	0.019	0.019

Source: Field survey, 2014.

5.4.0 The effects of price distortions on producers' and consumers' welfare

Table 5.57 showed the result of partial equilibrium analysis. The table showed that the domestic price (pd) of cocoa beans was ₦448,226.38 per tonne. This is the price paid to the producer. Border price (pb) is the prevailing price at the point of exit for an internationally tradable commodity and was estimated at ₦466,000.00 per tonne for cocoa beans. Due to the shortage of time series data, it was not possible to estimate the price elasticity of demand econometrically. Price elasticity of demand (e_d) was obtained from the research findings of Ebi and Ape (2014) which estimated the demand elasticity of cocoa in Nigeria to be -0.55. This means 100 percent change in the price brings about 55 percent changes in the quantity of cocoa demanded. This is so because cocoa has no close substitute. The computed elasticity of supply (e_s) for cocoa from the data collected for this study is 7.90. The estimated supply elasticity (e_s) was high because of the nature of cocoa. Cocoa is a commercial crop and hence its supply is purely price dependent. If the price is high, farmers strive to increase their production and *vice versa*. The amount of protection provided to the domestic producers was estimated using NPC. If the protection coefficient is greater than one, there is existence of support for the cocoa producers and if less than one, this shows the existence of taxes on the producers. NPC of 0.79 was obtained and this indicates that the cocoa producers were not protected and were not receiving support in their production activities.

The result of the analysis shown in Table 5.57 indicated that the Net Social Loss (NSLp) in production was ₦308,411.24 per tonne. Net social loss in production may be attributed to the low price being received by the farmers (low producer price). Cocoa buyers (middlemen) have a very strong influence in pricing/price manipulation in the cocoa value chain. They buy cocoa at a ridiculously low price from the farmers and later sell it a very high price. Apart from this, increase in NSLp may be attributed to the policy of imposing taxes (such as value added tax) on producers of cocoa and also inefficient distribution of production resources to get to the low producers.

The Net Social Loss in consumption (NSLc) was estimated at ₦2,471.10 per tonne. Similar to what was done for the producers, social loss was also computed for the consumers, though the social loss recorded by consumers was not as high as that of producers. It is however safe to say that producers have been more negatively affected than consumers by the current policies on cocoa.

It was also revealed in Table 5.57 that a value of –₦429,432.36 per tonne was recorded as welfare gain of producers (Gp). Hence, producers were selling their produce (cocoa) at a price that was lower than the equilibrium price thus making them to record a welfare loss. However, the welfare gain of consumers (Gc) was calculated as ₦123,492.22 per tonne. Hence, there was welfare gain by the consumers because they consume at a lower price that is below the equilibrium price. Therefore, the overall analysis has shown that the current policy favours cocoa consumers more than the producers.

Table 5.57. Effects of price distortions on cocoa producers' and consumers' welfare

Variable	Label	Value
Pd (₦/tonne)	Average domestic price	₦448,226.38
Pb (₦/tonne)	Average border price	₦466,000.00
e_d	Elasticity of demand of cocoa	-0.55
e_s	Elasticity of supply of cocoa	7.90
NPC	Nominal Protection Coefficient	0.79
NSLp (₦/tonne)	Net social loss in production	₦308,411.24
NSLc (₦/tonne)	Net social loss in consumption	₦2,471.10
Gp (₦/tonne)	Welfare gain of producers	-₦429,432.36
Gc (₦/tonne)	Welfare gain of consumers	₦123,492.22

Source: Field survey, 2014.

CHAPTER SIX

SUMMARY OF MAJOR FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1. Summary of major findings

This study mapped out linkages among the actors and the activities involved in cocoa value chain, analysed the competitiveness and the effects of policies on competitiveness as well as the comparative advantage in each of the stages in cocoa value chain. The study also analysed the effects of price distortions on producers' and consumers' welfare. Multi-stage sampling technique was used to select 250 cocoa farmers, 102 cocoa marketers, 52 black soap processors and 2 cocoa processing companies. Primary and secondary data were utilized for the study. Primary data were obtained through the administration of well-structured questionnaire to the respondents while the secondary data were sourced from Nigeria Bureau of Statistics (NBS), Central Bank of Nigeria (CBN), Nigeria Port Authority (NPA) and International Trade Statistics (ITS). The data were analysed using descriptive statistics, Policy Analysis Matrix (PAM) and Partial Equilibrium Model (PEM).

The following were the major findings from the study:

6.1.1. Value chain mapping of cocoa value chain

• The key stages in cocoa value chain were input supply, cocoa production, cocoa marketing and cocoa processing.

• The key activities/functions in cocoa value chain were input procuring, farm establishment, farm maintenance/management, cocoa harvesting, on-farm cocoa processing, marketing of well processed cocoa beans, processing/milling of cocoa beans and exportation of cocoa beans and cocoa products.

• The key actors in cocoa value chain were input suppliers, farmers, marketers and processors.

• The substantial part (85.1 percent) of the cocoa produced in the study area was exported while 14.9 percent was utilized by local processors.

6.1.2. Competitiveness and comparative advantage along cocoa value chain

• The result of PAM showed that the Sharecropping production management system was the most competitive out of the three evaluated production management systems with a private profitability of ₦468,729.76 per hectare followed by Owner-managed production management system with private profitability of ₦397,465.03 per hectare while the least competitive

production management system was the Leased/Rented production management system with private profitability of ₦331,931.22 per hectare.

• Private Cost Ratio (PCR) was lowest in the Sharecropping production management system (0.22) indicating that the management system was the most competitive at market price while the Leased/Rented production management system had the highest PCR (0.25) and was the least competitive management system. However, the PCR of less than one in all the management systems indicated that cocoa production in the Southern Nigeria was competitive.

• Private profits of ₦24,279.81/tonne, ₦36,104.98/tonne and ₦47,018.01/tonne were obtained for local buying agents, licensed buying agents and exporters, respectively. All the private profits were positive indicating that cocoa marketing in the study area was competitive under the existing policy.

• Private Cost Ratio values of 0.40, 0.27 and 0.18 were obtained for local buying agents, licensed buying agents and exporters showing that cocoa marketing was competitive. However, exporters had the least PCR (0.18) and were the most competitive marketing actors while local buying agents with the highest PCR (0.40) were the least competitive.

• Private profitability values of ₦94,262.26/tonne, ₦309,708.13/tonne and ₦730,229.77/tonne were obtained for Black soap processing, Cocoa powder processing and Cocoa butter processing respectively. All the private profits were positive indicating that cocoa processing in the study area was competitive under the existing policies.

• The value of PCR obtained for Black soap processing, Cocoa powder processing and Cocoa butter processing was 0.27, 0.05 and 0.02 showing that cocoa processing was competitive. However, cocoa butter processing with the least PCR (0.02) was the most competitive while black soap processing with the highest PCR (0.05) was the least competitive.

• Social Profitability (SP) was highest in Sharecropping production management system (₦792,038.37), this was followed by Owner-managed production management system (₦536,178.10) while the least was Leased/Rented management system with SP of ₦468,729.76. All the SP values were positive showing that cocoa production system was socially profitable.

• Sharecropping management system had the least Domestic Resource Cost (DRC) value of 0.14. This was followed by Owner-managed production management system (0.16) while the highest DRC was obtained for the Leased/Rented management system. All the DRC values were less than one indicating that there is efficiency in the production of cocoa domestically.

• The Social Cost Benefit (SCB) values of 0.19, 0.17 and 0.17 were obtained for Leased/Rented management system, Owner-managed production management system and Sharecropping management system respectively. All the ratios were less than one indicating that the sum of the cost of tradable inputs and domestic factors cost were less than the gross revenue; hence, all the production systems were profitable.

• The values of SP obtained for local buying agents, licensed buying agents and exporters were ₦32,025.81, ₦43,663.82 and ₦51,159.04, respectively. All the values were positive showing that cocoa marketing was competitive.

• The values of DRC obtained for Local buying agents, Licensed buying agents and Exporters were 0.31, 0.19 and 0.14, respectively. All the DRC values were less than one indicating that there is efficiency in the marketing of cocoa domestically.

• Social Cost Benefit of 0.34, 0.23 and 0.17 were obtained for Local buying agents, Licensed buying agents and Exporters, respectively. The SCB values were less than one showing that cocoa marketing system was profitable.

• Social Profitability was highest in cocoa butter processing (₦814,273.32). This was followed by cocoa powder processing (₦382,752.78) while the least was black soap processing with SP of ₦158,499.68. All the values of SP were positive showing that processing cocoa into each of these products was socially profitable.

• Cocoa butter processing had the least DRC value of 0.02. This was followed by cocoa powder processing (0.04) while the highest DRC was obtained for black soap processing (0.18). All the DRC values were less than one indicating that there is efficiency in the processing of cocoa domestically.

• The Social Cost Benefit values of 0.56, 0.46 and 0.37 was obtained for black soap processing, cocoa powder processing and cocoa butter processing respectively. All the ratios were less than one indicating that the sum of the cost of tradable inputs and domestic factors' costs were less than the gross revenue; hence, processing cocoa into each of these products was profitable.

• Result of the analysis of competitiveness and comparative advantage for the entire cocoa value chain indicated that the entire cocoa value chain was privately and socially profitable.

• There were indications that the actors in the entire cocoa value chain were not protected.

6.1.3. Effects of policies on competitiveness and comparative advantage at each stage of cocoa value chain

• Nominal Protection Coefficient (NPC) of 0.85, 0.79 and 0.75 was obtained for Owner-managed, Leased/Rented and Sharecropping management systems, respectively indicating that the domestic price of cocoa beans was lower than the border price showing lack of protection on farmers.

• Effective Protection Coefficient (EPC) value of 0.82, 0.79 and 0.75 was obtained for Owner-managed, Leased/Rented and Sharecropping management systems, respectively indicating that value added at market price was lower than that at border price showing that there is lack of incentives in the system.

• The Profitability Coefficient (PC) value of 0.74, 0.71 and 0.68 was obtained for Self-owned, Leased/Rented and Sharecropping management systems. All the ratios were less than one indicating that private profits were less than social profits which indicates lack of incentives in the production system.

• The NPC of 0.90, 0.94 and 0.98 were obtained for local buying agents, licensed buying agents and exporters, respectively indicating that the domestic price of cocoa beans was lower than the border price showing the lack of protection in the marketing system.

• The value of EPC obtained for local buying agents, licensed buying agents and exporters were 0.88, 0.91 and 0.96, respectively. This indicated that the value added at market price was lower than that at border price showing that there was lack of incentives in cocoa marketing system.

• The PC values of 0.76, 0.83 and 0.92 was obtained for local buying agents, licensed buying agents and exporters, respectively. All the ratios were less than one indicating that private profits were less than social profits which indicated lack of incentives in the marketing system.

• The NPC of 0.79, 0.94 and 0.95 was obtained for Black soap processing, Cocoa powder processing and Cocoa butter processing, respectively, indicating that the domestic price of cocoa products was lower than the border price showing the lack of protection in the processing system.

• The value of EPC obtained for Black soap processing, Cocoa powder processing and Cocoa butter processing was 0.67, 0.82 and 0.90, respectively. This indicated that the value added at market price was lower than that at border price showing that there was lack of incentives in cocoa processing system.

• The PC values of 0.72, 0.81 and 0.89 was obtained for Black soap processing, Cocoa powder processing and Cocoa butter processing respectively. All the ratios were less than one indicating that private profits were less than social profits which indicated a lack of incentives in cocoa processing system.

6.1.4. Sensitivity Analysis

• Increase in domestic price of cocoa by 60 percent increased the private profit of cocoa by 94.5 percent while a decrease in domestic price by 60 percent decreased the private profit by 94.5 percent.

• Increase in domestic price of cocoa beans by 40 percent and 60 percent changed the NPC from the base value of 0.80 to 1.12 and 1.28, respectively, thereby making the NPC to be greater than one.

• Increase in the domestic price of cocoa beans by 60 percent increased the EPC from the base value of 0.77 to 1.27.

• Increase in the world price by 60 percent increased the social profit of cocoa beans by 72.8 percent

• Decrease in the world price of cocoa beans by 20 percent, 40 percent and 60 percent changed the NPC to 1.01, 1.35 and 2.02, respectively, thus making the NPC to be greater than one.

• Increase in the exchange rate by 60 percent increased the social profit of cocoa beans by 56.2 percent while a decrease in exchange rate by 60 percent decreased the social profit by 56.2 percent.

• Decrease in the exchange rate by 40 percent and 60 percent changed the NPC from the base value of 0.81 to 1.35 and 2.02, respectively, thereby making the NPC to be greater than one.

6.1.5. Effects of price distortions on consumers' and producers' welfare

The result of the analysis of Partial Equilibrium Model showed the following:

• Net social loss in production was estimated at ₦308,411.24/tonne.

• Net social loss in consumption was ₦2471.10/tonne.

• Welfare gain of producers was -₦429,432.36/tonne.

• Welfare gain of consumers was ₦123,492.22/tonne.

• The current policies on cocoa favour the consumers while the producers were taxed.

6.2. Conclusion

• Findings showed that a substantial proportion of the cocoa produced is exported in raw form leaving only a small proportion for the use of the local processors. Cocoa exportation is triggered by the fact that its international price is higher than the domestic price. This was revealed by the value of the NPC which was less than one showing that domestic price was lower than international price. Hence, exporting cocoa would bring in more revenue to the stakeholders.

• Cocoa production, marketing and processing were privately profitable. This was indicated by the values of Private Profitability and Private Cost Ratio.

• There was comparative advantage in producing, marketing and processing cocoa in Nigeria as revealed by the values of Social Profitability, Domestic Resource Cost and Social Cost Benefit.

• The existing government policies on agriculture did not protect the production, marketing and processing of cocoa as indicated by the result of the Nominal Protection Coefficient, Effective Protection Coefficient and Profitability Coefficient. Hence, resources were diverted away from the value chain nodes and the nodes were taxed. Increase in domestic price of cocoa beans by more than half its original price made the domestic price to be higher than the border price. Hence, cocoa beans would not need to be exported thus making it more available for the use of the local processors thereby increasing local value addition.

• The result of Partial Equilibrium Model (PEM) recorded that there was welfare gain for consumers while there was welfare loss for producers; hence, the current market policies favoured the consumers while the producers were taxed.

6.3. Policy recommendations

• The Sharecropping production management system should be encouraged to improve the income of cocoa stakeholders. This is necessary because findings showed that the sharecropping management system was the most competitive of the three production management systems.

• Efforts should be made on the part of key stakeholders in the agricultural and cocoa subsector to strengthen the input distribution policies of government. This is quite imperative because findings from NPC, EPC and PC have shown that farmers were not deriving incentives from government policies.

• Efforts should be intensified to increase the processing of cocoa beans into by-products for export. This is quite imperative because findings have shown that Nigeria had comparative

advantage in the processing of cocoa beans to cocoa by-products such as cocoa powder and cocoa butter.

• Private profitability which is the difference between the output and the inputs used showed that there's competitiveness along the entire cocoa value chain. Hence, some input use efficiency technologies such as labour saving technologies should be introduced across the value chain. This will reduce the cost of production and thus further improve the competitiveness along the entire cocoa value chain.

6.4. Contribution to knowledge of this study

• Substantial proportion of the cocoa produced is exported in raw form leaving only a small proportion for the use of the local processors.

• Cocoa production, cocoa marketing and cocoa processing are competitive indicating that cocoa production, marketing and processing are profitable to the participants.

• There is comparative advantage in producing cocoa in Nigeria. Hence, resources are efficiently utilized for producing cocoa domestically and that cocoa could be conveniently produced in Nigeria for export.

• Existing government policies do not protect the production, marketing and processing of cocoa in Nigeria.

• There is welfare gain for cocoa consumers while there is welfare loss for cocoa producers.

6.5. Suggestions for further studies

• Further research studies should be conducted on international trade regulations on cocoa trading in cocoa value chain

• There is the need to carry out cocoa value chain study in all the fourteen cocoa producing States in Nigeria.

• There is the need to study the market structure and distributional issues of inputs used in cocoa value chain

• Study on how the key actors in cocoa value chain would derive maximum benefits that would enhance their retention within the value chain.

REFERENCES

Abiba, L., Franklin, S. and Moses, S. 2012. Assessing the competitiveness of groundnut production in Malawi: a policy analysis matrix approach. Selected paper presented at the International Association of Agricultural Economics (IAAE) triennial conference, Fozdo Iguacu, Brazil from 18-24 August, 2012. www.ageconsearch.umn.edu/bitstream/../2/G.nut_competitiveness_malawi.pdf. Downloaded on 12/05/2016.

Adamu, C.O., Sodiya, C.I. and Awotunde J.M. 2006. Agricultural income- generating activities of rural women in Ijebu North-East local government area of Ogun State. In Proceedings of the Fifteenth Annual Congress of the Nigerian Rural Sociological Association. Held at University of Ado-Ekiti between 6-9 November, 2006. 72-77.

Adebile, O. A. and Amusan A. S. 2011. The non-oil sector and the Nigeria economy. A case study of cocoa export since 1960. *International Journal of Asian Social Science.* 9, 1: 142-151.

Adegbite, O., Oni, O. A. and Adeoye, I.B. 2014. Competitiveness of pineapple production in Osun State, Nigeria. *Journal of Economics and Sustainable Development*. 5, 2: 205-214

Adegbola, M.A.K. 1990. Survey of cocoa production in Nigeria. *Annual Report, Cocoa Research Institute of Nigeria (CRIN), Ibadan, Nigeria.* 11.

Adegeye, A.J. 1977. An evaluation of food crops' farming inside old cocoa grooves. *The Nigerian Agricultural Journal.* 14, 1: 25-40.

Adegeye, A.J. 1991. A comparative analysis of the cost of production and producer prices of a tonne of cocoa from matured trees in Nigeria before and during the structural adjustment programme, *Ife Journal of Agriculture.* 2, 1: 14-18.

Adeoye, I.B., Oni, O.A., Yusuf, S.A. and Adenegan, K.O. 2013. Plantain value chain mapping in Southwestern Nigeria. *Journal of Economics and Sustainable Development.* 14, 16: 137-146.

Adeoye, I.B. 2015. Competitiveness and value chain analyses of plantain in Southwestern Nigeria. An Unpublished Ph.D Thesis of the Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.

Adeoye, I.B. and Oni, O.A. 2013. Policy analysis and competitiveness of plantain processing in Southwestern Nigeria. *Journal of Sustainable Development in Africa.* 15, 7: 135-151.

Adeoye, I.B. and Oni, O.A. 2014. Competitiveness and effects of policies on plantain production systems in Southwestern Nigeria. *Agris on-line in Economics and Informatics.* VI, 4: 3-13.

Adesimi, A.A. and Ladipo, O.O. 1979. Cocoa industry in Nigeria: some aspects of production and consumption. *In Proceedings of the 5th International Cocoa Research Conference,* CRIN., Ibadan, Nigeria. 521-529.

Aigbekean, E. O. 2004. Export potentials of cocoa in Nigeria. A paper presented at the national workshop on re-positioning of Nigerian agriculture for export: prospect and challenges. ARMTI, Ilorin, Nigeria.

Akanji, O.O. and Ukeje, E.U. 1995. A review and analysis of agricultural prices in Nigeria. *Central Bank of Nigeria Economic and Financial Review.* 33, 4: 35-61.

Akanni, K.A. and Dada, A.O. 2012. Analysis of labour use patterns among small-holder cocoa farmers in Southwestern Nigeria. *Journal of Agricultural Science Technology.* 2, 1: 107-113.

Akhtar, M.R. 1999. Effects of trade liberalisation on agriculture in Pakistan: commodity aspects. Working Paper 44, CGPRT Centre, ESCAP, United Nations, Bogor, Indonesia.

Alam, K., Pierre, M.l., Thomas, T., Thomas, B. and Muhammed, J. I. 2013. Retrieval of aerosol properties from surface measurements in an urban environment. *Aerol and Air Quality Research.* 14: 686-696.

Alan, B. 2007. The research question in social research: what is its role? *International Journal of Social Research Methodology.* 10, 1: 5-20.

Alexandre, G. and GianCarlo, M. 2016. Evaluating the market and welfare impact of agricultural policies in developed countries: comparison of partial and general equilibrium measures. *Review of Agricultural Economics*. 28, 2: 195-211.

Alibaba, 2012. Black soap. http://www.alibaba.com/countrysearch/NG/black-soap.html Downloaded on 18/08/2013.

Ali, A.T., Jan, G., Papa, A.S. and Aliou, D. 2013. Analysing policy induced effects on the performance of irrigated rice. *African Journal of Resource Agricultural Economics.* 8, 1: 68-77.

Amao, O.D., Oni, O.A and Adeoye I.B. 2014. Competitiveness of cocoa based farming households in Nigeria. *Journal of Development and Agricultural Economics.* 7, 2: 80-84.

Anapu, H., Quaw, E., Talumingan, C., Lobo, A. and Pangemanan, L. 2003. The effect of the rice tariff policy in Minahasa regency. www.stanford.edu/group/FRL/indonesia/newbook.htm. Downloaded on 13/05/2016.

Aregheore, E.M. 2009. Country pasture/forage resources profile. Nigeria. www.ijemail.org. Downloaded on 22/08/2015.

Awolala D.O. 2006. Labour utilization and productivity in cocoa production in Ondo State. An Unpublished Msc Project. Department of Agricultural Economics and Extension. Federal University of Technology, Akure.

Ayoola, B.F., Badaru, K. and Aikpokpodion, P. 2000. Development of the Nigerian cocoa industry. Current issues and challenges for research and production. In *Proceedings of 13th International Cocoa Research Conference.* Sabah, Malaysia. 1367-1373.

Ayorinde, J.A. 1966. Historical notes on the introduction and development of cocoa industry in Nigeria. *Nigerian Agricultural Journal.* 3, 1: 21-30.

Basavaraj, G., Parthasarathy, R., Lalith, A. and ChRavinder, R. 2013. Assessing the competitiveness of sweet sorghum for ethanol production: a policy analysis matrix approach. *Agricultural Economics Review*. 26, 1: 31-40.

Central Bank of Nigeria 1998. *Statistical Bulletin*, CBN, Abuja, Nigeria.

Daramola, A.G. 2004. Competitiveness of Nigerian agriculture in a global economy. Any dividend of democracy? inaugural lecture, series 36. Delivered at Federal University of Technology, FUTA, Akure, Nigeria.

Daramola, A.G., Fuwape, J.A., Ofuya, T.I., Okunlola, J.O., Ajibefun, I.A., Okuku, I.E., Oke, D.O., Aladesaiye, E., Badaru, K.B., and Olaiya, A.O. 2003. Evaluation of sustainable options for rehabilitation for small holder Nigerian farmers. *Sustainable and Competitive Cocoa System in Africa.* 16: 47-53.

Dolan, C. 2001. The good wife: struggles over resources in the Kenyan horticulture sector." *Journal of Development Studies.* 37, 3: 39-70.

Dornbusch, R. S., Fischer, S. and Samuelson, P.A. 1977. Comparative advantage, trade, and payments in a Ricardian model with a continuum of goods. *The American Economic Review*. 67, 5: 823-839.

Ebi, B. O. and Ape, A.S. 2014. Supply response of selected agricultural export commodities in Nigeria. *Journal of Economics and Sustainable Development*. 5, 5: 47-57.

Ebuehi, O.A.T. and Disu, R.T. 2000. Comparative proximate analysis of some non-carbonated beverages in Nigeria. *Nigerian Journal of Nutritional Science*. 22, 1&2: 24 – 28.

Fashina, A.B. 1999. Current status of Nigerian exportable agricultural commodities. information. Paper presented at the Lagos Chamber of Commerce and Industry. Workshop on focus on national export products in Nigeria, Lagos, Nigeria.

Federal Ministry of Agriculture and Natural Resources 1997. National agricultural research strategy plan: 1996-2010. Bukar Shaih, Adamu Aliyu and J.S. Bakshi (eds.). Department of Agricultural Sciences, FMA&NR, Abuja, Nigeria.

Folayan, J.A., Daramola, A. G. and Oguntade, A.E. 2006. Structure and performance evaluation of cocoa marketing institutions in South-Western Nigeria: An economic analysis. *Journal of Food, Agriculture and Environment*. 4, 2**:** 123-128.

General Nigerian Best Forum (NBF) Topics 2010. Increasing Nigeria's Cocoa Production. www.nigerianbestforum.com. Downloaded on 02/12/2012.

Gereffi, G., John, H., and Timothy, S. 2005. The Governance of global value chains. *Review of International Political Economy*. 12, 1: 78-104.

Ghana Cocoa Board 2010. History of cocoa and its production in Ghana. www.cocobod.gh. Downloaded on 16/12/2012.

Hollenberg, N.K. 2006. Vascular action of flavonols in humans: the roots of the story. *J. Cardiovascular, Pharmacology*. 47, 2: 99 – 102.

Hellin, J. and Meijer, M. 2006. Guidelines for value chain analysis. Rome: Food and Agriculture Organization (FAO). ftp://ftp.fao.org/es/esa/lisfame/guidel_valueChain.pdf. Downloaded on 23 September, 2014.

Idachaba, F.S. 1990. Philosophical foundation of SAP. *Business Times*, Monday April 16th. 13.

Idowu, E. O., Osuntogun, D. A. and Oluwasola, O. 2007. Effects of market deregulation on cocoa (*Theobroma cacao*) production in Southwest Nigeria. *African Journal of Agricultural Research*. 2, 9: 429-434.

Idowu, E.O. 1986. The political economy of cocoa production and marketing in Nigeria: a case study of Ondo State. An Unpublished M. Phil. Dissertation, Obafemi Awolowo University, Ile Ife, Nigeria.

International Cocoa Organization 2000. Celebration of Cocoa, 2000. (Sue, E. eds), published by *KP Partners in Publishing*. Hatton Garden London. 94.

International Cocoa Organization 2015. *Quarterly Bulletin of Cocoa Statistics*. Cocoa year 2014/15. XLI, 1.

Janvry, A. and Sadoulet, E. 1995. Quantitative development policy analysis. *Johns Hopkins University Press.*

Jayeola C.O. and Olubamiwa, O. 2010. Mycoflora and nutritional components of cocoa powder

samples in South West Nigeria. *African Journal of Agricultural Research.* 5, 10: 2694 – 2698.

Kaplinsky, R. 2004. Competitions policy and global coffee and coffee value chain. Paper presented for United Nations Conference for Trade and Development (UNCTAD). 34pp. www.IMG/pdf/rkaplinskycocoacoffee05.pdf. Downloaded on 5/10/2015.

Kaplinsky, R. and Morris, M. 2001. A Handbook for value chain research. Working paper prepared for the IDRC, Brighton, UK, Institute for Development Studies.

Keen, C., Holt R., Oteiza, P., Fraga, C. and Schmitz, H. 2005. Cocoa antioxidants and in cardiovascular health. *American Journal of Clinical Nutrition.* 81, 1: 2985 – 3035.

Ketut, B. and Bambang, D. 2003. The impact of liberalization on the competitiveness and efficiency of the cashew systems in Nusa Tenggara Barat Province, Indonesia. www.stanford.edu/group/FRI/indonesia/research/cashew.pdf. Downloaded on 10/05/2016.

Keyser, J.C. 2006. Description of methodology and presentation of templates for value chain analysis. Part 1: narrative text. Background paper for the competitive commercial agriculture in sub-Saharan Africa (CCAA) study. 40pp. www.worldbank.org/INTAFRICA/Resources/257994-12154571/CCAA_methodology.pdf. Downloaded on 08/02/2016.

Khai, H.B. and Yabe, H. 2013. The comparative advantage of soyabean production in Vietnam: a policy analysis matrix approach. Intech, Open Science. http://dx.doi.org/10.5772/51000. Downloaded on 13/05/2014.

Liverpool, L.S.O., Ayoola, G.B. and Oyeleke, R.O. 2009. Enhancing the competitiveness of agricultural commodity chains in Nigeria: identifying opportunities with cassava, rice, and maize using a policy analysis matrix framework. Nigeria Strategy Support Program (NSSP) background paper No. NSSP 013, December, 2009. International Food Policy Research Institute.

Lopez-Claros, A., Altinger, L., Blanke, J., Drzeniek, M. and Mia, I. 2006. The global competitiveness index: identifying the key elements of sustainable development. Global competitiveness report, 2006-2007. Davos: World Economic Forum. http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2006-07.pdf Downloaded on 24/03/2013.

Luta, E. and Scandizzo, P. 1980. Price distortions in developing countries: bias against agriculture. *European Review of Agricultural Economics.* 7, 1: 5-27.

Mashinini, N.N., Obi, A. and Herman van, S. 2005. Welfare effects of regulation of the maize in Swaziland. Paper presented for the International Food and Agribusiness Management Association (IFAMA) world food and agribusiness symposium on re-inventing of food chain: new market, customers and products. Chicago, Illinois, USA. 25-28 June, 2005.

Manyong ,V.M, Ikpi, A., Olayemi, J.K., Yusuf, S.A., Omonona, B.T., Okoruwa, V. and Idachaba, F.S. 2005. Agriculture in Nigeria: identifying opportunities for increased commercialization and investment in USAID/IITA/UI project report, Ibadan, Nigeria. 190.

Martin, L., Westgren, R., and van Durren, E. 1991. Agribusiness competitiveness national boundaries. *The American Journal of Agricultural Economics*. 73, 5: 1456-1464.

Masakure, O. and Henson, S. 2005. Why do small-scale producers choose to produce under contract? Lessons from non-traditional vegetable exports from Zimbabwe. *World Development*. 33, 10: 1721-1733.

Mejabi, D. 2012. The Nigerian cocoa value chain: vertical coordination for improved productivity. Cocoa round table workshop, Akure, 16th August, 2012.

Monke, E. and Pearson, S.R. 1989. The policy analysis matrix for agricultural development. Ithaca, N.Y., USA., *Cornell University Press*. 15-19.

Mohammed, D., David, A. and Felicity, A. 2011. Cocoa value chain implication for the smallholder farmer in Ghana. http://www.swdsi.org/swdsi2012/proceedings_2012/papers/Papers/PA157.pdf. Downloaded on 12/06/2014.

Mohanty, S., Fang, C., and Chaudhary, J. 2002. Assessing the competitiveness of Indian cotton production. A policy analysis matrix approach. CARD working paper 328. www.lib.dr.iastate.edu/card_workingpapers/328. Downloaded on 14/05/2016.

National Cocoa Development Committee 2008. Report on national cocoa production survey. Conducted by Cocoa Research Institute of Nigeria (CRIN). Submitted to National Cocoa Development Committee.

National Cocoa Development Committee 2006. The National Cocoa Development Committee intervention. *Cocoa Rebirth.* Published by National Cocoa Development Committee. 21.

Nelson, G.C. and Panggabean, M. 1991. The cost of Indonesian sugar policy: a policy analysis matrix approach. *Americal Journal of Agricultural Economics.* 73, 3: 703-712.

Nigerian Best Forum (NBF) 2010. Increasing Nigeria's cocoa production. www.nigerianbestforum.com/generaltopics. Downloaded on 18/06/2013.

Nkang, N.M., Ajah, E.A., Abang, S.O. and Edet, E.O. 2009. Investment in cocoa production in Nigeria: a cost and return analysis of three cocoa production management systems in the Cross River State cocoa belt. *African Journal of Food, Agriculture, Nutrition and Development (AJFAND).* 9, 2: 713-727.

Notta, Q., Vlachvei, A. and Samathrakis, V. 2010. Competitiveness – the case of Greek food manufacturing firms. *International Journal of Arts and Sciences.* 3, 7: 211 – 225.

Nwachukwu, I., Ndubuto, N. A., Jude, N. and George, I. 2011. Competitiveness and determinants of cocoa export from Nigeria. *Report and Opinion*. 2, 7: 51-54.

Obih, U., Emenyonu, C.A., Onyemauwa, S.C., Odii, M.A. and Okafor, R.M. 2008. Welfare effects of shifting from tarrif to ban on rice on import policies in Nigeria. *The Social Sciences* 3, 4: 309-321.

Oduwole, O.O. 2000. Sustainable cocoa production in Nigeria: farmers' perception of technology characteristics and socio-economic factors in adoption decision. In *Proceedings of the 13th International Cocoa Research Conference*, Sabah, Malaysia. 1147 – 1152.

Oduwole, O.O. 2004. Adoption of improved agronomic practices by cocoa farmers in Nigeria: a multivariate tobit analysis. Unpublished Ph.D Thesis. Department of Agricultural Economics and Extension, Federal University of Technology, Akure, Nigeria.

Ogbe, A.O., Okoruwa, V, O. and Saka, O.J. 2011. Competitiveness of Nigerian rice and maize production ecologies: a policy analysis matrix approach. *Tropical and Subtropical Agro-ecosystems Journal*. 14, 2: 493-500.

Ogunlade M.O., Oluyole K.A., Adebiyi, S., Adeyemi, E.A. & Aikopkodion, P.E. (2015). Introduction of Soil Test Kit to Small-holder Cocoa Farmers in South-western Nigeria. International Journal of Science and Nature. Vol.6 (1) 2015: 80-83.

Oguntade, A.E. 2011. Assessment of protection and comparative advantage in rice processing in Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*. 11, 2: 4632-4646.

Ojo, S.O. 2003. Productivity and technical efficiency of poultry egg production in Nigeria. *International Journal of Poultry Science.* 2, 6: 459-464.

Olagunju, F.I. 2015. Comparative advantage and competitiveness of cashew crop in Nigeria: the policy analysis matrix. *International Journal of Agriculture and Economic Development*. 3, 1: 1-14.

Olatunbosun, O. 1974. Pricing policy and supply response in cocoa production. The Nigerian case. In Kotey *et al* (eds); the economics of cocoa production and marketing. *Proceedings of Cocoa Economics Research Conference. Institute of Statistical, Social and Economic Research*, University of Ghana, Ghana. 236-250.

Olayemi, J.K. 1973. Some economic characteristics of peasant agriculture in the cocoa belt

of Western Nigeria. *Bulletin of Rural Economics and Sociology*. 1: 24-30.

Olayemi, J.K. 1974. Cost and returns to cocoa and alternative crops in Western Nigeria. In Kotey *et al* (eds.), *the economics of cocoa production and marketing*. *Proceeding of Cocoa Economic Research Conference*. Legon, Ghana. 48 – 59.

Olayide, S.O. and Olatubosun, D. 1974. Effects of the Nigerian commodity marketing board on the output and income of primary producers *(In Reading in Agricultural Marketing Eds. Adekanye T.O.)*. 75-91.

Oluyole, K.A. and Adeogun, S.O. 2005. Determining the profitability level of black soap production from cocoa pod husk in Lagelu Local Government Area of Oyo State. *Journal of Agriculture, Forestry and Social Sciences (JOAFSS)*. 3, 1: 69-81.

Oluyole, K.A. 2005. Evaluation of the economics of post harvest processing of cocoa in Cross River State, Nigeria. *Journal of Agriculture, Forestry and the Social Sciences.* 3, 2: 58-64.

Oluyole, K.A. and Sanusi, R.A. 2009. Socio-Economic Variables and Cocoa Production in Cross River State, Nigeria. *Journal of Human Ecology*. Vol. 25, Issue 1, Pp. 5-8.

Oluyole, K.A., Sanusi, R.A. and Aigbekaen, E.O. 2010. Food demand among cocoa farming households in Nigeria. *Proceedings of the 44th Annual Conference of Agricultural Society of Nigeria (ASN), Ogbomoso, held between 18-22 October, 2010.* 511-514.

Oluyole, K.A. and Usman, J.M. 2006. Assessment of the economic activities of cocoa licensed buying agents in Odeda Local Government Area of Ogun State. *Akoka Journal of Technology and Science Education*. 3, 1: 130-140.

Oluyole, K. A., Oni, O. A., Omonona, B. T.and Salman, K. K. (2016). Competitiveness and Effects of Policies on Cocoa Production Management Systems in Southern Nigeria. *International Journal of Applied Research and Technology*. Vol. 5, No. 2, 85–93

Omo-Erighe, E. 2004. Socio-economic factors affecting adoption of innovations by small-holder rubber farmers in Delta State. An Unpublished PhD Thesis. Department of Agricultural Economics and Extension. Federal University of Technology, Akure.

Ondo state 2003. Fact sheet on Ondo State. www.ondostategovernment.com. Downloaded on 4/7/2010.

Oni, S.A. 1971. An economic analysis of provisional and aggregate supply response among Nigerian cocoa farmers. Unpublished *Ph.D Thesis*, University of Ibadan.

Oni, O.A. 2000. A recursive analysis of enterprise combinations among cocoa farming households in Ondo State, Nigeria. Unpublished PhD Thesis, Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.

Opeke, L.K. 1984. Optimising economic returns (profit) from cocoa cultivation through efficient use of cocoa by-products. In *Proceedings of the 9th International Cocoa Research Conference*, Lome, Togo. 489-494.

Opeke, L.K. 1987. Tropical tree crops. *Spectrum Book Ltd.* Ibadan. 108 – 120.

Oussama, A. 2008. Trade policy simulation and welfare analysis using partial equilibrium model: the case of bovine meat in Morocco. An unpublished MSc project of the Department of Agricultural Economics, Kansas State University.

Oyedele, J.O. 2007. Enhancing the sustainability of cocoa growing in Nigeria. A paper presented at the ICCO roundtable congress on sustainable world cocoa economy at Accra, Ghana. 3rd – 6th October, 2007.

Pearson, S., Gotssch, C and Sjaiful, B. 2003. Application of policy analysis matrix in Indonesian agriculture. www. sandy-campbell.com/sc/KTC Module 2. Downloaded on 12/09/2013.

Perali, F. 2003. Partial equilibrium analysis of policy impacts (part 1). National Agriculture Policy Centre (NAPC), Syria. http.//www.napcsyryr.org/dwnldfiles/training_materials/en/tm_partial_equilibrium_

analysis_I_en.pdf. Downloaded on 14/03/2014.

Perera, M., Kodithuwakku, S.S. and Weerahewa, J. 2004. Analysis of vegetable supply chains of supermarkets in Sri Lanka. *Sri Lankan Journal of Agricultural Economics.* 6, 1: 67-81.

Porter, M. E. 1985. Competitive advantage: creating and sustaining superior performance, N. York: *The Free Press, New York*. ISBN 0029250900.

Rasmikayati, E. and Nurasiyah L. 2004. The competitiveness and efficiency of potato farming in Pangalengan. Research Institute of Padjadjaran University. http://web.stanford.edu/group/FRI/indonesia/research/potatoes.pdf. Downloaded on 23/4/2010.

Reddy, P.V., Raghavendra, M.S. and Lalith, A. 2005. Global competitiveness of medium quality Indian rice: a PAM analysis in rice is life scientific perspectives for the 21st century edited by K. Toriyama, K. L. Heong. Published by IRRI. 520-522.

Reig-Martínez, E., Picazo-Tadeo, A.J. and Estruch, V. 2008. The policy analysis matrix with profit-efficient data: evaluating profitability in rice cultivation. *Spanish Journal of Agricultural Research*. 6, 3: 309-319.

Ronnie, O.T. and Alan, M. 2002. General equilibrium, partial equilibrium and the partial derivative elasticities in a CGE model. Paper presented at the International Conference on Global Modeling. EcoMod2002, Brussels, July 4th to 6th, 2002. http://www.ecomod.net/conferences/ecomod2002/papers/otoole.pdf. Downloaded on 5/10/2012.

Samarendu, M., Cheng, F. and Jagadanand, C. 2003. Assessing the competitiveness of Indian cotton production: a policy analysis matrix approach. *The Journal of Cotton Science*. 7, 3: 65-74.

Samuelson, P.A. 1948. Economics. New York. Published by McGraw-Hill.

Sanusi, R.A. 2006. Demand for small and medium scale firms cocoa beverages in urban areas of Southern and North-Central Nigeria. Unpublished Ph D. Thesis. Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.

Sanusi, R.A. and Oluyole, K.A. 2005. An analysis of cocoa production and export in Nigeria (1930-2003). *Bulletin of Science Association of Nigeria*. 26: 146-154.

Shahid, A. 2010. India-Japan FTA in goods: a partial and general equilibrium analysis. www.gtap.agecon.purdue.edu/resources. Downloaded on 15/07/2016.

Shapiro, B. I. and Staal, S.J. 1995. The policy analysis matrix applied to agricultural commodity markets. In Gregory J. S. (Ed). Prices, products and people. Analysing agricultural commodity markets in developing countries. *Lynne Publishers*, London. 73-79.

The Sun Newspaper 2013. Cocoa contributes $900 million to Nigeria's economy in 2012. www. sunnewsonline.com. Downloaded on 17/11/2013.

Tsakok, I. 1990. Agricultural price policy: a practitioner's guide to partial equilibrium analysis. Ithaca and London: *Cornell University Press*. ISBN. 10.0801423635.

Ude, M., Adeoye, I.B., Yusuf, S.A., Balogun, O.L. and Akinlade, R.J. 2013. Competitiveness of rice processing and marketing in Ebonyi State: a policy analysis approach. *International Journal of Agricultural Sciences.* 3, 2: 410-418.

USAID. 2012. Gender equality and women's empowerment: integrating gender. http://transition.usaid.gov/our_work/cross-cutting_programs/wid/gender/index. Downloaded on June 8, 2012.

Umar, A.S., Amin, M.A., Mad, N.S. and Zainal, A.M. 2015. Welfare implication of paddy price support withdrawal from Malaysian rice sector. *Agricutura Tropica Et Sub-Tropical*. 48, 3&4: 45-52.

Vingerhoets, J.W.A. 1997. International Cocoa Organization. Quarterly bulletin of cocoa statistics.

Villalobos, V.M. 1989. Advances in tissue culture methods applied to coffee and cocoa plant biotechnology for developing countries. United Kingdom: CTA/FAO Chayce Publication Services.

Zulkifli, M., Harianto, N. and Nunung, N. 2004. Analysis of competitiveness of lowland rice farming in Indonesia: case study of Bolaang, Mongondow District, North Sulaweri Province. *Journal of Economics and International Finance*. 8, 4: 85-90.

APPENDIX

Table A1. Software PAM result for the entire cocoa value chain (Self-owned management system)

	REVENUES	COSTS TRADABLES INPUTS	DOMESTIC FACTORS	PROFITS
PRIVATE PRICES	A 875,312	B 78,485	C 116,479	D 680,348
SOCIAL PRICES	E 1,030,557	F 78,435	G 115,695	H 836,427
DIVERGENCES	I (155,245)	J 50	K 784	L (156,079)

1. FINANCIAL (PRIVATE) PROFITABILITY	[D = A - B - C]	680,348
2. FINANCIAL (PRIVATE) COST-BENEFIT RATIO	[C / (A - B)]	0.146
3. SOCIAL PROFITABILITY	[H = E - F - G]	836,427
4. DOMESTIC RESOURCE COST	[G / (E - F)]	0.122
5. SOCIAL COST-BENEFIT RATIO	[(F + G) / E]	0.188
6. TRANSFERS	[L = I + J + K]	(156,079)
7. NOMINAL PROTECTION COEFFICIENT	[A / E]	0.849
8. EFFECTIVE PROTECTION COEFFICIENT	[(A - B) / (E - F)]	0.837
9. PROFITABILITY COEFFICIENT	[D / H]	0.813

Table A2. Software PAM result for the entire cocoa value chain (Leased/Rented management system)

	REVENUES	COSTS TRADABLES INPUTS	DOMESTIC FACTORS	PROFITS
PRIIVATE PRICES	A 875,312	B 111,575	C 108,479	D 655,258
SOCIAL PRICES	E 1,030,557	F G 111,493	G 106,134	H 812,930
DIVERGENCES	I (155,245)	J 82	K 2,345	L (157,672)

1. FINANCIAL PROFITABILITY	[D = A - B - C]	655,258
2. FINANCIAL COST-BENEFIT RATIO	[C / (A - B)]	0.142
3. SOCIAL PROFITABILITY	[H = E - F - G]	812,930
4. DOMESTIC RESOURCE COST	[G / (E - F)]	0.115
5. SOCIAL COST-BENEFIT RATIO	[(F + G) / E]	0.211
6. TRANSFERS	[L = I + J + K]	(157,672)
7. NOMINAL PROTECTION COEFFICIENT	[A / E]	0.849
8. EFFECTIVE PROTECTION COEFFICIENT	[(A - B) / (E - F)]	0.831
9. PROFITABILITY COEFFICIENT	[D / H]	0.806

Table A3. Software PAM result for the entire cocoa value chain (Sharecropped management system)

	REVENUES	COSTS TRADABLES INPUTS	DOMESTIC FACTORS	PROFITS
PRIIVATE PRICES	A 875,312	B 51,768	C 89,135	D 734,409
SOCIAL PRICES	E 1,030,557	F G 51,686	G 84,922	H 893,949
DIVERGENCES	I (155,245)	J 82	K 4,213	L (159,540)

1. FINANCIAL PROFITABILITY	[D = A - B - C]	734,409
2. FINANCIAL COST-BENEFIT RATIO	[C / (A - B)]	0.108
3. SOCIAL PROFITABILITY	[H = E - F - G]	893,949
4. DOMESTIC RESOURCE COST	[G / (E - F)]	0.087
5. SOCIAL COST-BENEFIT RATIO	[(F + G) / E]	0.133
6. TRANSFERS	[L = I + J + K]	(159,540)
7. NOMINAL PROTECTION COEFFICIENT	[A / E]	0.849
8. EFFECTIVE PROTECTION COEFFICIENT	[(A - B) / (E - F)]	0.841
9. PROFITABILITY COEFFICIENT	[D / H]	0.822

Estimation of Import Parity Price (IPP)

CIF (Cost, Insurance and Freight)

↓

Add Tarrif

Add local port charges

Add transport and marketing cost

Deduct subsidy

Price at the market

↓

Deduct transport cost to the farm gate

Deduct marketing costs to farm gate

Deduct local storage

Import Parity Price (IPP) at farm gate

Estimation of Export Parity Price (EPP)

FOB (Free On Board) (Converted to domestic currency at official exchange rate)

↓

Add subsidy

Deduct tarrif

Deduct local port charges

Deduct local marketing cost

Export Parity Price (EPP) at project boundary

↓

Deduct local transport cost

Deduct local marketing cost

Export Parity Price (EPP) at farm gate

QUESTIONNAIRE FOR COCOA PRODUCERS

COMPETITIVENESS OF COCOA VALUE CHAIN IN SOUTHERN NIGERIA

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF IBADAN, NIGERIA

Dear respondent, this is a research questionnaire which is aimed at collecting data on Competitiveness of Cocoa Value Chain in Southern Nigeria. Please, fill it appropriately, as data collected will be used for the purpose of the research study.

Questionnaire code /_____/ Date of interview: _____

SECTION A. DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

1. State ……
2. Local Government Area ……
3. Town/Village ……..
4. Gender (a) Male (b) Female
5. Age ……
6. Religion (a) Christianity (b) Islam (c) Traditionalist
7. Level of Education (a) No formal education (b) Primary education (c) Secondary education (d) Tertiary education
8. Year of education ……
9. Did you receive any formal agricultural training? (a) Yes (b) No
10. Household size ……
11. Number of income earners in the household ……
12. What type of cropping system do you practice? (a) Sole cropping (b) Intercropping (c) Others (specify)……
13. If intercropping, what type of cocoa production system are you engaged in? (a) Cocoa/plantain (b) Cocoa/cassava/cocoyam/yam (c) Cocoa/oilpalm (d) Others (specify)
14. What variety of cocoa do you grow? (a) Amelonado (local) (b) Amazon (c) hybrid (d) Amelonado + Amazon (e) Amelonado + hybrid (f) Others (specify) ……
15. What is your farm size? ……
16. Which of the following socio-economic group do you belong to? (a) Cooperative (b) Cocoa Farmers Association of Nigeria (CFAN) (c) Cocoa Association of Nigeria (CAN)

(d) Cocoa Growers Association of Nigeria (COGAN) (e) Others (specify) ……

17. How many times do you harvest cocoa in a year? ……..

18. What is the nature of ownership of your farm? (a) Owned (b) Rented/Leased

(c) Sharecropping

19. If rented/leased, please complete the following table

Total farm area rented/ leased (ha)	Duration of rentage/ Leased	Cost of rentage/ Leased (₦)	Total cost (₦)

SECTION B. OUTPUT AND INPUT UESD IN PRODUCTION

20. Please provide record of inputs used in the production of cocoa.

Production Inputs	Quantity used 2013			Unit cost		
	kg	Bag	Other measure	Kg	Bag	Other measure
Herbicides						
1						
2						
Fertilizers 1 Urea						
2 NPK						
3 Superphosphate						
4 Organic manure						
Fungicides						
1 Copper sulphate						
2						
3						
4 Others (specify)						
Insecticides						
1						
2						
3						
4						

21. Indicate the capital equipment/assets owned for your farming activities in the last growing season and their running costs

Equipment	Quantity(in number)	Date of acquisition	Cost of acquisition (₦/one)	Expected life span	Cost of maintenance per year
Hoes					
Cutlasses					
Tractor					
Nylon					
Tarpaulin					
Drying slab					
Go to hell					
Bags					
Wheel barrow					
Transporting vehicle (lorry/pick up)					
Others: (i)					
(ii)					
(iii)					

22. Please indicate the labour activities used in the production of cocoa by gender.

Activity	Labour											
	Children(7-17 yrs)				Adult males (≥18 yrs)				Adult females (≥18 yrs)			
	Number	Hrs/ Day Day	Days	Wage rate/ day	Number	Hrs/ Day Day	Days	Wage rate/ day	Number	Hrs/day Day	Days	Wage rate/ day
Farm clearing												
Application of herbicides												
Application of fungicides												
Application of insecticides												
Application of fertilizer												

Harvesting												
Removal of cocoa bean seeds from the pods												
Cocoa beans fermentation												
Drying of cocoa beans												
Parkaging of dry beans												

23. Do you have access to credit facility for the production of cocoa? Yes ( ), No ( )

24. If 'yes' kindly complete the table below

Source of capital	Amount available for the last production season (N)	Interest paid (%) per year
Personal		
Friends/relatives		
Cooperatives		
Banks		
Local money lender		
Governmental agency		
Non-governmental agency		
Cocoa buyers		

25. Please indicate the average quantity of cocoa you produced in the last growing season.

Produce	Peak season			Low-season		
	Quantity (kg)	Quantity (bag)	Price (N)	Quantity (kg)	Quantity bag)	Price (N)
Cocoa beans						
Plantain						
Palm oil						
Kolanut						
Cassava						
Maize						
Others 1						
2						
3						

26. Who do you sell your cocoa beans to?

Buyers	Price/kg
1. Local buyers	
2. Licensed Buying Agents	
3. Cooperative society	
4. Local cocoa processors	
5. Others (specify)	

SECTION C. GOVERNMENT POLICY

27. Do you pay tax/levy to government at any level? ( ) yes, ( ) No

28. If yes, how much do you pay per annum? ……

29. Do you receive subsidies from government in any form? ( ) Yes, ( ) No

30. If yes, please complete the following table for 2013 production season

Level	Item	Rate	Amount
Government	Equipment Transaction Fertilizer Chemical Others (specify)		
Cocoa buyers	Equipment Transaction Fertilizer Chemical Others (specify)		
Non-Governmental Organisations	Equipment Transaction Fertilizer Chemical Others (specify)		

31. What are the major challenges/ constraints affecting your cocoa business?

Constraints	Tick	Ranking	Perception of severity [a]
Land accessibility			
Improved cocoa varieties			
Credit accessibility			
Labour availability			
Poor price of cocoa beans			
Poor distribution system for fertilizer and chemicals			
Inadequate marketing channels			

Storage facilities			
Others (specify):			
1.			
2.			
3.			

a: 1- Not severe, 2- Not very severe, 3- Undecided, 4- Just severe and 5- Very severe

QUESTIONNAIRE FOR COCOA MARKETERS

COMPETITIVENESS OF COCOA VALUE CHAIN IN SOUTHERN NIGERIA

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF IBADAN, NIGERIA.

Dear respondent, this is a research questionnaire which is aimed at collecting data on Competitiveness of Cocoa Value Chain in Southern Nigeria. Please, fill it appropriately, as data collected will be used for the purpose of the study.

Questionnaire code /_____/ Date of interview: _____

SECTION A. DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

1. State ……
2. Local Government Area ……
3. Town/Village ……
4. Sex (a) Male (b) Female
5. Marital status (a) Single (b) Married (c) Divorced (d)Widowed
6. Age ……
7. Religion (a) Christianity (b) Islam (c)Traditionalist
8. Level of education (a) No formal (b) Primary (c) Secondary (d) Tertiary
9. Year of education ……
10. Did you receive any formal training on cocoa buying? (a) Yes (b) No
11. How long have you been in cocoa marketing? ……
12. Apart from cocoa marketing, which other job are you engaged in? …….
13. At what level of market do you operate? (a) Local buying agents (b) Licensed buying agents (c) Exporter.

14. Which of the following socio-economic group do you belong to?

Groups	Member (Yes/No)	Position held	Memb-ership size	Indicate the activities
Cocoa Association of Nigeria (CAN)				
Cocoa Farmers				

Association of Nigeria (CFAN)				
Religious group				
Town union				
Cooperative				
Others				

15. From which source do you buy cocoa?

Source	Price
Farmers	
Local buying agents	
Licensed buying agents	
Other source (specify)	

16. Who do you sell your goods to?

Buyers	Price
Local buying agents	
Licensed buying agents	
Exporters	
Local processors	
Multinational companies	
Others (specify)	

SECTION B. OUTPUT/ INPUT USED IN MARKETING ACTIVITIES

18. How did you acquire the place you are carrying out your operations?

Method of acquisitions	Cost of building ₦	Cost/month if rented ₦	Expected life span ₦	Cost of maintenance ₦
Owned				
Rented				
Given/inherited				

19. Do you have your own means of transportation? (a)Yes (b) No

20. If yes, in what form?

Forms	Year of acquisition	Cost of acquisition (₦)	Expected life span (years)	Maintenance cost per (₦)		
				Repairs/month	Fuelling/week	Other cost
Pick-up Van						
Lorry						

Motor car						
Motor-bike						
Bicycle						
Wheel barrow						
Others (specify)						

21. How do you move your produce (cocoa) to and away from your store?

Destination	By head ₦	Bicycle ₦	Motor bike ₦	Motor car ₦	Pick-up van ₦	Lorry ₦	Animal ₦
From Seller to Store							
From store to the buyer							

22. Do you make use of electricity in your store? (a) Yes ( ) (b) No ( )

23. If yes in 22, how much is your monthly electricity bill per month ……

24. Do you use fuel (petrol/ diesel)? (a) Yes ( ) (b) No ( )

25. If yes, how much do you spend on fuel in a week? ……

26. How many days do you operate in a week? ……..

27. Do you have access to credit? (a) Yes ( ) (b) No ( )

28. If yes, fill the following table accordingly.

Source of capital	Amount	Interest paid per year	Year collected	Pay back year
Personal				
Friends/ relatives				
Cooperatives				
Banks				
Local money lenders				
Government				
Non-Governmental Organizations (NGOs)				
Others (please specify)				

29. Do you preserve your stored cocoa beans? (a)Yes ( ) (b) No ( )

30. If yes, please complete the table below

Chemical	Quantity / month		Period of storage (days/ months/ years)	Cost (₦)	
	Kg	Other measures		Kg	Other measure
Fungicides					
Rodenticides					

Insecticide					
Others (specify) i ii					

31. How many hours do you work in a day? ……

32. How many workers do you have, please specify:

	Professional			Unskilled		
	Children ≤18 years	Adult male > 18 years	Adult female >18 years	Children ≤ 18 years	Adult male > 18 years	Adult female >18 years
Number						
Hour / Day						
Monthly pay/person						
Weekly pay/person						
Daily pay/ person						
Hourly pay/person						

34. What is the quantity of cocoa purchased and sold in the last production season?

Qty purchase/sold	Quantity for last production season		Price (N)	
	Kg	Ton	Kg	Ton
Quantity purchased				
Quantity sold				

SECTION C. GOVERNMENT POLICY

27. Do you pay tax/levy to government at any level? (a) yes (b) No

28. If yes, please complete the following table for 2013 production season

Level of government	Amount paid
Federal government	
State government	
Local government	

29. Do you receive subsidies from government in any form? (a) Yes (b) No

30. If yes, please complete the following table for 2013 production season

Level	Item	Rate	Amount
Federal government	Weighing scale Jute bag Preservative chemical Others (specify)		
State government	Weighing scale Jute bag Preservative chemical Others (specify)		
Local government	Weighing scale Jute bag Preservative chemical Others (specify)		

QUESTIONNAIRE FOR COCOA PROCESSORS

COMPETITIVENESS OF COCOA VALUE CHAIN IN SOUTHERN NIGERIA

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF IBADAN, NIGERIA

Dear respondent, this is a research questionnaire which is aimed at collecting data on Competitiveness of Cocoa Value Chain in Southern Nigeria. Please, fill it appropriately, as data collected will be used for the purpose of the study.

Questionnaire code /_____/ Date of interview: _____

SECTION A.DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

1 Name of the processing organization ……

2. State ……

3. Local Government Area ……..

4. Town ……

5. Gender of the owner (a) Male (b) Female

6. Marital status (a) Single (b) Married (c) Divorced (d) Widow/widower

7. Age ……

8. Religion (a) Christianity (b) Islam (c) Traditionalist (4) Others

9. Level of education (a) No formal education (b) Primary (c) Secondary (4) Tertiary.

10. Number of years of education ……

11. Household size ……

12. Did you receive any formal training in processing? (a) Yes (b) No

13. What type of processing system do you operate? (a) Small-scale (b) Medium-scale (c) Large-scale

14. Are you a member of any socio-economic/cultural association? (a) Yes (b) No

15. If yes, which association? ……

SECTION B. PROCESSING/SYSTEM/ TECHNOLOGY

16. What part of cocoa pod do you use for processing? (a) Cocoa beans (b) Cocoa pod husk

17. What is the processing stages do you undertake in the processing of your product?

Stages	Procedure
1	
2	
3	
4	
5	

18. How did you acquire your processing facilities?

Method of acquisition	Type of machine	Installation capacity (tons)	Date of acquisition	Cost of acquisition (₦)	If rented, cost of rent/month (₦)	Maintenance cost (₦)
Owned						
Rented						
Given/ Inherited						

SECTION C. INPUT USED IN PROCESSING

17. How did you acquire the place you are carrying out your processing operations?

Method of acquisitions	Cost of land acquisition	Cost of building	Cost/month if rented	Expected life span	Cost of maintenance
Owned					
Rented					
Given/inherited					

18. How many bags/quantities (in kg/ton) of cocoa beans/cocoa pod husk can your facilities process per week …….

19. What is the cost of the cocoa bean/cocoa pod husk per kg/ton? ……

20. What type of package do you use? ……

24. How much do you spend on packaging per unit (₦) ……

25. How many days do you operate in a week? ……

26. What is the source of power to your processing facilities?

S/N	Types of the source of power	Cost per month (₦)
1		
2		
3		
4		

27. Do you have a generator of your own that you use for processing? (a) Yes ( ) (b) No ( )

28. If yes, complete the following table?

Date of acquisition	Cost of Acquisition (₦)	Expected life span	Cost of maintenance (₦)	
			Monthly repair (₦)	Fuelling per week (₦)

29. Do you have access to credit? (a) Yes ( ) (b) No ( )

30. If yes, fill the following table accordingly

Source of credit	Amount(₦: K)	Interest paid per year	Year collected	Payback period
Personal				
Friends/ relatives				
Cooperatives				
Banks				
Local money lend				
Government				

31. How many hours do you work in a day? ……...

32. How many days do you work in a month? ……

33. How many workers do you have? please specify

	Professional			Unskilled		
	Children < 18 years	Adult male ≥ 18 years	Adult female ≥ 18 years	Children < 18 years	Adult male ≥ 18 years	Adult female ≥ 18 years
Number						
Hours / Day						

Monthly pay/person						
Weekly pay/person						
Daily pay/ person						
Hourly pay/person						

SECTION D. SALES AND MARKETING

34. In what forms and prices do you normally sell your products after processing?

Forms of sale	Farm gate/ producers price (₦:K)

35. Please indicate the average quantity of products processed per week

Products	Peak season			Low-season		
	Quantity (Kg)	Unit price ₦	Quantity in other local measure	Quantity (Kg)	Unit price ₦	Quantity in other local measure

36. Who are your suppliers?

Suppliers	Material Supplied	Nature of supply (1-Cash, 2-Credit)

37. Who are your buyers?

Buyers	What do they purchase?

38. Apart from your processing activities, which other business are you doing?

SN	Business process	Average monthly income from the business
1		
2		

SECTION C. GOVERNMENT POLICY

39. Do you pay tax/levy to government at any level? (a) yes (b) No

40. If yes, please complete the following table for 2013 production season

Level of government	Amount paid ₦
Federal government	
State government	
Local government	

41. Do you receive subsidies from government in any form? (a) Yes (b) No

42. If yes, please complete the following table for 2013 production season

Level	Item	Rate	Amount ₦
Federal government	Equipment Income/profit Transaction Others (specify)		
State government	Equipment Income/profit Transaction Others (specify)		
Local government	Equipment Income/profit Transaction Others (specify)		

43. What are the major challenges/ constraints affecting the growth of your processing?

Constraints	Tick	Ranking	Perception of severity
Water availability/supply			
Electric supply			
Transport/Road condition			
Storage facilities			
Land accessibility			
Credit accessibility			
High costs of agro machinery			
Training			
Inadequate marketing channels			
Others (specify):			
1.			
2.			
3.			

b: 1- Not severe, 2- Not very severe, 3- Undecided, 4- Just severe and 5- Very severe.