Institutional innovations to reduce transaction costs and risks between smallholder farmers and traders in rural markets in Ghana.

Alfred Mensah

A thesis submitted for the degree of Doctor of Philosophy

School of Sustainable Environments

Writtle University College

(University of Essex)

Abstract

Despite the vast research by the New Institutional Economists on impacts of high transaction costs on market participation by farmers in Sub-Saharan Africa (SSA), little is known in the literature about how institutional innovations can be used as a tool to address high transaction costs and risks associated with smallholder farmers market participation in Ghana. Consequently, this study aimed at finding out how institutional innovations can be used to address high transaction costs and risks affecting smallholder farmers' and traders' marketing transactions.

The study used a mixed methods approach to collect data from the participants (farmers, traders and other stakeholders). The quantitative data was obtained from smallholder farmers and traders through questionnaire interviews. The qualitative data was collected through key informants and vulnerability (MARISCO) analysis. All the data were collected and analysed concurrently using SPSS, Excel and PAST. The data was interpreted through cross tabulation, chi-square test, and PCA. The data generated from MARISCO vulnerability analysis was analysed through results chain, gap analysis and cause-effect.

The study discovered that institutional innovations can address high transaction cost and risks affecting smallholder farmers and traders market interactions. Also, the chisquare test (0.047) shows statistical significance on the ability to use institutional innovations to address high transaction costs and risks with institutional innovations. Additionally, commissioners (lead boys) in the local markets of Ghana were discovered to be a source of high transaction costs and risks. Finally, price fluctuation was discovered as a major marketing problem in all the data collection methods used.

i

Acknowledgement

I would like to express my sincere gratitude to my lead supervisor, Prof. Peter Hobson and assistant supervisor Mr Henry Matthews of the Writtle University College for their guidance throughout the preparation and writing of this thesis. I found our meetings very fruitful and highly rewarding. I am extremely appreciative of the speed with which Professor Peter always managed draft chapters and set SMART objectives for our next meeting.

Particular thanks go to Mark Cannon for his support and encouragement at the early stage of my study. Also, special thanks go to Ziaul Hoque (former direct of Essex International College) for his very kind support for my school fees.

Thanks to my family for all of their support over the last few years, especially my late father, Christian Amankwah Mensah, who invested a lot of money in my education and made me believe that I can go higher in my academic ladder than my siblings. Besides, I thank my sister Diana for her encouragement on up and downs on my academic journey. Again, I thank Rhoda Tabiri (my wife's younger sister) for her assistance during my field data collection in Ghana; she volunteered to be a research assistance throughout the data collection.

Finally, my most heartfelt thanks go to my wife, Denise Adjei, for her unfailing support, love, patience and understanding throughout the completion of this thesis (not to mention all of the caring for our children).

ii

Table of Contents

1	Intr	oduo	ction	1
	1.1	Pro	blem Statement	. 11
	1.2	The	e study aim and objectives	. 13
	1.3	Mot	tivation	. 15
	1.4	Res	search Methods	. 17
	1.5	Def	inition of Key Concepts	. 18
	1.6	Stru	ucture of the thesis	. 19
2	Lite	eratu	re review	. 21
	2.1	Tra	nsaction costs	. 21
	2.1	.1	Classification of transaction costs	. 27
	2.1	.2	The impact of high transaction costs on smallholder farmers	. 28
	2.2	Inst	titutions	. 33
	2.2	.1	Definition of institution	. 33
	2.2	.2	The difference between institution and organisation	. 39
	2.3	Inn	ovation	. 42
	2.4	Les	sons of institutional innovations	. 46
	2.5	Pos	ssible institutional innovations required for smallholders in Ghana	. 48
	2.5	.1	Contract farming	1
	2.5	.2	Co-operative	6
	2.5	.3	Government intervention	. 11
	2.6 risks	Inno 32	ovative public and private institutions role to reduce transaction costs a	and
	2.7	Tra	nsaction risks	. 38
	2.8	The	e transaction costs, transaction risks, and institution	. 42
	2.8	.1	Relationship between institutions, transaction costs and risks	. 42

2.9	Enabling environment4	16
2.10	Innovation system approach4	19
2.1	0.1 Agricultural Innovative platforms5	52
2.11	Definition of smallholder farmers5	53
2.1	1.1 Some of the challenges faced by smallholder farmers in SSA5	55
2.12	The existing conceptual model (framework for linking smallholder to market	s)
2.13	Unlocking markets to smallholders6	30
2.14	The market structure analysis framework6	51
2.15	Framework of analysis6	32
2.16	Vulnerability Assessment6	35
2.17	Vulnerability and risk assessment methods6	6
2.1	7.1 The risk analysis6	57
2.18	The conclusion of the literature review6	39
3 Me	thodology7	' 5
3.1	Introduction:7	' 5
3.2	Research setting (The study location)7	' 5
3.2	The agriculture sector in Ghana7	7
3.2	Agriculture development policy (the FASDEP II)	78
3.2	2.3 Study locations in Ghana7	79
3.3	Research design	34
3.4	Research Strategy (mixed methods)	36
3.5	The positionality of the researcher	37
3.6	Sampling Design	38
3.7	Data collection	} 0
3.8	Quantitative data collection) 4

	3.9	Qu	alitative data collection9	5
	3.10	Da	ta analysis9	9
	3.11	An	alysis of quantitative and qualitative data9	9
	3.12	Da	ta transformation and consolidation10	0
	3.13	MA	RISCO Situational analysis10	1
4	Re	sults	and analysis10	8
	4.1	Fin 108	idings from smallholder farmers' questionnaire survey in both study area 8	s
	4.2	The	e gender of the participants11	0
	4.2 farr	.1 ners	Comparison of levels of Education for all participants (smallholdes)	۶r 1
	4.3	Fai	rm sizes of the participants11	3
	4.4	Ag	es of the participants11	5
	4.5	Re	asons for entering farming11	7
	4.6	Fai	rming knowledge rated by participants12	1
	4.6	.1	Training requirements for smallholder farmers	4
	4.7	Cro	ops cultivated by the participants12	6
	4.7	.1	The quantity of the produce consume at home12	9
	4.8	So	urces of market information13	1
	4.8	.1	The method used by smallholder farmers to access market informatio 134	n
	4.8	.2	Existing markets for smallholder farmers13	9
	4.8	.3	Channel of distribution for smallholder farmers14	5
	The and	e pa I the	rticipants were asked about the channel of distribution for their produce air responses are depicted in table 4114	e 5
			146	
	4.9	Sm	nallholder farmers marketing problems15	0
	4.10	Tra	ansaction costs affecting smallholder farmers	2

4.11 Institutional innovations to reduce high transaction costs and risks 157
4.12 Participants view on smallholder farmers' participation in decision making 164
4.13 Areas smallholder farmers can participate in decision making
4.13.1 Impact of smallholder farmers' participation in decisions on transaction costs and market access
4.14 Findings from traders (agents) 173
4.14.1 Age of traders who participated in the study
4.14.2 Sources of information for smallholder farmers and agents market transactions
4.14.3 Traders responses on distribution channels for smallholder farmers 178
4.14.4 Market problems affecting smallholder farmers from traders' perspective 180
4.14.5 Comparison of benefits for smallholder farmers in domestic, regional and international markets
4.15 Do traders (market agents) and smallholder farmers received support on the market?
4.16 Awareness of high transaction costs affecting agents and smallholders 191
4.17 High transaction costs affecting marketing interaction between traders and smallholder farmers in rural markets of Ghana
4.18 The implication of high transaction costs in the market transactions between traders and smallholder
4.19 Institutional innovations to address high transaction costs and risks 196
4.20 Traders view on smallholder participation in decision-making
4.20.1 Areas smallholder farmers are allowed participation in decision-making 200
4.20.2 Why smallholder farmers are denied participation in decision-making 202
4.21 Findings from key informants' data interviews
4.21.1 Ages of participants for key informants' interviews
4.21.2 The gender of the participants

	4.22	The	e educational levels of the key informants	. 209
	4.2	2.1	The professions or occupations of the key informants	. 212
	4.23	Ма	rketing problems affecting smallholder farmers	. 214
	4.2	3.1	Marketing problems encountered by smallholder farmers	. 214
	4.2	3.2	Existing markets for smallholder farmers	. 217
	4.2	3.3	High transaction costs affecting smallholder interaction with traders	. 220
	4.2 inv	3.4 olve	Institutional innovations to address high transaction costs and din smallholder farmers transactions with traders	risks . 229
	4.2	3.5	Smallholder participation in decision-making	. 234
	4.24	The	e importance of smallholder farmers participation in decision-making	. 237
	4.25	PC	A analysis for smallholder farmers	. 241
	4.2	5.1	The PCA loadings for smallholder farmers' responses	. 241
	4.26	PC	A analysis for key informants	. 248
	4.2	6.1	The PCA loadings on axis 1 for key informants	. 248
	4.27	MA 259	RISCO vulnerability analysis (Concrete application and MARISCO res	ults)
	Re	sult	chain for MARISCO analysis	. 262
	4.2	7.2	Proposed strategies to address threats and contributing factors	. 263
	4.28	Co	nclusion for data analysis	. 266
5	Dis	cuss	sion	. 267
	5.1	Sou	urce data for the discussion	. 267
	5.2	Dei	mographic information of the smallholder farmers	. 268
	5.2	.1	Gender of the participants	. 268
	5.2	.2	Farm sizes of smallholder farmers	. 269
	5.2	.3	The educational level of the participants	. 270
	5.3	Sou	urces of market information	. 272

5.4 farm	Cha ers	annel of distribution and market access problems for the smallholder
5.5 acce	Hig ss	h transaction costs and its implications on smallholder farmers market
5.5 inte	5.1 eract	Impacts of high transaction costs on smallholder farmers and traders ions
5.5 tra	5.2 nsac	Application of framework of analysis to the smallholder farmers' high tion costs
5.5 Ah	5.3 afo F	Nature of high transaction costs affecting smallholder farmers in Brong Region
5.6 trade	Tra ers (n	nsaction risks in the market interactions between smallholder farmers and narket women)
5.7 trans	Ana actic	alysis of the innovative public and private institutions role in address high on costs and risks
5.7	7.1	Contract farming
5.7	7.2	Smallholder farmers' participation (involvement) in decision making 298
5.7	7.3	Government intervention smallholder agriculture
5.8	Alte	ernative sources of livelihoods to benefit smallholder farmers
5.8	3.1	MARISCO situational (vulnerability analysis)
5.9	Co	nclusion
5.9	9.1	Summary of the study
5.9	9.2	A summary key finding from the study
5.9	9.3	Conclusion
5.10	Re	commendation
5.11	Qu	estions for future research
1. Ho innova	w dc tions	bes gender inequality in smallholder agriculture affect institutional to promote market access?
5.12	Lim	nitations
6 Re	ferer	nces

Mburu, S., Ackello-Oguu, C. and Mulwa, R. (2014) Analysis of Economic Efficiency and Farm Size: A Case Study of Wheat Farmers in Nakuru District, Kenya...... 336

<i>Ecor</i> http:/	nomics Research International, Vol. 2014, Article ID 802706, 10 pages //dx.doi.org/10.1155/2014/802706
We	ebsites
7 Ap	pendices
7.1	Appendix 1: Participants' information sheet (questionnaire)
7.2	Appendix 2: Questionnaire for smallholder farmer
7.3	Questionnaire for traders(Market women)
7.4	Questionnaire for key informants
7.5	Traders questionnaire
7.6 farm	Appendix 3: Tomatoes boxes use by market women to purchase smallholder ers' tomatoes
7.7	Some interviews photos
7.8	Cassava (Gari) processing site at Aworowa, Techiman
7.9	Interview with the best farmer at Aworowa (Brong Ahafo Region)

List of plates

Plate 2:: Knowledge group meeting with gate-keepers
Plate 2:Participants at Gyinase, KMA106
Plate 3:MARISCO participants at Dabaa 106
Plate 4: Participants from Oforikurom106
Plate 5: Animals kept alongside vegetable crops by Gyinase, Karikari farms 253
Plate 6:Animals kept alongside vegetable crops by Gyinase, Karikari farms253
Plate 7:Tomatoes boxes use by market women to purcahse tomatoes from farmers in Tuobodum and Akumadan
Plate 8:Interview pictures for MARISCO, questionnaire and key informants interviews

Plate 9:Gari or cassava processing site at AworowaPlate 10:Inte MARISCO, questionnaire and key informants interviews	erview pictures for 373
Plate 11:Gari or cassava processing site at Aworowa	
Plate 12:Interview with the best farmer at Aworowa (Brong Ahafo)	

List of tables

Table 1: Summary of institutional innovations with the potential to address hightransaction costs and risks affecting smallholder farmer market access in Ghana,source: Adapted from Oluoch-Kosura, 201030
Table 2: Mode of supply Chain governance in relation to theoretical constructs, source:Tilburg, 201062
Table 3: Bottlenecks to smallholders' market access, source: Obi et al, 2012 62
Table 4: Factors influencing market access by type of governance made in the valuechain, source: An Tilburg, et al., 201263
Table 5: The study locations in Ghana 80
Table 6: Timeline of field data collection in Ghana in August 2014, Source: Author 92
Table 7: Timeline of data collection in September 2014, source: Author
Table 8: Study location in Ghana showing the number of participants
Table 9: Gender of the participants 110
Table 10: Chi-square test for the gender of the participants
Table 11: Comparison of Educational levels of participants in Brong Ahafo and Ashanti Regions of Ghana
Table 12: Chi-square test for the educational levels of participants
Table 13: Average and standard deviation for farm size of participants 113
Table 14: Comparison of farm sizes of participants in Brong Ahafo and AshantiRegions of Ghana114
Table 15: Chi-square test for farm size of the study areas

Table 17: Chi-Square test for ages of participants in Brong Ahafo and Asante Regions
Table 18: Reasons for entered into farming in Brong Ahafo and Ashanti Regions of GhanaGhana
Table 19: Chi-square test for the reason for farming by participants in Brong Ahafoand Ashanti Regions of Ghana118
Table 20: Reasons for participants engaging in farming in villages/towns in BrongAhafo and Ashanti Regions
Table 21: Chi-square test for participants at villages/towns level in Brong Ahafo and Asanti Regions 121
Table 22: Rated farming knowledge by the participants at the regional level 121
Table 23: The rated farming knowledge in the towns (villages) level in Brong Ahafoand Ashanti Regions of Ghana122
Table 24: Chi-square test for rated farming knowledge at village/town level 123
Table 25: Cross tabulation for participants responses on further training requirementsat the regional level124
Table 26: Participants responses for further training at villages/towns level 125
Table 27: Cross tabulation for types of crops cultivated by participants in BrongAhafo and Asanti Regions
Table 28: Types of crop grown by participants from various villages/towns
Table 28: Types of crop grown by participants from various villages/towns
Table 28: Types of crop grown by participants from various villages/towns
Table 28: Types of crop grown by participants from various villages/towns
Table 28: Types of crop grown by participants from various villages/towns
Table 28: Types of crop grown by participants from various villages/towns
Table 28: Types of crop grown by participants from various villages/towns127Table 29: Quantity/Percentage of the produce used at home by participants130Table 30: Cross tabulation for sources of market information for participants131Table 31: Kind of market information access by participants at regional levels132Table 32: The kind of market information farmers normally access132Table 33: Methods used by participants in towns/villages in Brong Ahafo and Ashanti Regions to access market information136Table 34: Existing markets for smallholder farmers' produce in the Brong Ahafo and Asanti Regions in Ghana139
Table 28: Types of crop grown by participants from various villages/towns
Table 28: Types of crop grown by participants from various villages/towns

Table 38: Participants preferred markets access for their produce
Table 39: Chi-square test for preferred markets for participants
Table 40: Preferred markets for participants 144
Table 41: Marketing channels for smallholder farmers produce
Table 42: Channels of distribution of smallholder farmers produce in Brong Ahafo and Asanti Regions
Table 43: Chi-square test for channels of distribution for smallholder farmers 149
Table 44: Chi-square test for marketing problems for smallholder farmers in Brong Ahafo and Asanti Regions
Table 45: How high transaction costs affect participants
Table 46: Smallholder farmers from study villages/towns views on how high transaction costs affect them
Table 47: Chi-square test on how high transaction costs affect farmers 157
Table 48: Institutional innovations to reduce high transaction costs suggested bysmallholder farmers at a regional level
Table 49:Chi square test for institutional innovation to reduce high transaction costs
Table 50: institutional innovations to reduce transactions costs suggested bysmallholders161
Table 51: Chi-square test for suggested institutional innovation to reduce transaction costs. 163
Table 52: Participants view whether smallholder farmers participate in decision making or not 164
Table 53: Participants responses to smallholder farmers' participation in decision- making
Table 54: Areas smallholder farmers can participate in decision making in both BrongAhafo and Ashanti Regions166
Table 55: Areas smallholder farmers are permitted to take part in decision making 167
Table 56: Benefits of participation in the decision for smallholder farmers
Table 57: Participants view on how smallholder farmers' participation

Table 58: Cross tabulation for traders or market women in both the Brong Ahafo and Ashanti Regions
Table 59: Participants ages shown in towns/villages level
Table 60: Chi-square test for ages of traders in both the Brong Ahafo and AshantiRegions175
Table 61: Sources of market information for market interactions between smallholder farmers and traders 176
Table 62: Sources of information for smallholder farmers' interaction with traders at town/village levels
Table 63: Chi-square test for traders' view on sources of information for theirinteractions with smallholder farmers177
Table 64: Traders views on distribution channels for smallholder farmers
Table 65:Current market access by both traders and farmersFigure 18: Traders viewon distribution channels for smallholder farmers179
Table 66: Chi-square test for the channel of distribution for smallholder farmers 179
Table 67: Traders' view on marketing problems affecting smallholder farmers 180
Table 68: Market problems identified by traders in villages/Towns in the Brong Ahafo and Ashanti 181
Table 69: The market smallholder farmers like most
Table 70: Traders in views on the best markets for smallholder farmers attowns/villages level
Table 71: Chi-square test for preferred market for smallholder farmers from traders' perspective 185
Table 72: Do smallholder farmers benefit more in regional and domestic markets thanin the international markets?186
Table 73: Traders responses on the comparison of for smallholder farmers to accessdomestic and regional markets instead of international markets
Table 74: Chi-square test for responses on whether domestic and regional markets are beneficial to smallholders than international markets
Table 75: Do traders and smallholder farmers receive support for market access. 189
Table 76: Chi-square test on whether traders and smallholder farmers receive support for market access 189

Table 77: Do traders and smallholder farmers access support on market access? 190

Table 78: Awareness of high transaction costs on market interactions between traders Table 79: Sources of high transaction costs affecting traders' interaction with Table 80: Sources of high transaction costs identified by participants at villages/towns Table 81: Traders view on how high transaction costs affect their interactions with Table 82: Implication of high transaction costs on marketing interactions between Table 83: Best institutional innovation to address high transaction costs and risks 197 Table 84: Traders' view on whether smallholder farmers allow to take part in decision-Table 85: Traders response on whether smallholder farmers participate in decisionmaking or not at villages/towns level......199 Table 86: Traders view on areas smallholder farmers allowed participation in decision-Table 87: Areas where smallholder farmers can take part in the decision-making. 201 Table 88: Chi-square test on areas smallholder farmers allowed participation in Table 89: Reasons for excluding smallholder farmers from participatory decision Table 91: Age range for key informants who participated in the study at towns/villages Table 93: Gender of the key informants 207

Table 97: Cross tabulation for the education of participant
Table 98: Occupation (profession) of the key informants 212
Table 99: Crosstabulation for professions of the participants at towns and villages levels 213
Table 100: Chi-square test for professions of key informants
Table 101: Marketing problems affecting smallholder farmers 214
Table 102: Key informants' responses to marketing problems faced by smallholdersat Towns or villages levels216
Table 103: Existing markets for smallholder farmers identified by key informants . 217
Table 104: Existing markets for smallholder farmers identified by key informants at thetown and village levels218
Table 105: Chi-square test for key informants view on existing markets for smallholder farmers 219
Table 106: High transaction costs affecting smallholder farmers
Table 107: Key informant responses on high transactions costs affecting smallholderfarmers at town/village levels222
Table 108: Chi-square test on high transaction costs affecting smallholder farmersfrom key informants' perspective
Table 109: The implications for high transaction costs for smallholder farmers 224
Table 110: The implication of high transactions costs on smallholder farmers at towns and village levels 226
Table 111: Chi-square test for the implication of high transaction costs on smallholder farmers 228
Table 112: Institutional innovations to address high transaction costs and risks 229
Table 113: Institutional innovations to address high transaction costs and risks 231
Table 114: Chi-square test for institutional innovations for smallholder farmers market access 233
Table 115: Do smallholder farmers participate in decision-making?
Table 116: Key informants' responses on farmers participate in decision-making at towns/villages levels
Table 117: Benefits for smallholder farmers participation in decision-making 237

Table 118: Benefits for smallholder farmers participation in decision-making 23
Table 119: Chi-square test for benefits of smallholder farmers participation in decisionmaking
Table 120: Cause-effect web26
Table 121: Results chain for MARISCO analysis 26
Table 122: Newly formulated strategies to fill gaps in the existing strategies 26

List of figures

Figure 1: Causes of smallholder farmers vulnerability, source: author
Figure 2: Low level Equilibrium trap, source: Dorward et al, 2003
Figure 3: Relationship between transaction risks, transaction costs, and institutions, source:Meijerink and Eaton, 2009
Figure 4: Institutional constraints face by smallholder farmers, source: Royer, et al.,2016
Figure 5:Transaction costs and risks encountered by smallholder rural farmers in Ghana, including possible institutional innovation to address them, Source: author 50
Figure 6:Common interest space (Kenya case), source:Oluch-Kosura, 201029
Figure 7:Diagrammatic representation of state of smallholder farmers in rural market of Ghana
Figure 8: Conceptual diagram of innovation system, source: Aerni et al., 2015 49
Figure 9: Marketing channels for smallholder farmers produce, source: Jari and Fraser, 2012
Figure 10: Framework for linking smallholder to markets, source: Torero, 2015/ 59
Figure 11: Map of West Africa, source: Cambridge Graduate University, 2013 76
Figure 12:Map of Ghana, source: UN Cartographic section 1
Figure 13: Map of Brong Ahafo showing study locations in Techiman, Source: Techiman Municipal Assembly (2011)
Figure 14: Map of Asanti Region showing study locations, Source: Amoateng, et al, (2018)
Figure 15:Concurrent (or parallel) design Source: Creswell, 2003

Figure 16: The vulnerability and Risk Assessment Process, Source: Morchain and Kelsey (2016)
Figure 17: Traders view on distribution channels for smallholder farmers
Table 65:Current market access by both traders and farmersFigure 18: Traders viewon distribution channels for smallholder farmers179
Figure 19: responses of participants on desired markets for smallholder farmers . 184
Figure 20: Best Institutional Innovations to reduce high transaction costs between agents and farmers transactions
Figure 21: Ages of participants in the key informants' interviews
Figure 22: The educational levels of the key informants
Figure 23: PCA loading on axis 1242
Figure 24:PCA loading for axis 2 244
Figure 25: PCA loadings on axis 3245
Figure 26: Biplot for smallholder farmers responses to the questionnaire interviews
Figure 27: for axis 1 (key informants' interviews)249
Figure 27: for axis 1 (key informants' interviews)249 Figure 28:PCA loading for axis 2252
Figure 27: for axis 1 (key informants' interviews)249Figure 28:PCA loading for axis 2252Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong Ahafo Regions255
Figure 27: for axis 1 (key informants' interviews)249Figure 28:PCA loading for axis 2252Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong Ahafo Regions255Figure 30: provide more detailed legendCluster analysis257
Figure 27: for axis 1 (key informants' interviews)249Figure 28:PCA loading for axis 2252Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong Ahafo Regions255Figure 30: provide more detailed legendCluster analysis257Figure 31:Cluster analysis257
Figure 27: for axis 1 (key informants' interviews) 249 Figure 28:PCA loading for axis 2 252 Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong Ahafo Regions 255 Figure 30: provide more detailed legendCluster analysis 257 Figure 31:Cluster analysis 257 Figure 32:Rating of categories for manageability, Source: Ibisch and Hobson, 2014 2014
Figure 27: for axis 1 (key informants' interviews) 249 Figure 28:PCA loading for axis 2 252 Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong Ahafo Regions 255 Figure 30: provide more detailed legendCluster analysis 257 Figure 31:Cluster analysis 257 Figure 32:Rating of categories for manageability, Source: Ibisch and Hobson, 2014 260 Figure 33:Rating categories for current criticality, Source: Ibisch and Hobson, 2014 260
Figure 27: for axis 1 (key informants' interviews) 249 Figure 28:PCA loading for axis 2 252 Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong Ahafo Regions 255 Figure 30: provide more detailed legendCluster analysis 257 Figure 31:Cluster analysis 257 Figure 32:Rating of categories for manageability, Source: Ibisch and Hobson, 2014 260 Figure 33:Rating categories for knowledge, Source: Ibisch and Hobson, 2014 260
Figure 27: for axis 1 (key informants' interviews) 249 Figure 28:PCA loading for axis 2 252 Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong 255 Ahafo Regions 255 Figure 30: provide more detailed legendCluster analysis 257 Figure 31:Cluster analysis 257 Figure 32:Rating of categories for manageability, Source: Ibisch and Hobson, 2014 260 Figure 33:Rating categories for current criticality, Source: Ibisch and Hobson, 2014 260 Figure 34:Rating categories for knowledge, Source: Ibisch and Hobson, 2014 260 Figure 35:Nature of market smallholder farmers access in rural Ghana, Source: Author 277
Figure 27: for axis 1 (key informants' interviews) 249 Figure 28:PCA loading for axis 2 252 Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong Ahafo Regions 255 Figure 30: provide more detailed legendCluster analysis 257 Figure 31:Cluster analysis 257 Figure 32:Rating of categories for manageability, Source: Ibisch and Hobson, 2014 260 Figure 33:Rating categories for current criticality, Source: Ibisch and Hobson, 2014 260 Figure 34:Rating categories for knowledge, Source: Ibisch and Hobson, 2014 260 Figure 35:Nature of market smallholder farmers access in rural Ghana, Source: Author 277 Figure 36:Small farmers Heterogeneity, Source: Torero, (2011) 281

List of Abbreviations

ASFG	African Smallholder Farmers Group
BE ICA	Behaviour Economics International Cooperative Alliance
ECOWAS	Economic Community of West Africa States
FAO FASDEP	Food and Agriculture Organisation Food and Agriculture Development policy
FO	Farmer organisation
GCAP GFSI	Ghana Commercial Agriculture Project Global Food Security Index (GFSI)
IFL	International Finance Corporation
IFAD	International Funds for Agricultural Development
IP	Innovation Platform
КМА	Kumasi Metropolitan Assembly
IMF	International Monetary Funds
MoFA	Ministry of Agriculture
MOFED	Ministry of Finance and Economic Planning
NIE	New Institutional Economists'
PPP	Private-Public Partnership
SAPS	Structural Adjustment Programmes
SSA	Sub-Saharan Africa
TCE	Transaction Cost Economics

тс	Transaction costs
ТМА	Techiman Municipal Assembly
VA	Vulnerability Analysis
WTO	World Trade Organisation

1 Introduction

Agriculture is the backbone of the African economy and the main industry in Sub-Saharan Africa (SSA). It provides 65% of jobs and contributes about a third of SSA Gross Domestic Products (World Bank, 2008).

Equally importantly, the smallholder farmers play a major role in the agricultural achievements in Africa. They constitute about 80% of all farms in SSA (Cooper, et al., 2014; Gollin, 2014). For example, is a major contributor to Nigeria's Gross Domestic Product (GDP) of which smallholder farmers play a dominant role. They constitute more than 80% of farmers and account for 98% of the food consumed in the country except for wheat (Mgbenka and Mbah, 2016).

Burundi's economy is sustained by agriculture. About 90% of the entire population depends on agriculture for their livelihoods. Most of the farmers in this country are smallholders and practice subsistence farming, but only about 15% of the entire food production is marketed (Chauvin, et al., 2012).

Also, Benin is known to be an agricultural country. In 2000 about 55% of the economically active population was employed in the agricultural sector and accounted for 38% of GDP for that year. Furthermore, small, independent farmers produce 90% of entire agricultural output in the country. However only about 17% of the total area is cultivated, much of it in the form of collective farms since 1975 (Chauvin et al., 2012).

2014).

Similarly, agriculture contributes more than 30% of Ghana's GDP (Diao, 2010). Smallholder farmers play an important role in this GDP contribution. These farmers use conventional knowledge and basic technology to account for 80% of food production in Ghana. Also, 90% of their farm holdings are less than 2 hectares in size. For example, cocoa production in Ghana is dominated by thousands of smallholder producers operating less than 2 hectares per farm. Most of the smallholder farmers are rural dwellers; 87%-89% of rural households in Ghana are engaged in crop production (Diao, 2010; MOFA, 2015).

Therefore, a lot is known in the literature about smallholder farmers compared to large farms. Chapoto et al., (2013:22) observe that "In the literature, a survey of farm size in developing countries frequently show small farms producing more per acre than large farms, a sign of the inverse relationship between farm size and production per unit." This could be the reason behind the lack of popularity associated with large farms in SSA.

Although, smallholder farmers have access to less than 15% of the agricultural land, they are able to produce more than 70% of the food consumed in the continent (Fitzpatrick, 2015). In addition, they benefit from the family labour supply, which is flexible compared to hired labour and can be mobilised according to the needs of the farmers (Gollin, 2014).

In terms of crop production, smallholder farmers tend to grow traditional crops, such as cocoa, maize, and cassava (Chamberlin et al., 2007) in Ghana. Compared to the existing large farms and plantations farmers, they grow rubber, oil palm and to a lesser extent, rice, maize and pineapples production (Mendes, et al., 2014).

In spite of smallholder farmers' contribution in agricultural development in SSA, some recent studies (Houssou, et al., 2016; Fold and Gough, 2008) show that smallholder farmers' percentage in Ghana is decreasing, while the percentage of large farms is increasing. For example, Houssou, et al., (2016) discovered that "the share of farmers cultivating between 2 ha and 5 ha grew by 24 per cent; those cultivating between 5 ha and 10 ha grew by 28 per cent."

It seems the current growth in large farms in Ghana is as a result of the initiative undertaken by the government of Ghana to promote smallholder commercialisation. The government of Ghana has adopted a strategy known as 'Ghana Commercial Agriculture Project (GCAP)'. It is jointly funded by the World Bank-IDA and USAID. The main aim of this project is to develop agriculture in Ghana to facilitate poverty reduction and guaranteeing food security through the promotion of inclusive commercial farming for selected commodity value chains.

Another objective of the GCAP is to increase smallholder farmers' access to secure land, private sector finance, agricultural input and output markets from investors from commercial farming from the project sites in Accra plains and Savannah Accelerated Development Authority (SADA) zone of Northern Ghana (GCAP, 2017). Indeed, the GCAP project has successfully converted some smallholder farmers into commercial or large-scale farmers at the project sites.

Likewise, Grow Africa operations in Ghana are contributing to the growth of large farms in Ghana. Currently, it is working in partnership with 20 companies (12 international and 8 domestic), 3 three farmer association, other stakeholders and government of Ghana to undertake agricultural projects, such as Ghana Cassava

Working Group. About 738,409 smallholder farmers have been supported by this partnership of which 70% of them are women. Some of the support smallholder farmers are receiving from Grow Africa include production contracts, financial and data services. Moreover, some pineapple and cassava growers are now practising commercial farming in Ghana (Grow Africa, 2017).

As a result of the above achievements, Grow Africa mentions that "The Ghana Industrial Cassava Stakeholders platform (GICSP) is a good example of co-operation development. It goes on to say, "It brings together representatives from producer groups, processors, buyers, financiers and the public sector to work together to build links between actors along the value chain."

While some smallholder farmers have benefitted from GCAP and Grow Africa, many smallholder farmers in other parts of Ghana especially in rural areas lack similar support. Thus, the existing policies on smallholder farmers' commercialisation in Ghana appear to be unfavourable to rural dwellers. Houssou, et al., (2016:11) argues that "It is expected that the agricultural policies and programs put in place to date will create an environment conducive to agricultural transformation and the transition from small-scale to medium- and large-scale farming in the country." However, "existing evaluations suggest that public interventions in the agricultural sector have had mixed results." It is, therefore, crucial for many smallholder farmers to be introduced to institutional innovations like those discussed earlier.

Similarly, agriculture in SSA in general is face with some challenges, such as food security and wastage. Food security is a problem in SSA resulting from poor performance of the agricultural sector in SSA and declining export earnings from

agricultural produce (Obwona and Chirwa, 2007). Moreover, the entire African continent is seen as a net importer of food and agricultural products (Rakotoarisoa et al., 2011) due to poor export earnings.

The above problem is reflected in Ghana's agricultural sector. The country experiences both food insecurity and net importer problems (Rutten and Verma, 2014; Rakotoarisoa et al., 2011; USDA Foreign Agricultural Services, 2011). For example, Ghana exported agricultural food products worth about \$100 million in 2011 but imported (mostly bulk/intermediate and consumer-ready commodities such as rice, wheat, sugar and poultry) approximately \$1 billion in the same year (USDA Foreign Agricultural Service, 2012).

Again, the Global Food Security Index, which is a system that ranks 113 countries according to their access to affordable, available and quality food (Caluag, 2013), revealed that Ghana reached an average score of 43% out of 100 in 2014. This places Ghana in the bottom 28% of the index as a 'moderate' performer, with a ranking of 78th out of 109 countries in total. Compared to other countries in the Sub-Saharan African region, Ghana's index ranks fifth out of 28, behind South Africa, Botswana, Uganda and Cote d'Ivoire (Rutten and Verma, 2014). However, in terms of the three dimensions (affordability, quality & safety and availability) of the score, and especially affordability, it had a score of 37.4% out of 100; ranking 84th out of 109 and this seems to be its biggest problem (Rutten and Verma, 2014). Thus, in view of the poor affordability score, it can be argued that Ghana is experiencing food insecurity. Similarly, 2017 Global Food Security Index (GFSI) ranked Ghana to 76 out of an overall 113. This position as well indicates that food security is a problem for Ghana,

although the GFSI net change in overall score in 2017 compared to 2016 shows that Ghana's food security has gone up by +1.2 (The Economist Intelligence Unit Limited, 2017).

Additionally, food wastage is another problem facing Ghana. It is estimated that the country loses about 20 to 30% of cereals and legumes and about 20 to 50% of roots, tubers, fruits and vegetables, in storage, during transport, or at the market each year (Rutten and Verma, 2014; ICIPE, 2013). Moreover, the World Bank (2011) points out that post-harvest cereal losses can be as high as 50 to 70%. Rutten and Verma (2014:12) mention that "Whilst currently there is a problem of food losses in the early stages of the food chain, it is in future expected to change into one of waste, due to increased urbanisation, income growth and resulting changes in dietary patterns of a growing middle class." In view of this "The Government of Ghana has made the reduction of post-harvest losses its priority and wishes to develop a national investment plan towards this goal, as indicated in Malabo Declaration" (African Union, 2014).

The comparison of country scorecards in the implementation of Malabo Declaration revealed that Ghana's score is 4.0 out of 10. This shows that the country is on track on Malabo Declaration implementation (Department of Rural Economy and Agriculture (DREA, 2017). The country has seen improvement in the following areas according to assembly report (2017): inclusive institutionalised mechanisms and platforms for mutual accountability', the undernourished population, children under 5 years affected by wasting, evidence-based policies, supportive institutions and CAADP process completion index. However, the following areas still require attention in the

implementation due to low scores: share of agricultural land under sustainable land management practice, public agriculture expenditure as share of total public expenditure, decrease in rate of the value of intra-Africa trade of agricultural commodities and services, growth rate of agriculture value added per agricultural worker and proportion of men and women engaged in agriculture with access to financial services (Department of Rural Economy and Agriculture (DREA, 2017).

Other problems specifically affecting most smallholder farmers' especially those in rural areas in Ghana, include lack of contract, assets, urbanisation and high transaction costs. The large-scale plantations do not benefit rural smallholder farmers. Since, they often offer contract farming opportunities to smallholders in outgrower schemes and few purchases from smallholder farmers outside outgrowers' schemes at farm gates (Kleemann, 2011). Many smallholder farmers in rural areas do not have outgrowers' schemes. Furthermore, IFAD (2015:2) report indicates that "small-scale farmers in Ghana's poor rural areas have limited access to the assets that would facilitate a shift from low-productivity subsistence farming to modern, commercial agriculture." It further explains that "major constraints to their livelihoods include lack of infrastructure and insufficient access to equipment such as agricultural inputs and technology, and facilities for storing, processing and marketing products." These constraints are sources of high transaction costs and risks for rural smallholder farmers market in rural markets.

Also, increasing urbanisation and population growth are obstacles to rural smallholder farmers' commercialisation in rural areas in Ghana. The rapid urbanisation is facilitated

by demographic factors, such as rural-urban migration, natural increases in towns and cities, and re-classification (Naab et al., 2013).

Ghana's population is naturally increasing leading to a population of towns and cities (Songsore, 2009; Naab et al., 2013). The 2010 population census revealed that more than half of the population of Ghana is expected to live in urban centres.

Many rural dwellers are migrating to towns and cities in Ghana for better living conditions. This rural-urbanisation, however, affects rural smallholder farmers' contribution to Ghana's GDP. For example, it reduces agriculture land for smallholder farmers in urban centres. Naab et al., (2013:261) discovered that "A major feature of the urbanisation trends is the active conversion of subsistence agricultural holdings into housing estates, industrial estates, infrastructure, schools, offices, shops, recreational grounds and other related land uses." Therefore, farming lands are constantly encroaching.

Additionally, smallholder farmers (or small family farms) encounter high external transaction costs in their interactions with both upstream and downstream agents due to lack of economies scales. This contributes to their higher unit costs incurred from procuring inputs, obtaining credit and other financial services, accessing agronomic and market information, implementation of standards and certification, and marketing (Key et al., 2000; Wiggins et al., 2010). Thus, many Ghanaian smallholder farmers' inability to acquire inputs, access credits and other financial services, meet international standards for improved market access might due to unfavourable interactions with upstream and downstream marketing agents.

Moreover, Key et al., (2000:1256) found that "higher degrees of concentration in upstream and downstream markets can lead to asymmetries in market power. This makes small family farms more vulnerable to opportunistic behaviour." They go on to say, "These problems are particularly severe in developing countries, where institutions and physical infrastructure are often weak."

In view of the above, smallholder farmers are often challenged with constraints and barriers to agricultural markets access that appear to be multifaceted (Jagwe, et al., 2010; Martey et al., 2003; Pingali, et al., 2005). Examples of such constraints are: hidden costs or transaction costs (Pingali, 2005), minimal or lack of incentives, poor investments, low levels of technological innovation, productivity (Torero, 2007), insecure rights to land and natural resources, lack of access to financial services, inadequate support from research and extension services (ASFG, 2013). This means that smallholder farmers' access to agricultural markets (domestic, regional or international) is contingent on the absence of the above barriers. Thus, smallholder farmers require access to good investment opportunities, high level of technological innovation on, high bargaining power and a ready market to enable them to perform well.

Unavoidably, there is widespread agreement that smallholder farmers require access to agricultural markets (both local and international) and favourable domestic policies to raise their farm productivity and living standards (Chamberlin and Jayne, 2013; Magingxa and Kamara, 2003). Arias et al., (2013:6) observe that "Raising smallholder productivity is obviously a strategic necessity but attempts to raise productivity will

have limited success if smallholder linkages to markets are not strengthened simultaneously."

In view of this, institutional innovations are required for smallholder farming especially in rural parts of Ghana. For example, Narrod et al., (2009:9) observe that "In addition to collective action, public-private partnerships can play a complementary role in linking smallholders with high-value markets." 2009). Thus, GCAP and Growth Africa partnership with 20 companies to offering support to selected smallholder farmers are examples of institutional innovations likely to link smallholder farmers in rural areas with high-value markets, to address the high transaction costs and transaction risks faced by many rural smallholder farmers in Ghana who do not have the above support. Moreover, institutions innovations identified from GCAP and Growth Africa, successful institutional innovations practiced by smallholder farmers in other parts of Ghana and SSA can be adopted for smallholder farmers in Ghana, such as co-operative adopted by Assosa Farmers' Co-operative Union (AFCU) in Ethiopia, a partnership between the Farm Concern International, Ministry of Agriculture (MOA) and other private stakeholders facilitated onion farmers' association in Nairobi (Kenya) commercialisation and commercialisation of Mozambigue smallholder farmers through contract farming.

Similarly, Pingali, et al., (2005) argue that the best approach to improve the livelihood of the smallholder farmers is the promotion of public good provision, generating market efficiencies and developing institutional innovations to encourage private sector participation. They go on to say, "It is the combination of both public and private action

that enables farmers to enter into competitive markets while also generating rural growth to stimulate nonfarm employment."

In addition, Dorward and Kydd (2004) observe that "Institutional innovation is needed to develop more imaginative solutions that reduce risk and promote coordination, sustainable investment, confidence and market development." In view of this, it is a very important concept as it speeds up the economic activities.

1.1 Problem Statement

How much is known in the academic literature about institutional innovations likely to address transaction costs and risks between smallholder rural farmers and traders in Sub-Sahara Africa (SSA) especially in Ghana in order to promote market access?

Much of the academic literature (Dorward, et al., 2004; Sahin, 2014; Ugwu and Kanu, 2012) on agricultural reforms in Africa attributes the poor performance of the agricultural markets to state interventions. However, private participation that could enhance markets efficiency through institutional developments has received little attention (Kherallah, et al., 2000; Jacobs, 2009). Therefore, agricultural markets lacking the ideal liberalised market model are constrained by high transaction costs. The magnitude of transaction costs is particularly seen in the rural agricultural markets as a result of the high cost of assembling produce and absence of information on quality and quantity (Holloway, et al., 2000).

Additionally, the agricultural market systems are changing rapidly due to internal and external factors, such as urbanisation and globalisation. These factors present both opportunities and challenges for smallholder farmers (Onumah, et al., 2007). It

appears that the changing agricultural market systems present challenges rather than opportunities to many smallholder farmers in SSA.

Similarly, much of the literature on market liberalisation (globalisation) policies for SSA point out that sooner or later the World Trade Organisation (WTO) policies may have negative implications on the African agricultural exports (Low, et al., 2005; Low et al., 2006; Jensen and Gibbon, 2007). For example, there have been predictions of competition between African countries and global giants like India and Brazil. This is due to the WTO's lift of preferential treatment for African farmers' exports in the European Union (EU) markets, which came into force after 2008 (Bertow and Schultheis, 2007; Singh, 2002; Raike and Gibbon, 2000). The outcome of the WTO's initiative affects livelihoods of small-scale farmers in Africa, including those in Ghana since they are the dominant group among all the key players of the agricultural sector in the continent (Bertow and Schultheis, 2007).

Furthermore, little is known in the literature on the role of transaction costs in developing countries to assist agricultural marketing decision. Some researchers (de Janvry, et al.; 1991; Zanello, et al., 2014) deem this to be strange because rural markets are often imperfect and transactions costs tend to be high in these markets. This is seen as an obstacle to smallholder farmers' participation in markets, and therefore the market is said to be missing. Similarly, much is known about institutional innovations and their impacts on the livelihoods of smallholder farmers in Southern Africa compared to their counterparts in West Africa (Jacobs, 2009).

1.2 The study aim and objectives

The current study aimed to examine the possibility of using institutional innovations to reduce transaction costs and risks between farmers and traders in rural markets in Ghana.

It is premised on the assumption that there are hidden costs and risks to transactions relating to market access, hence institutional innovations or changes in existing institutions could alleviate the costs and risks related to market transactions, which would then make market access much easier for smallholder rural farmers in Ghana. This postulation is aligned with the research of some of the new institutional theorists (North, 1997; Polski, 2001; Lund, 1993; Pingali, et al., 2005; Meijerink and Eaton, 2009).

The study objectives

The study objectives are as follows:

First, to analyse the innovative public and private institutions' role to reduce transaction costs and risks, and to explore alternative sources of livelihoods to benefit smallholder farmers.

Second, to assess the potential small-scale rural farmers in Ghana have to access the national and West Africa markets.

Finally, to find out if other factors contribute to the high transaction costs and risks associated with smallholder farmers' market transactions with traders. This was performed through risk vulnerability analysis. The outcome can help to recommend strategies to address smallholder farmers multifaceted problems associated with smallholder farmers' market access in Ghana.

Research questions

The overarching question of this thesis is: How much is known in the literature about specific institutional innovations likely to reduce high transactions costs and risks between smallholder farmers and traders in the rural markets of Ghana?

The specific research questions of this thesis are as follows:

How will institutional innovations help to reduce transactions costs and risks between rural smallholder farmers and traders in Ghana?

Can small-scale rural farmers of Ghana get more benefits from accessing local, national (or domestic) and West Africa markets instead of international markets?

To what extent will smallholder farmers' involvement (or local knowledge) in decision making facilitate market access?

How will vulnerability analysis help to discover other factors contributing to the high transaction costs and risks associated with smallholder farmers' market transactions with traders?

The hypotheses upon which this study is based include the following:

 Institutional innovations could have an important influence in reducing high transaction costs and risks between smallholder farmers and traders in rural markets in Ghana.

- Institutional innovations can enhance market efficiency through private and public participatory decision making.
- 3. Smallholder farmers in different Regions of Ghana exhibit different characteristics.

The findings presented in this study attempt to add to the existing literature on the implications of high transaction costs on smallholder farmers' markets access in SSA. In addition, they highlight the need to adopt different institutional arrangement to address high transaction costs and risks associated with the interactions between smallholder farmers and traders.

It is not claimed here that institutional innovations alone will remove all the market access challenges for smallholder rural farmers in Ghana. Indeed, many of the existing external economic factors identified by agricultural economists and other researchers in the literature remain important. However, the institutional innovations approach presents an important framework within which stakeholders from both public and private sectors can use to discover other important variables that can be implemented to address some of the challenges to the smallholder rural farmers' market access in Ghana and other parts of West Africa.

1.3 Motivation

In recent years, there has been increased attention on smallholder farming, especially in Africa, since, it plays a crucial role in the rural livelihoods, food security, poverty alleviation and the fulfilment of millennium development goals (Collins,2013). These farmers require easy access to improve markets to enable them to continuously contribute to Ghana's development and sustain their livelihoods. This as well means that they have to overcome most of their market constraints (poorly functioning inputs and outputs markets). The above constraints are attributed to high transaction costs affecting smallholder farming business in both input and output markets (Okello, 2012).

Consequently, a motivation for this study is to improve the understanding of how institutional innovations can address high transaction costs and risks between smallholder farmers and traders in rural markets of Ghana. Even the International Monetary Fund (2012) affirms that the appropriate development of market institutions based on well-informed policies through state and non-state participation is a key prerequisite for success in Ghana's ongoing poverty reduction strategy.

Furthermore, Martey, et al. (2014) discovered that most smallholder farmers in Sub-Saharan Africa (SSA) are experiencing multifaceted challenges. The authors further mention that the challenges require a range of interventions, such as institutional reforms to promote smooth rural service delivery, the creation of markets, including physical infrastructure and supportive governments policies. The absence of the above interventions for smallholder can make them less competitive and sustainable.

Additionally, they lack participation in decisions relating to their business and wellbeing. The outcome of this appears to have contributed to high vulnerability associated with smallholder rural farming in Ghana. Figure 1 depicts possible causes of vulnerability of smallholder farmers:


Figure 1:Causes of smallholder farmers vulnerability, source: author

In view of the above, another rationale or motivation for the current study is to ascertain how vulnerability risk (MARISCO situational) analysis can help to address

The multifaceted challenges are seen as an obstacle to smallholder commercialisation in Ghana.

1.4 Research Methods

The study used concurrent mixed methods design in order to understand the nature of high transactions costs and risks between smallholder farmers and traders in rural markets in Ghana. This approach helped to discover other sources of high transaction costs and risks, which are less discussed in the literature, such as the presence of "lead boys" (commissioners) in the market transactions between smallholder farmers and traders in rural markets of Ghana.

The approach combined quantitative and qualitative data collections methods. The specific methods adopted include a questionnaire survey with close-ended questions (quantitative data) for farmers, key informant interviews with open-ended questions (qualitative data) and MARISCO situational analysis, or risk vulnerability analysis with a range of stakeholders, such as extension officers, farmers, traders, (qualitative data) and executives of farmer associations. The main benefit obtained from this approach is access to different but complementary data to address the research problem (Morse, 1991). (See chapter 3 for detailed discussions of the methodology of the study).

1.5 Definition of Key Concepts

The current section discusses the key concepts in the study are defined.

Transaction costs can be defined as "the costs incurred in finding and negotiating with a trading partner and making a contract and enforcing it. These costs could be in terms of money spent or the opportunity cost of time spent" (Jagwe et al., 2010).

Institutional innovation can be explained by changes in the institutional design aimed at reaching explicit targets (Orozco, 2009).

Smallholder farmers refer to a group of farmers operating within 0.5 to 3 hectares of land with limited assets based (Torero, 2011; World Bank, 2003).

MARISCO terminologies

Threats refer to any-human-induced action forcing or exerting a direct or indirect impact on the natural structure and dynamics of the ecosystem (Ibisch and Hobson, 2014). Threats result in stresses.

Stresses are used to describe the "symptoms and manifestations of the degradation of key ecological attributes caused by the insufficient availability or quality of master factors and manifesting as the loss of minimum levels of biomass, information and network." Ibisch and Hobson (2014:75).

Contributory factors can be explained as a human action or activity that give rise to a threat, which further induces stress or stresses (Ibisch and Hobson, 2014).

Strategy refers a series of decision linked to the deployment of available resources (management) and the establishment of appropriate socio-institutional conditions (governance) that allows for effective action towards achieving desirable goals and objectives (Ibisch and Hobson, 2014).

1.6 Structure of the thesis

Chapter one introduces the project outlining: nature and scope of the thesis, the aim, and objectives, including the motivation for the study.

Chapter two presents the literature review on the various aspects of the study, such as transaction costs, transaction risks, existing institution and their impacts on smallholder farmers, lessons of institutional innovation from farmers in other parts of

Africa, possible institutional innovations for smallholder farmers in Ghana and the theoretical framework used in the study.

Chapter three discusses the methodology used for the entire data collection in Ghana, including the reasons for undertaking the study in Ghana and the locations of the study. In addition, this section looks at the sampling technique, pilot testing of the research instrument, data collection tools, data analysis technique limitations of the methodology and ethical considerations.

Chapter four focuses on the presentation of findings from quantitative, qualitative (key informants and MARISCO situational analysis.

Chapter five provides the analysis of the findings from quantitative, qualitative and MARISCO situational analysis.

Chapter six focuses on the analysis of the findings from both quantitative and qualitative data, including MARISCO vulnerability analysis.

Chapter seven discusses the conclusions of the entire study base on quantitative, qualitative and MARISCO situational analysis. In addition, it makes recommendations likely to address high transaction costs and risks involved in smallholders' transactions with traders.

2 Literature review

This chapter reviews the literature on aspects of the study. It will begin by discussing the concept of transaction costs and its effects on smallholder farmers. Also, institutional innovations will be discussed, including the specific institutional innovations likely to reduce high transaction costs and risks affecting smallholder farmers in Ghana. Furthermore, the definition of smallholder farmers, including common indicators used to define smallholder farmers from different literature will be discussed. The theoretical framework adopted for this study will as well be discussed. The latter part of the review looks at MARISCO vulnerability analysis.

The specific transaction costs and institutional innovations from the literature are key and should be highlighted early in the abstract and literature review and put in a wider context of productivity and opportunities. Ensure you cover all the innovation options given as options in the questionnaire.

2.1 Transaction costs

The term transaction can be explained basically as a process that connects different functions, involving the exchange of information, goods, services, money and property rights (Poole, 2010). The Transaction Cost Economics (TCE), unlike other branches of economics, prefer to use the costs associated with transactions instead of the intrinsic costs of the commodities in their day to day analysis. These costs are known as transaction costs. Williamson (1985) on the other hand argues that "transaction costs are the economic equivalent of friction in physical systems. Hence "the neglect of transaction costs had numerous ramifications, not the least of which was the way in which nonstandard modes of economic organisation were interpreted." This means

that undermining transaction costs may affect economic development. Thus, high transaction costs within the value chain can affect agriculture growth and poverty reduction.

While, the concept of transaction costs is not new in the literature (Maltsoglou and Tanyeri-Abur, 2005; Coase, 1937), there is no consensus on the definition of the term transaction costs, which seems to make the application of the concept ambiguous, including its measurements or quantification in monetary terms (Allen, 1999; de Silva, et al., 2010; Singh, 2008). For example, Key et al., (2000) define it as observable and unobservable costs of market exchanges, but North (1990) thinks that it refers to "the overall costs involved in measuring the valuable attributes of the goods and services or performance of agents in exchange that is the fundamental key to the cost of the transaction." It includes any direct costs, as well as any concomitant inefficiencies in the production or misallocation of that, resulted from them (Allen, 1999).

Even though there is no definition on transaction costs but most of the definitions generally see it as costs associated with the act of exchanging ownership rights of economic assets (de Silva, et al.,2010).

Allen (1999) claims that the ambiguity that surrounds the concept of transaction costs stems largely from the existence of two kinds of literature, which simultaneously claim ownership over the term. The first literature that claims ownership of the transaction costs is the 'property rights' literature, which begins with Coase, and has consistently focussed on the role transaction costs play in determining the distribution property rights broadly defined as all laws, rules, social customs and organisations that generate incentives for behaviour. The second literature is the 'neoclassical' literature

on transaction costs, which started in the early 1950s, but some might believe it commences from Hicks (1935) or Coase's (1937) studies (Allen, 1999).

In terms of history, the transaction cost literature can be traced back to Coase's (1937) article "Nature of the Firm", where the author argues that market exchange is not costless. In other words, the exchange is based on transaction costs. The cost of a transaction has an important role in the organisation of firms and contracts.

Maltsoglou and Tanyeri-Abur (2005), on the other hand, summarise the background of transaction costs as follows: This line of work [transaction costs] has evolved over the years and has become part of a larger framework entitled the New Institutional Economics, as opposed to Institutional Economics. The latter was pioneered by Commons (1931) and Veblen (1898), who argued that institutions played a key role in explaining economic behaviour but did not build these arguments around the neoclassical economic model, which made it difficult to generalise through rigorous analysis.

Also, the New Institutional Economics (NIE), according to Williamson (1993), uses the neoclassical framework, but takes transactions as the unit of analysis, relaxes the hypothesis of perfect information and emphasises the importance of institutions as a means to reduce high transaction costs. The current study is adopted NIE approach to understanding how institutional innovations can reduce high transactions costs and transaction risks to facilitate smallholder rural farmers' markets access in Ghana.

Notwithstanding the ambiguity associated with transaction costs (Allen, 1999), they play an important role in social systems in recent times. Williamson (1985) argues that "transaction costs are the economic equivalent of friction in physical systems. Hence

"the neglect of transaction costs had numerous ramifications, not the least of which was the way in which nonstandard modes of the economic organisation were interpreted." This means that undermining transaction costs may affect economic development. For example, de Silva, et al., (2010) observe that "lowering transaction costs within the value chain is one of the key elements to ensuring growth in agriculture which will, in turn, have a significant impact on reducing poverty." In view of this, the reduction in high transactions associated with smallholder farmers' transactions with traders in rural markets can lead to rural development in Ghana.

Some specific costs classified in transaction costs literature (Ellis, 2004; Williamson, 1985; Kherallah and Kirsten, 2002; Vengayi, 2009) include the cost of information search and monitoring, coordination, arbitration, definitions of property rights, changing of institutional arrangements, decision, policing and enforcement of contract costs.

One of the main challenges associated with smallholder farmers in Africa's access to the market is lack, or asymmetry, of information (Barrett, 2008) on the price of products, inputs, credit markets and buyers. As a consequence, many smallholder farmers depend on an unreliable source of information from informal and formal sources, such as friends, family members, including extension agents (Maumbe and Okello, 2013). In fact, lack, or asymmetry of information is a major problem facing smallholder farmers in Ghana. For example, they have limited access to important information on constant changing global food chains, and this prevents them from fully maximising the value of their crops (Schalkwyk et al., 2017). Also, Antwi and Ohene-Yankyira (2017:39) discovered that "many transactions involving credit to the

agricultural sector in developing countries such as Ghana involve high transaction cost because of information asymmetry."

According to Maumbe and Okello (2013:2), "The consequences of information asymmetry are problems of moral hazard, and opportunistic behaviour by traders and money lenders towards smallholder farmers." Besides, the nature of exchange process associated with the above process can lead to high transaction costs, which impede smallholder farmers' access to better-paying markets and can lead to entrenched poverty as smallholder farmers are forced to accept low prices for their produce in their market participation (Maumbe and Okello, 2013).

Additionally, lack of information especially on markets can lead to the problem of 'lowlevel equilibrium poverty trap' (Doward et al., 2003; Maumbe and Okello, 2013). This problem locks up smallholder farmers into subsistence production and imperfect markets and trade in low volumes. It further prevents smallholder farmers from diversity, from producing 'low value 'staples food into 'high-value crops' (Maumbe and Okello, 2013) that could help them to enter into commercial production and access better market conditions for their farm produce. The low-level equilibrium is summarised in figure 2.



Figure 2: Low level Equilibrium trap, source: Dorward et al, 2003

Alternatively, Dorward et al., (2003:324) interpret the low-level equilibrium trap this way: "Where economic activity is low, markets are imperfect and transaction risks high (as is the case in rural people's economic environments) transaction costs tend to be high and institutional arrangements tend to be incomplete, missing or ill-structured for poor people's livelihoods opportunities." They go on to say that, "Such economic environments can result in the existence of a 'low-level equilibrium trap' for rural people, where poverty, low levels of economic activity, and constraints to market and technical development all reinforce each other." This argument clearly shows that many smallholder farmers in rural Ghana are operating under 'low level of equilibrium trap' and unless they are exposed to innovations, they are likely to remain in 'low-level equilibrium trap all the time and remain in perpetual poverty.

2.1.1 **Classification of transaction costs**

Since there is no explicit definition for transaction costs and ambiguity associated with its application (Allen, 1999; Singh, 2008), as discussed earlier, much of the literature has a different classification on transaction costs. For example, some authors classified transaction costs into two, namely: proportional or variable and fixed transactions costs (Key et al., 2000). The proportional transactions costs are dependent on how much a household sells or buys (for example, per unit transportation costs and price premiums deriving from bargaining capacity). However, the fixed transactions costs are independent of the quantities sold or bought (Vakis, et al., 2003). For example, the quantity of produce sold or bought by smallholder rural farmers in Ghana can incur proportional transaction. However, the fixed transaction costs do not relate to the quantity they sold or buy from the local markets.

According to Key et al., (2000:1256), "Fixed transaction costs include the costs of searching for trading partners with whom to exchange goods or services, and screening, enforcement and supervision." They identified an example of variable transaction costs as the costs related to transferring the products to its destination.

In the case of agricultural marketing, three types of transaction costs are encountered: information (search) costs, negotiation and bargaining costs, and monitoring and enforcement costs (Hobbs, 1997). The negotiation costs involve the costs of the physically undertaking transaction; monitoring costs occur ex post of a transaction and include costs that occur when ensuring the terms of the transaction (like quality standards and payment arrangements) expected to be adhered to by the other parties involved in the transaction (Pingali., 2005). Thus, proportional and fixed transaction

costs could be broken for rural smallholder farmers in Ghana as follows: when searching for buyers of their produce (searching transaction costs), during transactions in the market with traders (negotiation transaction costs) and ensuring terms for purchase from traders after sales (monitoring transaction costs).

Furthermore, some studies (Holloway et al., 2000) have separated transaction costs into tangible (transportation costs, communication costs, legal costs, etc.) and intangible (uncertainty, moral hazard, etc.) transaction costs.

It seems smallholders in Ghana, especially those in rural areas, encountered all the above classification of transaction costs. These costs, however, are not available on financial records; hence, it is difficult to measure or quantify them in monetary terms (MacInnis, 2003). Schlag (1989) thought that "the concept of transaction costs does not have the sort of theoretical intelligibility and operational applicability necessary to make the market-based transaction cost approach plausible. He further argues that "the concept is wholly inadequate to perform the specific intellectual function required of it by market-based transaction cost analysis." In view of this, many smallholder farmers and traders in Ghana may not be able to assess their impacts on their current transactions.

2.1.2 The impact of high transaction costs on smallholder farmers

The transaction costs (both proportional and fixed) have an important application to smallholder farmers study. Since, they can prevent or reduce market exchange (Key et al., 2000). For example, Key et al., (2000:245) discovered that, "proportional transactions costs (PTCs) raise the price effectively paid by buyers and lower the price effectively received by sellers of a good, creating a 'price band' within which some

households find it unprofitable to either sell or buy." In view of this, it can be argued that PTCs affect both traders and smallholder farmers in their market interactions by lowering their profit margins. Similarly, the authors observe that "implication of fixed transactions costs for supply response is that, as producers enter or leave a market, the movement between autarky and market participation is accompanied by a discrete change in household production and consumption." FTCs can affect the marketing and production of food crops in rural markets.

However, both PTCs and FTCs can be used together with rural institutions to assess the impacts of globalisation on their markets access beyond the local markets (Maltsoglou and Tanyeri-Abur, 2005). For example, it can help policymakers to identify a specific transaction affecting smallholders' market access in Ghana.

In view of the above, Barrett (2007) discovered that "The primary theme in the literature on smallholder markets participation is the importance of transaction cost." He goes on to say, "household crop supply and welfare response to exogenous market price changes are heavily affected by transactions costs, which create important discontinuities in supply response and nonconvexities commonly associated with poverty traps." The above view is especially pertinent for many smallholder farmers in Ghana and highlights the causes of poverty traps plaguing rural Ghanaian communities. Therefore, it is essential that effective strategies be developed and applied to reduce crippling transaction costs associated with interactions between traders (market queens) and smallholder farmers.

Also, Maltsoglou and Tanyeri-Abur (2005) observed that transaction costs are specific to each seller. This implies that each household faces a different price rather than a single market price. Yet "the presence of high transaction costs is a cause for thin

markets in which market participation is low or even for markets to fail completely." This means that farmers at the household level required different strategies to address high transactions costs, in order to access markets for their farm produce.

Some studies have shown that transaction costs exist in all market exchanges (Coase, 1937; Mkenda and Campenhout, 2011). This means that all market transactions that are conducted between smallholder farmers and traders in local markets of Ghana have associated transactions costs, yet the smallholders tend to ignore them since they are difficult to measure in the real world. The transactions costs, unlike other costs, have a largely hidden component, which can only be revealed and measured indirectly from the behaviour of potential agents in the markets (Vakis, et al., 2003).

Following up on that, Maltsoglou and Tanyeri-Abur (2005) claim that "quantitative measurement of market transaction costs and quantification of the impact of institutions still remain as major hurdles when attempting to account for the impact of [transaction] costs." Notwithstanding challenges associated with the measure of these costs, their impacts appear to affect both smallholders and traders in market transactions. The impacts tend to be more severe on smallholder farmers (Goetz, 1992; Pingali, et al., 2005 and Jagwe, 2010; Mkenda and Campenhout, 2011; Okoye, et al., 2016). For example, a study carried out by Okoye, et al., (2016) in Central Madagascar reveals that higher transaction costs deter entry of small farmers into the market. The authors discovered in their data analysis (measured in coefficients) that factors such as distance from the farm to the nearest town or market and age had an indirect relationship with the decision to participate in the market, whereas factors such as membership of co-operative and native of the community means of transport and

market experience had a direct relationship with the decision to participate in the market with their cassava produce. This situation can be explained by their findings, which proved that means of transport and market experience are linked to high transaction costs, while the remaining two factors, membership of co-operative and native of the community, can be seen as an example of institutions.

Again, a high transaction cost is among the major factors preventing smallholder farmers' commercialisation, and this is a problem is attributed to poor infrastructure, such a poor road network, and poor communication services in remote rural areas. (Directorate Co-operative and Enterprise Development, 2012). For example, an IFAD report (2015:2) shows that "Small-scale farmers in Ghana's poor rural areas have limited access to the assets that would facilitate a shift from low-productivity subsistence farming to modern, commercial agriculture." Hence, "Major constraints to their livelihoods include lack of infrastructure and insufficient access to equipment – such as agricultural inputs and technology, and facilities for storing, processing and marketing products."

Also, other challenges associated with high transaction costs include problems of licensing, the absence of grades and standards, lack of marketing information, poor access to markets, weak entrepreneurial skills, and high marketing margins (Mangisoni, 2006). These problems can create unfavourable marketing experiences for smallholders and, consequently, affect their market participation.

High transaction costs affect smallholder farmers in rural markets of Ghana in many ways, such as thin market, decision to participate in market and 'low-level equilibrium trap' (Goetz, 1992; Pingali, et al., 2005 and Jagwe, 2010; Mkenda and Campenhout, 2011; Okoye, et al., 2016), yet little is known in the literature about rural Ghanaian

smallholder farmers' awareness of the existence of high transaction costs, sources of high transaction costs ,the specific transaction costs affecting them and existing strategies to address them in their farming activities to improve and promote their farming activities, and improve their livelihoods. Similarly, traders are affected by high transaction costs, especially PTCs (Key et al., 2000), in their market interactions with traders in rural markets, yet little is known in the literature.

2.2 Institutions

Having discussed transaction costs and their impacts on smallholder farmers, the current section discusses institutions, innovation, the concept of institutional innovation and specific institutional innovations likely to address high transaction costs and risks involved in the marketing interactions between smallholder farmers and traders in rural markets of Ghana.

2.2.1 **Definition of institution**

There is no explicit definition of the term "institution", as it has a wider application in the literature (Keohane, 1988; Hall, et al., 2003; Pant and Odame, 2010). For example, the World Bank (2002) defined it as the rules that enable agents to interact and the organisations that implement rules to achieve the expected outcomes. The agents used in the above definition comprise individuals, firms, public institutions and nonstate actors, who, together, form the principal operating components of the system (Spielman, 2005).

North (1990) on the other hand explains institution as formal rules, informal constraints (norms of behaviour, conventions, and self-imposed codes of conduct), and the enforcement characteristics of both.

The lack of consensus in the application of the term risks ambiguity (Pant and Odame, 2010). For example, Hall, et al., (2003) observes that, while institutional economist literature normally uses the sociological interpretation of the term (referring to things like routines, norms, shared expectations, and morals), the scientific and technological policy literature uses the term institution as an embedded concept to explain the

behaviour of physical organisations, such as research centres, universities, private companies, research foundations, farmers' associations, co-operatives and so forth that handle research and development (R&D) and economic activity.

In view of the ambiguity associated with the application of the term institution, Keohane (1988) argues that "Institution" is an even fuzzier concept than cooperation. Institutions are often discussed without being defined at all, or after having been defined only casually.

The institutions have different interpretations for different actors, according to the roles that they are expected to perform. However, whenever an institution is identified, there should be persistent sets of rules that restrict actors' activity and shape their expectation (Keohane, 1988).

Nevertheless, across diverse definitions of the term 'institution', the common theme is some sort of establishment of relative permanence of a distinctly social sort (Keohane, 1988; Huges, 1936).

In the current study, the preferred definition of the institution comes from Torero (2011), who argues that institutions are the structure of relations between individuals within the system of market interactions in which the players include producers, consumers, and the state. Thus, interactions between market women ("market queens"), commissioners ("lead boys"), smallholder farmers, consumers and the state in the local market of Ghana can be considered as an institution.

Torero's definition fits perfectly well with the current study. Yet, it seems the definition concentrated only on marketing interactions rather other factors that can create

constraints on smallholders and their market access, such as culture and enabling environment. Traditional agricultural markets, especially in Africa, associated with human relationships are influenced by culture, values, history and social forces (Obi and Seleka, 2011). All the above factors can originate from both the public and private sectors. Hence, North (1990) is right to classify institutions under formal and informal, as both can influence market interactions.

In view of the above, the working definition of institutions in the current study can be explained as a set of rules, values and norms originating from within or outside the system of market interactions serving as a guide for smallholder farmers, market women (market queens), "lead boys" and consumers.

2.2.1.1 Impacts of institutions

Also, institutions can either present a constraint or enable the behaviour (Hounkonnou, et al., 2012; Hodgson, 2006). Hodgson (2006) explains that the existence of rules implies constraints. Yet, such a constraint can open up possibilities: it may enable choices and actions that otherwise would not exist. For example, Uphoff and Buck (2006:1) state that "Institutions can make it easier, cheaper and more profitable for people to invest in activities that produce more income and employment in rural areas, for themselves and/or for others." In view of this, institutions can help to improve the livelihoods of smallholder rural farmers in Ghana.

Furthermore, the institutional infrastructure plays a very crucial role in facilitating a market exchange for smallholder farmers in countries experiencing challenges from market liberalisation, such as Ghana (Torero, 2011). Torero found that markets do not work for the poor rural farmers when market information and markets themselves are

not accessible to them. In other words, institutional infrastructure creates the chain for market interactions between different key players like state, consumer, and producer firms in the marketplace.

Again, institutional settings are indispensable in dealing with the processes that are critical to innovation, since they facilitate knowledge sharing or education, which is needed for innovation (Hall, et al., 2005). Moreover, institutions, whether economic, political, or cultural in nature, emerge and evolve as a product of social interactions. Hence the analysis of institutions is especially important in circumstances characterised by instability rather than continuity (Doner, 2010).

As previously mentioned, changes in an institution can lead to changes in transaction costs (North, 1997; Polski, 2001). As a result, an institution plays an important role in smallholder farmers' market access (Hodgson, 2006; Shiferaw, et al., 2006; Doner, 2010). For example, Torero identified five specific roles of institutions in relation to market access. These include a reduction in transaction costs, management of risk, creation of social capital, enabling collective action and redressing missing markets. In view of the above, Torero sees institutions as links in market interactions (See figure 3)



NB: transaction is unit of analysis

Figure 3: Relationship between transaction risks, transaction costs, and institutions, source:Meijerink and Eaton, 2009

Indeed, institutions can improve market participation for smallholder farmers, yet state institutions for the agriculture sector in some Africa countries, especially the poorest countries, are weak (FAO, 2009). Some constraints associated with weak institutions are discussed in the next section.

2.2.1.2 Institutional constraints faced by smallholder farmers

First, smallholder farmers face a range of institutional constraints associated with their access to input and output markets, to credit and information, and to technical assistance and innovation options, including lack of enabling institutions (Royer, et al, 2016). Some of the constraints faced by smallholders are summarised in figure 4.



Figure 4: Institutional constraints face by smallholder farmers, source: Royer, et al., 2016

Second, there is a disconnection between agricultural R&D and innovation processes on farms and in value chains. For example, most agricultural research organisations pay attention to the expansion of the supply of new technologies instead of linking research more effectively to change processes on farms and in value chains (Devaux, et al., 2018).

Meijerink and Eaton (2009) observe that the challenges African market institutions are trying to address are not new, such as commitment failure, asymmetric information (or unequal access to trade information by parties), and transaction risks and costs. Yet, they discovered that the solutions to those challenges are often new. This means that most of the existing market institutions in Africa, including those in Ghana, are ineffective, leading to institutional failures in African food markets. The challenges associated with the above include the following: market failures, policy failures and lack of capacity for smallholders, co-operatives and other support services (Hoeffler, 2005). In addition, Dorward et al., (2005:1) state that "Unfortunately these shortcomings in the mainstreaming of institutionalism are most acute when applied to problems of poor rural areas where the challenges of poverty are greatest."

Consequently, institutional innovations are needed to promote effective institutions that could improve transactions between smallholder farmers and traders in rural markets in Ghana, thereby improving the livelihoods of smallholder farmers.

2.2.2 The difference between institution and organisation

Again, there are opposing views in the literature on institution and organisations. While some authors (North, 1993; Hall, et al., 2005; Hall, 2009; Edquist, 2001) treat institutions and organisations as different concepts, Hogen (2006) argues that treating the institution as different from an organisation may cause problems.

Hence, the institution is not a synonym for an organisation. The term organisation refers to bodies such as enterprises, farmer cooperatives, government and non-governmental organisations, while institutions can be seen as the set of common habits, routines, practices, rules or laws that guide the relationships and interactions between individuals and groups (Hall, 2009; Edquist, 2001).

In the current study, an organisation can be used for any of the elements of the enabling environment for smallholders' market access, such as extension service, banks, NGOs and so on as depicted in plate 2, which summarises the study. An institution, as discussed earlier, is seen as the norms, rules or laws that guide the relationships or interactions between individual farmers, groups or traders' interactions with the elements of the enabling environment.

In other words, institutions are seen as the rules of the game, while organisations are seen as the players, and the interaction between the two shapes institutional change (North, 1993). Douglass North further explains that institutions determine the opportunities in society. Organisations are created to take advantages of those opportunities and, as the organisations evolve, they alter the institutions (North, 1990). For example, as a norm or rule of the game, market women have more bargaining power than smallholder farmers in the rural Ghanaian local market. While the Ministry of Agriculture (MOFA) is an organisation, it is made up of a group of individuals with a shared or common goal (North, 1990) of ensuring the welfare of the smallholder farmers.

On the contrary, Hogen (2006) claims that there are no clear-cut differences between the terms "institution" and "organisation". Hence when North (1993), among others,

distinguishes institutions from organisations, especially by referring to institutions as a "game" and organisations as "players", they are causing unnecessary confusion. Hogen further argues that "The unavoidable existence of rules within organisations means that, even by North's own definition, organisations must be regarded as a type of institution."

Similarly, Kherallah and Kirsten (2002) reveal that certain institutions (such as households, firms, and cooperatives) are organisations, yet not all organisations are institutions (such as money or the law, including grass-roots organisations). Hence, they believe that "It is also useful to distinguish institutions from organisations."

In fact, there are clear-cut differences between an institution and an organisation, and therefore treating both as one entity can make it difficult to assess certain constraints associated with them or their impacts on transactions between smallholders and traders. In view of this, the current study further supports the division of institutions and organisations.

Furthermore, it is important to distinguish the institution from the organisation in order to achieve a lasting and desired transformation in smallholder agriculture (IFAD, 2014). According to IFAD (2014:2), "both institutions (i.e. the rules) and organisations (i.e. the players) challenges affecting smallholder farmers must be addressed simultaneously (IFAD, 2014). It further argues that "Once poor rural people have strong institutions and organisations, they are able to overcome their isolation from centres of power and influence." Thus, strong institutions (rules) and organisations (players) at the rural areas in Ghana can create an enabling environment for

smallholder rural farmers in Ghana to address challenges, such as high transaction costs and risks to access better marketing conditions.

2.3 Innovation

Devaux et al., (2009:32) state that "innovation is concerned with the practical use of new knowledge." Thus, if smallholder farmers learn any new way of doing things and put them into use, it can be considered as an innovation. Also, Barnett (2004:1) defines innovation as "the use of new ideas, new technologies or new ways of doing things in a place or by people where they have not been used before."

The preferred definition of innovation in the current study is that of Barnett as it covers broader areas, such as technologies and new ways of doing things.

Also, innovations could be new approaches to the existing practices of smallholder farmers designed in response to market inefficiencies (Llanto and Lavina, 2006).

Bragdon and Smith (2015:5) categorised smallholder farmers' innovations into two, namely, 'technical and institutional innovations'. The authors mention that "Technical innovation refers to the development of new varieties, tools and techniques, most commonly associated with the term innovation."

It seems both categories of innovations affect smallholder farmers, since they are unable to innovate, increase their market surplus and add value to their farm produce due to limited access to land, credit, technical advice, basic knowledge of the market system, including information on existing market prices and conditions (Devaux, et al., 2011). These challenges tend to increase the unit cost of individual smallholders assembling, handling, and transporting of products (Devaux, et al., 2011). The outcome of the challenges can as well lead to high transaction costs and risks encountered by smallholders in their markets.

In addition, the lack of collective action can affective smallholder innovations. Much of the literature on innovations system approach (Ngwenya and Hagmann, 2011; Spielman, 2005) use collective action as the central theme. Thus, collective action encourages smallholders to innovate. In addition, Devaux, et al., (2011) discovered that "The agricultural innovation system approach emphasizes the collective nature of innovation and stresses that innovation is a co-evolutionary process."

In view of the above, Asenso-Okyere, et al., (2008) do not see just technological innovations as a main problem of Agriculture in rural areas, but rather immense "institutional weaknesses", including problems with organisation and management of research, education, and existing extension systems. Moreover, they highlight the fact that "there are examples of organisational, technological, institutional, and policy innovations that are transforming agriculture and leading to growth and development." This shows that an introduction of appropriate institutional innovations in smallholder agriculture can improve the living standards of the smallholder farmers.

2.3.1.1 Institutional Innovations

Tenywa, et al., (2010:28) define institutional innovations as "the changes made in redefining roles and responsibilities of different Agricultural Research for Development (ARD) organisations to deliver more returns to investments in research, education, extension and business systems." Tatwangire (2013), however, thinks that it is a process or practice of changing the rules in a way that makes the seemingly impossible outcome become possible.

The preferred definition of institutional innovations in this study is that of Tatwangire. It is centred on rules or norms (North, 1990; World Bank, 2002) that govern the activities of a group of people or organisations, including ARD organisations. The working definition of institutional innovations adopted in the current study is as follows: the introduction of relevant changes to existing institutions (norms or rules), in order to address specific needs of smallholder farmers, such as removal of barriers to market access. For example, adopting specific strategies to minimal transaction costs and risks between smallholders and traders in rural parts of Ghana can be seen as institutional innovation. It is a very important concept as it speeds up the economic activities and contributes to the economic value-added (Yustica, et al, 2014).

The Innovative institutional arrangements that facilitate mutual learning and coordination can generate adaptive expectations, hence, they are crucial in improving rural livelihoods and enabling a larger portion of the rural populations to contribute to and to profit from market-driven development (Appiah, et al., 2010).

The institutional innovations are known to be more crucial in weak institutional environments, whereby smallholder farmers are caught up in a poverty trap (Tenywa, et al, 2010), especially, when there are market failures due to poor access to market information, low farm-gate prices, high transaction costs, lack of effective partnerships from support services providers, including poor access to extension services, lack of access to financial services, lack of trust among value chain key players, lack of innovation, policy advocacy platforms, and so on (Tatwangire, 2013).

Furthermore, the interactions between smallholder farmers and traders can be seen as one of the obstacles preventing smallholder farmers from discovering new opportunities in the formal market's participation (Jari and Fraser, 2009). Yet, many smallholders' farmers, especially in Ghana, prefer to sell their produce to traders (market queens) since they have limited access to financial resources. Quartey (2012), unlike Jari and Fraser, associated the smallholders' dependence on "market queens" (traders) with the location of many smallholder farmers' households due to the fact that these households are located in the rural parts of the country and very often widely dispersed. This is seen as a challenge for financial institutions in providing cost-effective and affordable services to them. Besides, formal financial institutions and investors in SSA see the whole agriculture sector as possessing varied risks based on economic, political, and environmental uncertainties, such as climate change. These discourage them from supporting smallholders with financial services to improve formal market access (Jatoe, 2012; Wroblewski and Wolff, 2010). As a result, new institutional innovations or arrangements are required to promote market access for smallholder farmers in SSA, including Ghana.

Consequently, there is a growing concern that institutional innovations are required for smallholder farmers, in order for them to sustain and improve their livelihoods (FAO, 2006; Oluoch-kosura, 2010). This is a result of the major changes that have taken place in the commodities markets at both domestic and at the international levels. Factors such as market liberalisation have affected smallholder farmers' market access. Hence, institutional innovations are required to address the above (Aihoon, et al., 2009). In addition, institutional factors, or failures, were discovered among the three main factors affecting the competitiveness of Agriculture in SSA at the 2006 FAO regional conference in Mali.

All studies of institutional innovations can be categorised into two main groups. The first group refers to institutional innovations that study the performance of specific

innovations, like contract farming, farmer cooperatives and certification. The second group of institutional innovations evaluate particular experiences to improve the functioning of supply and value chains where one or more institutional innovation may apply. The current study comes under the second category.

Similarly, Chitja and Mabaya, (2015) believe that institutional innovations for smallholder farmers are grouped into two, namely: Push and pull strategies. The pull strategies are designed to address the challenges faced by smallholder farmers at the farm-gate level and they include microfinance institutions, collective action, training and extension. While, pull strategies seek to create lucrative opportunities in the markets and they include market information system, contract farming, alternative food networks, fresh produce markets and preferential procurement (Chitja and Mabaya, 2015). In fact, Chitja and Mabaya (2015) categorisation of institutional innovation is more important in the current study compared to the former as it concentrates specifically on smallholder farmers. Also, a combination of pull and push strategies identified by Chitja and Mabaya (2015) can help smallholder farmers to overcome high transaction costs and risks in their existing markets, which is the focus of the current study. In other words, both push and pull strategies can guarantee ready markets for smallholder farmers and address high transaction costs and associated with their market interaction with traders in rural markets of Ghana.

2.4 Lessons of institutional innovations

Some studies have revealed success stories of institutional innovations for rural agriculture. The following are examples of successful institutional innovations.

A study carried out to assess the institutional context suitable for agricultural technology development and poverty reduction among smallholder farmers of the Soroti District of Uganda revealed that the implementation of new farmer-governed local institutions and the emergence of a private service provider have been successful in reducing rural poverty in the area (Friis-Hansen, 2010).

The Assosa Farmers' Co-operative Union (AFCU) in Ethiopia was used as an institutional innovation through Oxfam to overcome gender inequality and other forms of discrimination. This resulted in the improvement of the productivity of women, including market access. The women in AFCU developed alternative tasks as marketing agents of edible sesame oil in the local markets (Oxfam, 2013).

Another example pertains to institutional innovation, which supported smallholder farmers' access to markets through the organisation of Kuapa Kokoo (Cocoa) producers in Ghana. This is a farmers' co-operative which started by utilising its network of village co-operatives and was promoted under the old state-led marketing system. The organisation has succeeded in securing access to the fair-trade cocoa market for smallholder farmers (Onumah, et al., 2007).

Additionally, a partnership between the Farm Concern International, Ministry of Agriculture (MOA) and other private players helped the onion farmers' association in Nairobi (Kenya) to promote smallholder commercialisation and market access (Mwangi, 2009) leading to a success story.

Contract farming is another example of institutional innovation that enabled many smallholder farmers of Mozambique to be integrated into commercial agriculture. It is estimated that more than 400,000 producers involved in the above contracts farming

are smallholder farmers with access to less than one hectare of land. The farmers' achievement is based on the collective action of all farmers; they shared limited resources to generate input, and also to reduce production costs and marketing risks. The approach also enabled them to access support services and infrastructures, such as transport (Oluoch-Kosura, 2010).

Consequently, possible institutional innovations for smallholder farmers in Ghana are discussed below:

2.5 Possible institutional innovations required for smallholders in Ghana

Ozowa (1995) claims that no one knows all the information needs of farmers. This view may be right to some extent, especially for smallholders, who are known to be highly heterogeneous in nature or in their activities (Gollin, 2014; Torero, 2011).

However, the lessons learned from smallholder farmers in other parts of Africa, especially in SSA, as reflected by various pieces of evidence revealed in the literature on this issue, show that there are some similarities on smallholders in the region. These similarities reinforce a common ongoing need to develop and implement particular institutional innovations for smallholder farmers in Ghana, in order to reduce high transaction costs and risks associated with their interactions with traders and, thereby, facilitate the promotion of their market access. For example, they are known to be inefficient due to the lack or lower level of education, which tend to affect their ability to adopt modern technologies (Kherallah, et al., 2000).

Also, smallholder farmers in SSA, compared to other regions, lacked improved seeds and fertilisers (Livingston, et al., 2011). Additionally, smallholders face a lot of

challenges in accessing formal sector credit and insurance markets, which create unfavourable conditions for them to access improved technologies and marketing opportunities (Jack, 2013). Moreover, they often face extra obstacles to integrating their marketing activities into commercial marketing channels. This is a consequence of their inability to comply with high-quality standards, in addition to the high transaction and monitoring costs (Gollin, 2014).

As a result of the above, the possible institutional innovations identified in the current study for smallholder farmers in Ghana include contract farming, co-operative society, public and private sector partnership and participatory decision making.



Figure 5:Transaction costs and risks encountered by smallholder rural farmers in Ghana, including possible institutional innovation to address them, <u>S</u>, source: author

Figure 5 depicts the transaction costs and risks encountered by smallholder rural farmers in Ghana, including institutional innovations likely to address both transaction costs and risks. Besides, it shows how the removal of transaction costs and risks through institutional innovations can help smallholder farmers to access a range of markets.

2.5.1 Contract farming

Minot (2011) defines the term contract farming as agricultural production carried out according to a prior agreement in which the farmer commits to producing a given product in a given manner and the buyer commits to purchasing it. In other words, it is an agreement between the farmer (producer) and the trader that ensures a ready market for produce offered by the producer according to the trader's specification.

Oluoch-Kosura (2010) observes that "contract farming has the potential to link farmers to markets, give them access to credit, technologies, and inputs, and to stimulate agricultural production."

Consequently, contract farming is an institutional innovation needed for smallholder farmers in Ghana. It is known to be an economic institution that addresses irregularities in the credit, insurance, information, inputs, and raw product markets, including transaction costs, or costs associated with information search, screening, and the transfer of goods, bargaining, and enforcement (Key and Runsten 1999; Torero, 2011; Oluoch-Kosura, 2010). Torero further mentions that contract farming is an institution that can incorporate low-income growers (mostly small landholders) into the modern agricultural sectors due to its position as a source of credit, insurance, and information for the contracted farmers.

Indeed, contract farming may help many smallholders in rural markets in Ghana enormously as it offers credit, insurance, and access to information, which appears to be a prerequisite for smallholders' market participation. Also, it can help to overcome well-known smallholder problems, such as commissioners, the absence of storage, and high transaction costs (or high cost of information search, bargaining, and transport). Moreover, it is particularly beneficial as it offers a reliable source of funding for smallholder farmer and guarantees fix pricing structures and other inputs to smallholder farmer for their farm activities (Prowse, 2008). This can help to address price fluctuation seen as one of the major challenges facing smallholders in Ghana.

Furthermore, Henningsen, et al., (2015) argue that contract farming in developing countries like Ghana often enables the contractors to enter into a contractual agreement directly with the farmers or indirectly through the farmers' association, with periods lasting up to one year. This approach, compared to the existing marketing arrangements for smallholders found in agriculture markets in Ghana, appears to be much better. Hence, if it is adopted in Ghana, smallholders can bypass middlemen (market queens) and commissioners in rural markets of Ghana. It will as well help to address high transactions costs (information search, transport, and bargaining costs), and other problems affecting smallholder farmers, such as price fluctuation, lack of storage and high costs of inputs.

Again, it is seen as an effective way to integrate farmers into domestic and international markets (Torero, 2011). However, Torero finds that for ambiguous reasons, this particular role of contract farming especially benefits medium-sized and relatively more educated farmers. Similarly, Kherallah and Kirsten (2002) argue that it
is unsuitable for connecting smallholder farmers to high-value globalised markets. This is because it is ineffective as a mechanism for attaining equal bargaining power and confronting other economic inequalities linked with monopolies. This argument appears to be well founded in the midst of globalisation and market liberalisation.

Notwithstanding the numerous benefits associated with contract farming as an institutional innovation for smallholder farmers, there are a few disadvantages that can affect the smallholder farmers. Some of them are discussed below:

Firstly, the fixed pricing structure and access to credit and other inputs associated with contract farming can be a source of problems for some smallholder farmers, rather than of benefits. The smallholder farmers may lose the ability to negotiate further on the final price for their products (Prowse, 2010). Consequently, contract farming can exacerbate the lack of bargaining power of smallholder farmers in rural markets in Ghana.

Secondly, Prowse (2010) identified five main risks for smallholder producers undertaking contract farming. This seems to contradict his argument on the benefits of contract farming. These five risks are as follows: loss of power and control over farm enterprises; high production risks due to inaccurate technology or firm's price forecasts; high debt resulting from the firm's exclusive purchase rights (or depress producer prices); unfair contract types and manipulated terms and unfair intrahousehold distribution of labour/income against women's interests.

Additionally, informal (verbal) contracts are obstacles to smallholder market access, since terms used in these contracts cannot be easily verified by a court of law in the case of contract breach (Bijaman, 2008). For example, the contracts between

smallholder tomato producers and market women in rural Ghana tend to be informal (verbal), hence the farmers are unable to take legal action against the traders for contract breach. This, however, affects the cash flows of the smallholder farmers for future farming activities and market access.

In view of the above, one may doubt the suitability of contract farming as the best method for market access for smallholder farmers' in Ghana. However, through appropriate negotiation, it can work for smallholder rural farmers in Ghana in overcoming most of the challenges mentioned earlier. For example, a study carried out in Zimbabwe (Maminimini, FAO-Zimbabwe) shows that smallholder farmers were not well informed on contract negotiation, lacked contract negotiation and resources until FAO stepped in with improved contract farming, whereby contractual agreements were ensured. In addition, inputs were provided and training to farmers given on various aspects of agricultural production, including credit schemes. This was seen as an institutional innovation and helped to alleviate many risks associated with contract farming, including guaranteed market access for smallholder farmers. The study further reveals that with the private sector connection, smallholder farmers are now earning enough income to improve their livelihoods. In fact, Zimbabwe's smallholder farmers' achievements through improved contract farming can be copied by Ghana's rural smallholders in order to access new markets in domestic, regional or international levels.

However, many smallholder farmers in Ghana practice mixed cropping with a range of crops, such as cash crops, staple crops and high-value crops. The above farming system can enable smallholder farmers in Ghana to be integrated into domestic,

regional and even international markets with little support from contractors of contract farming, government or non-governmental agencies. For example, the contractors in contract farming tend to provide inputs (seeds and chemicals), credit facilities, and, at times, technical field assistance to farmers (Swinnen, et al., 2013). The smallholders can take advantage of the contractors' support and guidance to produce food products according to the expected domestic, regional and international standards.

Also, the introduction of formal or written (Bijaman, 2008) contracts backed by law enforcement can help to address the challenges associated with transactions between smallholder farmers and traders in rural markets of Ghana.

2.5.2 **Co-operative**

The International Co-operative Alliance (ICA, 2005) defines the term cooperative as "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically controlled enterprise." In relation to smallholders in this study, a cooperative is a group of farmers who have voluntarily come together to address their own challenges through their skills, experiences, and limited resources.

Co-operative (or collective) action is another institutional innovation likely to reduce high transaction costs and risks in the smallholders' interactions with traders in rural markets of Ghana (Mojo, et al., 2015).

Moreover, UNCTAD secretariat (2015:13) points out that "Enabling institutions should also include farmers' organizations as they enable individual smallholders to aggregate their produce and increase their bargaining power in their interactions with input and output markets." It further argues that "strong farmers' associations would be able to influence policy in their favour through their voting power." In view of this, the introduction of more farmers' organisations for smallholder farmers especially in the rural areas can help to address high transactions costs and risks existing between smallholder farmers and traders in Ghana.

There are different types of cooperatives created by members to serve their interests worldwide, including consumer, producer, worker, and service cooperatives. In terms of agriculture, the cooperatives can be classified into three broad categories based on their purposes: marketing cooperatives, farm supply cooperatives and service cooperatives (Ortmann and King, 2007). These types of farmer associations can open

up other opportunities for rural smallholder farmers', such as improving their access to agricultural services, realising large-scale economies, value addition to products and promotion of stable relationships with suppliers or traders (Stringfellow, et al., 1997).

FAO (2016) confirms that cooperatives offer opportunities that smallholder farmers could not achieve individually. Examples of such opportunities include bargaining power and resource sharing (Mojo et al., 2015; Bernard and Spielman, 2009). Normally, smallholders' farmers in SSA including those in Ghana lack bargaining power and resources to enable them to bypass market intermediaries (commissioners, or "lead boy") to market conditions, such as higher prices for their produce in the local agricultural markets. It seems the above challenges can be overcome through a co-operative society.

In addition, the current agricultural markets favour commercial farmers compared to smallholder farmers; the commercial farmers are able to supply a large volume of agricultural products, possess bargaining power and with access to quality information, services, technology and capital (Devaux, 2009). In view of this, co-operative societies, such as Rural Producers Organisations (RPOs) are known to be a mechanism likely to promote smallholder farmers' commercialisation (Bernard and Spielman, 2009). Clearly, RPOs can offer opportunities for rural poor farmers like those in Ghana to access better marketing conditions and ready markets for their farm produce.

Bernard and Spielman (2009: 60) reveal that "renewed interest in RPOs as a mechanism to support smallholder farmers' commercialisation is of significant

importance to sub-Saharan Africa, where agricultural growth and development is decidedly smallholder-based and often constrained by persistent market failure." Therefore, RPOs can be a medium for rural smallholder farmers of Ghana to enter into commercial and improve their livelihoods.

Similarly, RPOs can offer economies of scale to rural smallholder farmers through the aggregation of their surplus output (Bernard and Spielman, 2009). Normally, individual smallholder farmers in Ghana and other parts of SSA lack the ability to produce farm produce on time, right standards and in large quantities to meet the market demands. The ability of smallholder farmers to produce in larger volume, at right time and year-round, is seen as a problem for these farmers to access contract farming (Adjognon, 2012; Torrero, 2011; Key and Runsten, 1999). This problem is likely to be addressed by collective action in RPOs.

In addition, Ortmann and King (2007) claim that issues, such as poverty, market failure, and high transaction costs were the main reasons for the creation of cooperatives in various parts of the world. Indeed, it creates a platform for smallholder farmers to negotiate better terms in contract farming agreements and also lower prices for agricultural inputs like seeds, fertiliser, and equipment. Furthermore, working together as a group provides better prospects than working individually (FAO, 2016). For example, co-operative or collective action enabled pastoral women in Kenya and Ethiopia to create a large connective network that helped to overcome risks to their livelihoods. It empowered them, increased their incomes and promoted livelihoods diversification (Coppock, et al., 2009). In view of this, it could help smallholders in Ghana to access better terms in contract agreements. By adopting this approach, it is

believed that they will be in better positions to bargain the prices they are willing to accept for their food products in domestic, regional and even in the international markets.

Poulton, et al., (2016) point out that farmer organisation (FOs) are well positioned to offer an important role in both the delivery and coordination of services to smallholder farmers. The researchers affirm that FOs create a platform for service providers to promote more secure transactions, thereby lowering costs and risk. However, they point out that FOs in Africa favour influential people and can lead to complete failure unless the members have access to the relevant skills and resources, and in addition devise their own internal accountability systems, to provide valued services to their members.

This stance is supported by Holloway, et al., (2000), who notes that producer cooperatives are very helpful for overcoming challenges, such as barriers to assets, information, services, and markets for high-value products. Their study was primarily based on small-scale farmers' marketing of milk in the East African highlands. The authors concluded that cooperative selling institutions are catalysts for reducing high transaction costs, facilitating easy entry into the market and promoting growth in rural communities. Consequently, if smallholder farmers form cooperatives, they will have a higher chance of overcoming transaction costs and improve their livelihoods.

Notwithstanding this, Devaux, et al, (2009) identify participatory market chain approach (PMCA) and stakeholder platforms as the best option for the traditional collective action (or co-operatives). They argue PMCA and stakeholders' platforms promote market chain innovation that facilitates small farmers and other market chain

actors, such as market women and agricultural service providers' activities. Also, the authors believe that the potential outcomes of these new approaches to collective action include commercial, technological and institutional innovations. However, most of the collective actions (co-operatives) discussed in much of the literature tend to report on farmer organisation for achieving economies of scale, enhancing small farmers' bargaining power or improving the management of common pool resources (Devaux, et al, (2009).

The argument of Devaux, et al., (2009) is valid as collective actions among farmers alone are not new in Ghana, such as producers' co-operative, yet some members, especially in rural areas, are still experiencing marketing problems (Asibey-Bonsu, 2012). Even other places in Africa like Malawi, where co-operatives improved livelihoods of smallholder farmers due to enabling environment, are now faced with problems ranging from organisational setup, environmental and contextual challenges, including an inability to meet the needs of its constituents (Mapila, et al., 2010).

However, smallholder farmers' co-operatives (like producer co-operatives) may be easier to implement compared to their recommended PMCA from Devaux, et al., (2009). Moreover, producer co-operative has helped some rural dwellers in Ethiopia to create a large connective network that helped to overcome risks to their livelihoods (Coppock, et al., 2009).

Notwithstanding this, the smallholder farmers in Ghana will benefit more from new strategies likely to be realised from PMCA due to stringent food safety and quality control requirements in various markets in recent times (Hellin, et al., 2009). In view

of this, Hellin et al., (2009:3) point out that "In the context of making markets work for the poor, strategies are, therefore, needed that enable producers to diversify or upgrade production, and to compete more effectively in markets where they have advantages." Thus, adopting the PMCA approach may be an upgrade of the traditional collective action with a potential to enable rural smallholder farmers in Ghana to become more competitive.

In addition, Hellin, et al., (2009:4) mention that "the above imply the need for close linkages between farmers, processors, traders, and retailers to coordinate supply and demand), and to access key business development services (BDS) such as market information, input supplies, and transport services." Consequently, Hellin et al., (2009) and Devaux, et al., (2009) views are akin to each other. Thus, collective actions involving various stakeholders or key players of smallholder value chains, such as traders, extension officers, processors and financial institutions be the best institutional innovations for smallholder rural farmers of Ghana. However, little is known about how to implement a collective action for smallholder rural farmers based on close linkages between farmers and other stakeholders, such as extension offers, processors, market women and financial institutions.

2.5.3 Government intervention

A government can undertake a range of roles in the institutional innovation process, hence the World Bank (2007:49) pointed out that "It is quite difficult to distinguish between government action designed to provide an enabling environment for the [agricultural] sector and specific support for innovation." It goes to say, "Often the government may have been investing in agricultural research and training and subsequently established a dedicated scheme or pilot initiative to orchestrate the sector's take-off." In view of this, the current study classified government initiative or intervention with the potential of addressing challenges affecting smallholder farmers, including high transaction costs and risks as an institutional innovation. For example, the World Bank (2007) report found that in Ghana, the government provided infrastructures, such as roads, power, and other utilities to motivate the private sector to establish starch factories under the President's special scheme for cassava. The government initiative leading to the establishment of the starch factory can be seen as an institutional innovation for the beneficiaries.

Similarly, the 'Ghana Commercial Agriculture Project (GCAP)' adopted by the government has promoted smallholder farmers' commercialisation in some parts of the country (GCAP, 2017). In view of this, the project can be seen an institutional innovation to smallholder farmers especially in rural areas without access to GCAP as it could help them to access better marketing conditions and minimise or remove completely high transaction costs and risks existing in the transactions between smallholder farmers and traders in rural markets.

Also, DFID (2015) explain at broad-based agricultural transformations require all stakeholders' involvement, including the public sector, in order to address coordination and market failures in addition to investing in public goods, such as rural roads and infrastructure, agriculture research, and development of an enabling policy environment and investment climate. Consequently, government involvement in multi-stakeholder decision-making can lead to agricultural transformation or improvement in the livelihoods of smallholder farmers.

Furthermore, government intervention on smallholder agricultural in rural parts of Ghana through subsidies of various forms, such as subsidies on interest charges on agriculture inputs and innovative subsidy-delivery systems can lead to agricultural productivity (Dorward et al., 2007; Seini, et al., 2016). In view of this, subsidies can promote innovativeness of smallholder farmers of Ghana. Furthermore, Dorward et al., (2007:2) discover that primary role [of subsidies] is "to promote the adoption of new technologies." The authors realised that subsidies enable farmers to access inputs, such as fertilisers and improved seeds at a lower cost, and they could be introduced as part of policies purposely to support agricultural development in more remote areas. In view of this, the government of Ghana can implement subsidies as part of its policies to address smallholder farmers in rural parts of Ghana.

However, subsidies are not free from challenges. For example, the costs associated with input subsidies are very difficult to control, strong political pressures tend to exist for the expansion of subsidies and strong resistance to reduce or terminate subsidies (Dorward et al., 2007). Yet, little is known about how government can address problems associated with subsidies if they are to be introduced to minimise high transaction costs and risks involved in rural smallholder farmers' transactions with traders in the local and other agricultural markets.

2.5.3.1 Smallholder farmers' empowerment

According to Narayan (2002:13), "The term empowerment has different meanings in different sociocultural and political contexts and does not translate easily into all languages." Thus, there is no consensus on the definition of empowerment and its application. Similarly, the existing literature shows a lack of agreement between

donors and academics as to what constitutes farmer empowerment today (Bentsen and Knudsen (2004). It seems lack of consensus on what constitutes farmer empowerment can have a repercussion on approaches designed to promote smallholder empowerment in Ghana.

Nevertheless, Narayan (2002:14) defines empowerment as "the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affect their lives." This definition seems to be based on the acquisition of assets, capabilities and power. In other words, empowerment will not occur if there is no change in assets, no improved capabilities of people concerned to enable them to participate in decisions and negotiate with stakeholders, and if there is an inability to hold institutions accountable.

Kabeer (1999:437) on the other hand thinks the term empowerment means "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them." This definition, unlike Narayan's definition of empowerment, however, points out that empowerment can occur when people's ability to make strategic life choices or decisions is enhanced.

In terms of smallholder farmers in rural parts of Ghana, Narayan's definition of empowerment is preferred to other definitions of empowerment as it is more detailed and touches on some of the issues, such as participation in decision and bargaining power (negotiation) that need to be improved to facilitate smallholder rural farmers in Ghana productivity. Also, Narayan's definition was preferred to other definitions as Bentsen and Knudsen (2004: ii) discovered that:

The roles and rights of farmers have in the past often been neglected by governments and donors, and farmers usually have little or no involvement in the formulation of national policies for the agricultural sector and the management of the development programmes which affect their livelihoods. During recent years, farmer empowerment has been put on the agenda and is now an integral part of many international development organizations.

Therefore, Benten and Knudsen (2004:vi) define farmer empowerment as "a process that increases the capabilities of smallholder farmers and farmer groups to make choices and to influence collective decisions towards desired actions and outcomes on the basis of those choices" This definition is close to that of Narayan (2002), as both focus on development of capabilities of individuals or a group in their explanations. Based on both definitions, it can be argued that smallholder farmers in rural parts of Ghana cannot be empowered without an increase in their capabilities. In view of the above, the working definition of empowerment in the current study is as follows: a set of mechanisms implemented to improve capabilities, opportunities and minimise risk to smallholder farmers to enable them to carry out tasks which they were unable to do in the past, such as participation in decisions, bargaining of food prices, meeting international market standards, year-round production and access to information.

The capabilities and opportunities associated with empowerment do not occur by chance but through institutional changes (Gatzweiler and Braun, 2016). Hence, smallholder farmers' empowerment is identified as one of the institutional innovations in the current study. It is possible through the empowerment of smallholder farmers in

rural parts of Ghana can overcome high transaction costs and risks, including other factors affecting their market access and livelihoods.

Additionally, empowerment is crucial to smallholder rural farmers in Ghana, since agriculture is re-emerging as an important industry in achieving economic growth and poverty reduction in many developing countries, including Ghana. Hence, helping smallholder farmers through empowerment to address their new challenges and discover new opportunities have emerged as crucial (Onumah, et al., 2007:2).

Smallholder farmers can be empowered in many ways. However, the current study identified policies, education and market-based approach as the best approaches likely to promote smallholder farmers' empowerment, especially in rural parts of Ghana.

Prato (2013:2) mentions that "policies can contribute to poor rural people's empowerment if they help build their assets, skills, and social capital to fully benefit from changes in the rural sector." He further explains that "if they help address inequalities and exclusion underpinned by unequal power relations, and if the processes through which they are made and implemented promote active and inclusive rural citizenship." In view of the above, it can be argued that smallholder rural farmers can be empowered if existing policies are amended or new policies are introduced to promote the building of smallholder rural farmers' assets, skills and equality.

Also, education is another way for empowering smallholder farmers to expand their capabilities, even though some authors have challenged the use of education,

especially formal education, as a tool for empowerment (Murphy-Graham, 2008; Jayaweera, 1997).

However, education, both formal and informal, can play a crucial role in the livelihoods of the smallholder farmers through improvement in their capabilities. For example, a study carried out by Ferreira (2015) discovered that there are positive returns to education in agricultural productivity, specifically in maize production, and the total value of all produce in a study carried out in Malawi. The author discovered that households whose head possessed a primary level of education produced 9.85% compared to households where the head had no schooling. Again, households' heads with junior secondary education produced 17.54% but those with senior secondary school education produced 41.56%. Similarly, household heads with technical and university levels of education produced more than 77% (Ferreira, 2015).

Similarly, informal learning, such as training in how to produce to meet international standards enabled some smallholder farmers working with Blue Skies Company Ltd in Ghana, as discussed earlier, to meet international market standards (Onumah, et al., 2007). This is a good example of how informal learning can be used to achieve smallholder farmers' empowerment in rural areas of Ghana.

Additionally, education can be used to empower smallholder farmers to overcome most challenges associated with lack of access to information, such as high transaction costs. For example, smallholder farmers can be introduced to the use of information and communication technologies (ICT) to access information on markets and improved ways of undertaking their farming activities (Langat, et al., 2016). Furthermore, Uphoff (2012) discovered three crucial roles associated with empowering poorly-endowed smallholder farmers with limited assets and purchasing power with ICT technologies. These roles include gaining access to and control over more and improved resources on favourable terms, access to modern or better technologies to facilitate the productive use of their available resources and connections with organisations, formal or informal, that give them access on favourable terms to resources and technologies as well as to markets for their products.

Another possible way of promoting smallholder rural farmers' empowerment is through a 'market-based approach', as it offers an opportunity to target and empower smallholder farmers to access higher value markets. Also, it is a very important approach to dealing with a situation requiring the protection of rural livelihoods and when young people's interest in agriculture is challenged by declining farm size (Vorley, et al., 2012). Also, for Vorley et al., (2012:4), "[a market-based approach concept] sees the development of small-scale producers as best achieved by bringing organised producers into trade arrangements with an inclusive business that is supported by the right policies and market institutions." The authors further explain that "producer organisations create mechanisms for aggregation, maintaining quality and substantially reducing the transaction costs for accessing modern inputs and value chains."

An example of a market-based approach is a company known as Blue Skies Company Ltd, operating in the Eastern Region of Ghana, owned and managed by a private investor, who carries out processing of fresh chilled fruits, such as pineapple, mangoes, watermelon, passion fruit and papaya for export offer free technical training

and advice from the company staff to farmers. The approach has enabled farmers to meet safety and quality requirements in the European markets and other international markets. In addition, experts from Europe and South Africa often visit farmers to ensure that they comply with EurepGAP standards (Onumah, et al., 2007).

Currently, the company purchases fruits from about 135 suppliers, including 77 smallscale producers of pineapple who have been certified as organic Fair Trade. However, the company does not work with formal co-operatives, but with selected smallholders in groups promoted by the company. Blue Skies pays the farmers for fruits delivered to the factory or at the farmgate two weeks after delivery. The company does not provide credit facilities to farmers, but it does offer inputs and equipment on hirepurchase without interest. It is obvious the above approach can benefit smallholder farmers in rural parts of Ghana to overcome many problems associated with their market access (Onumah, et al., 2007).

It is clear from this example that a market-based approach can empower smallholder rural farmers in Ghana to overcome most of their challenges, such as high transaction costs and risks if they are introduced into it.

Furthermore, women smallholder farmers play a crucial role, yet they are constantly overlooked in the policy agenda (Barrientos, 2012). It is possible that the continuous denial of women contribution in smallholder agriculture in the policy agenda can affect smallholder farmers' productivity. As a result, they must be considered in all empowerment approaches adopted for smallholder rural farmers in Ghana. For example, Barrientos (2012:10) observed in her study on the cocoa sector in Ghana that "women often found to do as much, or even more, work than men without getting

formal recognition or receiving an equal share of the cocoa, or the profit." Thus, women's empowerment can promote equality among men and women in rural parts of Ghana.

Female empowerment appears to be much harder compared to men empowerment due to the existing social norms and unfair practices in Ghana. Moreover, women are normally denied similar rights to land tenure system arrangements (Barrientos (2012). However, little is known on effective strategies likely to address the existing challenges faced by women smallholders in Ghana to promote women's empowerment in rural markets of Ghana.

Finally, empowering smallholder rural farmers can help them to improve their capabilities, skills, influence, bargaining power and assets to overcome most of their challenges, such as high transaction costs and facilitate their market access. However, specific supports and workable strategies to facilitate smallholder rural farmers' empowerment in the Ghanaian context is unknown.

2.5.3.2 Public and private sector partnership

There is no consensus on the definition of the public and private partnership (PPP), hence it can be used in different settings (FAO, 2016). Ponnusamy (2013:3) thinks that "PPP involves a contract between public and private sector entities wherein the private entity provides a public service or project and assumes substantial financial, technical and operational risk in the project with specified roles and responsibilities." He goes on to say, "The PPP approach supplements scarce public resources, creates a more competitive environment and helps to improve efficiencies and reduce costs." In view of this the above definition PPP, it is obvious that PPP can be instrumental in

helping smallholder farmers to improve their livelihoods and remain competitive in their farming activities.

In terms of Ghana, Ministry of Finance and Economic Planning (MOFEP, 2011:2) defines PPP as "a contractual arrangement between a public entity and a private sector party with clear agreement on shared objectives for the provision of public infrastructure and services traditionally provided by the public sector." MOFEP further explains that "In a PPP arrangement, the private sector party performs part or all of a government's service delivery functions and assumes the associated risks for a significant period of time." As a result, MOFEB definition of PPP is similar to Ponnusamy's definition of PPP as both definitions see PPP as contractual arrangements between public and private entities. Besides, both definitions claim the private entity in the partnership takes more risks than the public. In view of this, it can be argued that PPP arrangements may favour the public-sector entity more than the private sector entity in Ghana.

In relation to agriculture sector, FAO (2016) defines an 'agri-PPP' or a PPP for agribusiness development as "a formalised partnership between public institutions and private partners designed to address sustainable agricultural development objectives, where the public benefits anticipated from the partnership are clearly defined, investment contributions and risks are shared, and active roles exist for all partners at various stages throughout the PPP project lifecycle."

Also, agri-PPP is adaptable to various aspects of agriculture, such as research and development, quality enhancement, crop production, extension and marketing (Ponnusamy, 2013). Hence, Ponnusamy (2013:4) found that "Functional and

operational factors of the PPP linkage tend to differ from field to field based on the capability of partners, budget and time frame." This means that the inability to distinguish between operational and functional factors in agri-PPP may lead to failures of agri-PPP partnerships.

There are potential benefits of using agri-PPP to improve smallholder agriculture.

First, PPP or agri-PPP is a form of institutional innovation that serves as a governance strategy designed purposely to promote a reduction in transactions costs or costs incurred in the formation and maintaining relationships (Oluoch-Kosura, 2010). Similarly, agri-PPPs have the ability to address the commercial risk for the private sector, which can be achieved through fiscal incentives and institutional guidance to reduce transaction costs, such as organising farmers into groups and ensuring exclusive purchase rights of raw materials (Leitão and Aleluia, 2018). Consequently, PPP (or agri-PPP) is another institutional innovation likely to reduce high transaction costs and risks associated with smallholder farmers and traders in rural markets of Ghana.

Additionally, FAO (2016) discovers that PPP is an innovative partnerships platform that brings businesses, government, and civil society actors together. Moreover, it can create a conducive environment for facilitating productivity and speeding up growth in agriculture and food sectors around the world (FAO, 2016). Since agri-PPP is innovative partnerships platform, it can be used to promote smallholder farmers' participation decision in decision making.

Additionally, PPP is gaining more attention in many developing countries due to declining state intervention in agriculture and limited access to expertise resources

((Camagni, 2013; FAO, 2016). Consequently, it has opened the way for the free play of market forces and encouraged private companies' participation in the production, processing and marketing of agricultural commodities (Camagni, 2013).

Similarly, PPP is becoming more popular in various sectors of many economies as it is seen as an alternative and effective means of organising additional financial resources and benefits from private sector efficiencies (Barnier, 2003). For example, Cankar (2013) discovered that "Collaboration between public and private entities creates better and more effective public and private services and products." He further mentions that "Collaboration enables the participants to exchange and share knowledge, experiences, know-how and expertise." Consequently, PPP can create an enabling environment for smallholder agriculture in Ghana. Moreover, the collaboration between innovative public and private institution can result in the discovery of alternative livelihoods for smallholder farmers in Ghana.

The possible partners in the PPP for agriculture sustainable development or 'agri-PPP' identified by FAO include national and decentralised government agencies, publicly funded research and education institutions, national banks and state-owned enterprises (SOEs). Besides, international donors are classified as public partners. Private partners, on the other hand, may include agribusinesses, farmer associations, individual farmers and non-governmental organisations, also known as NGOs (FAO, 2016). In relation to smallholders in Ghana, the following are possible additional private partners: rural banks, credit unions, traders' unions and the local authorities (or traditional councils).

Again, the PPP for agricultural development creates a positive enabling environment and regulatory system to satisfy social interests. Some of the benefits identified for smallholder PPP include improvement in net income through market access, increased productivity, improvement in product quality, reduction in costs from technological innovations, the creation of off-farm jobs and improvement in the performance of FOs (FAO, 2016).

2.5.3.3 Lessons of PPP contribution to smallholder farmers

First, PPP was used to address food safety-related barriers for exportation of green beans in Kenya and grapes in India (Ponnusamy, 2013). In view of this, it seems it is the best approach to reduce risks and uncertainties associated with crop production, such as crop failure, pest and diseases, natural calamities and natural resource management (Ponnusamy, 2013).

Also, it was used to enable smallholder farmers in Malawi to meet market standards and ready market for groundnuts. The partnership in the above was between the government and two private sector organisations (Exagris Africa Ltd and National Smallholder Farmers' Association of Malawi, or NASFAM) and, it was supported by IFAD with the aim of developing value chains for groundnuts. Thus, it was intended to equip farmers to produce groundnuts according to required market standards and guarantee buyers for their produce (Camagni, 2013).

Additionally, 'Ghana – Northern Rural Growth Programme' is another IFAD-supported PPP programme is currently designed to set up contractual farming arrangements between private partners (buyers and processors) and smallholder farmers who grow cotton, shea nuts, maize, sorghum, soybeans, butternut squash and groundnuts. The PPP programme offers technical support to promote outgrower schemes; improves infrastructure like feeder roads or storage facilities and capacity building farmers' organisations (Camagni, 2013).

Similarly, as discussed earlier in the introduction, GCAP project and Growth Africa partnership with 20 companies are offering support to selected smallholder farmers in some Regions of Ghana to link the beneficiaries of the project (smallholder farmers in rural areas) with high-value markets.

The success stories of the above PPP projects offer a guarantee that smallholder farmers in rural parts of Ghana can use agri-PPP to overcome their challenges, such as high transaction costs, price fluctuations and lack of ready market for produce (Obi, et al., 2012; Kirsten, et al., 2012), even though PPP projects are not immune from challenges.

2.5.3.4 Challenges associated with PPP

There are possible challenges likely to hinder the PPP projects for smallholder farmers. Some of the challenges include finance; technical and operational challenges; social and environmental sustainability challenges (FAO, 2016).

One of the main challenges facing agri-PPP projects is inaccessible guidance and support to both public and private partners in the design and implementation of PPP projects (FAO, 2016). This problem occurs since most PPP policies and strategies devised for PPP are originally for mega-infrastructure programmes. As a result, many important issues, such as conflict resolution strategies, risk sharing and mitigation mechanisms to protect smallholder farmers are not taken into consideration at the

partnership design stage. Thus, partnership policies and strategies designed for bigger projects are not adaptable to small projects and beneficiaries.

Similarly, the unfavourable legal environment is another challenge facing PPP projects. This problem can occur when exiting the policies and legislation are found to be hindering the PPP activities rather than promoting it. Also, it can occur as a result of the failure to implement the existing policies and legislation (FAO, 2016). For example, FAO (2016:138) observe that "Outdated and inconsistent legal systems for land tenure and lack of enforcement of land laws often constrain the smooth implementation of agri-PPPs." Furthermore, this problem is common in Ghana's PPP projects. The country lacked an adequate legal framework for PPP practice. Hence, it uses only a national policy guide for PPP projects, which does not give many details as to how the implementation process (Osei-Kyei, et al., 2017).

In terms of Ghana, Osei-Kyei, et al., (2017:3) claim that the "key challenges in Ghana's PPP practice include the lack of experience and appropriate skills in PPP delivery, misallocation and incomplete transfer of risks, and high use of unsolicited proposals."

Experiences and skills are crucial for members of PPP in order to deal with the complexities associated with PPP projects. However, most local practitioners from both public and private sectors officials in Ghana are inexperience in managing modern PPP transactions properly. Consequently, this has led to the slow pace of PPP development in Ghana (Osei-Kyei, et al., 2017).

Also, whilst risk sharing is identified as one of the benefits for PPP arrangements in many countries (Tolani, 2013; FAO, 2016), it is regarded as a problem in Ghana's PPP projects due to improper risks allocation and incomplete risks transfer. This, however,

has repercussions, such as litigations and poor performance of PPP projects (Osei-Kyei, et al., 2017). For example, Osei-Kyei, et al., (2017:4) discovered that "past projects' experiences in Ghana have demonstrated that risks are often poorly managed; in most cases, contracting authorities end up retaining excessive risks which are not supposed to be so for Ghana's PPP arrangement." In view of this, it can be explained that future agri-PPP projects in Ghana required proper arrangements between the partners to avoid improper allocation and transfer of risks.

Notwithstanding the challenges, smallholders in rural parts of Ghana may benefit from 'agri-PPP' in many ways if precaution is taken and necessary measures are put in place to promote accountability from the PPP officials from both public and private sectors to address some of the challenges identified in the current study.

Properly designed agri-PPP for rural smallholder farmers can help to minimise risks, such as price volatility, changes in the climate conditions and enabling environment risks (like weak capacity among state-level institutions) encounter by smallholders and other stakeholders in Ghana's agriculture sector (Choudhary, et al., 2015).

Also, PPP is not a new approach in Ghana's agricultural development (FAO, 2013). For example, the Ghana Rubber (Outgrower) Project has been in the existence for the past 15 years; the West African Sorghum project, Allanblackia Project, and the Cadbury Cocoa Partnership started in 2006, the early 2000s and 2008 respectively. These examples show that agri-PPP may have some success stories in Ghana.

However, the country is yet to achieve a holistically developed agribusiness PPP strategy to aid the development of the agricultural sector and related industries (FAO (2013). In view of this, PPP can be extended to smallholder farmers in rural parts of

Ghana. However, it may require careful planning and innovation to achieve the expected targets since, FAO (2013) discovered that currently, it is difficult to get farmers to heed technical advice as a result of high illiteracy rate (or low educational levels), limited resources and poverty.

2.5.3.5 Ways to achieve successful PPP

PPP is effective if there is an identification of a common interest space, whereby activities follow from objectives shared by both partners in the PPP (Oluoch-Kosura, 2010). This is illustrated in figure 8.

This view is akin to one of the eight lessons learnt by FAO (2016) on what makes PPP successful. It states that "To be successful, agribusiness partnerships need to align the partners' disparate interests and visions and reach consensus, particularly on public-sector objectives and priorities for promoting PPPs." Besides, "Partnerships should aim to leverage financing from both partners to achieve common goals that have a high potential for socio-economic spillover effects."



Figure 6:Common interest space (Kenya case), source:Oluch-Kosura, 2010

Additionally, the partners' roles in the PPP must be clearly defined based on the unique skills and expertise they can offer to the agri-PPP, with appropriate incentives designed to reward these roles (FAO, 2016). This approach can help to avoid conflict of interests that can occur without a clear demarcation of roles and responsibilities for the partners.

Again, the PPP contractual arrangement must be transparency and promote competition. The benefit of using this approach in the PPP agreement is that it can boost the general public's trust in public officials and, in PPP arrangements. In order to achieve this, contracting authorities have to make contract information accessible to the general public. Moreover, encouraging competition in the PPP arrangement can ensure value for money (Osei-Kyei, et al., 2017).

The summary of possible institutional innovations for smallholder farmers to minimise

high transaction costs and risks associated with their market interactions with traders

are summary in table 1.

Table 1: Summary of institutional innovations with the potential to address high transaction costs and risks affectingsmallholder farmer market access in Ghana, source: Adapted from Oluoch-Kosura, 2010

Forms of innovations	Roles	Examples	Problems
Contract farming	 improve farmers' access to inputs make production methods more efficient reduce marketing risks -reduce production costs -link farmers to markets -provide financial services 	- supermarket chains in Kenya offering contracts to large- and medium-sized farms (Oluoch- Kosura, 2010) -	-can contribute to a loss of autonomy and control over firm enterprise -production risks if technology available is inadequate -exclusive purchase rights by firms can depress producer prices or lead to late or partial payments -contract conditions can be easily manipulated -side marketing by producers e.g. selling fertilizer or selling produce post-harvest -widely dispersed smallholder population increases transaction costs
Producer organizations	-help reduce risks faced by producers -provide a platform for farmers to express their dissatisfaction - mobilize resources for their members	Kenya Tea Development Agency (KTDA) supplies fertilizer on credit to smallholder tea farmers National Smallholder Farmer Organization of Malawi (NASFAM) has become the voice of smallholder farmers in policy circles in Malawi's capital, Lilongwe	 -lack of management capacity struggles to achieve coherence among a diverse membership subject to elite capture - problems related to a trade-off between equity and efficiency
Farmers co-operative	 help to address gender inequality and other discrimination against smallholder farmers Facilitate smallholder farmers with market access 	 Implemented by Oxfam in Ethiopia (Oxfam, 2013) Smallholders commercialisation in Kenya and Mozambique (Mwangi, 2009; Oluoch-Kosura, 2010) 	- underdeveloped agricultural -
Government intervention	 -Helps to reduce high transaction costs and risks provides supportive infrastructure for processing and marketing produce Standardisation of prices -Provides subsidies for inputs 	- Ghana Commercial Agriculture Project (GCAP,2017)	-`Lack of participatory decision-making -Smallholder farmers are passive recipients of aid programmes (

Smallholder farmers empowerment	-Ability to make strategic live choices -Discover opportunities (Onumah, et al., 200)		- Female empowerment is much harder (Barrientos, 2012)
Public-private partnerships	-minimize transaction costs or the costs associated with forming and sustaining relationships -contracting, coordinating -enforcing a relationship between actors engaged in the production of some good or service -Share experience and experience (Cankar, 2013).	- in Kenya, the Alliance for a Green Revolution in Africa (AGRA), in partnership with Equity Bank Limited, the International Fund for Agricultural Development (IFAD) and the Ministry of Agriculture, signed an agreement for a loan facility of US\$50 million (3 billion Kenyan shillings) to facilitate access to affordable financing	 problems with practicing coherent planning of how to attain the common objective Finance operational challenges (FAO, 2016)

2.6 Innovative public and private institutions role to reduce transaction costs and risks

Halvorsen, et al., (2005) think that the term innovation can be defined most generally as changes in behaviour. Thus, changes in the existing practices of smallholder farmers, government institutions, NGOs activities and support services for smallholder farmers can be termed as an innovation.

In view of the above, OECD (2012) thinks that "public-sector innovation involves significant improvements in the services that government has a responsibility to provide, including those delivered by third parties.". It goes on to say, "It covers both the content of these services and instruments used to deliver them." An example of public innovative approaches discovered from OECD research includes digital technologies, partnerships with citizens and civil society, a partnership with the private sector and solutions to improve access conditions.

In term of the private sector, it is commonly known that innovation is crucial to success for private businesses (Schumpeter, 1934, 1946). For example, it enables private businesses to reduce costs, improve quality products and offer new markets, hence failure to innovate affect their competitiveness (Sørensen and Torfing,2012).

Consequently, the government of Ghana can achieve innovative public status if it creates an effective enabling environment to encourage smallholder farmers' participation in decision making, the introduction of regulations to facilitate market access for smallholder farmers, the introduction of contract farming and co-operatives

and other strategies, public-public and partnerships to improve rural development. These approaches can help to overcome high transaction costs and risks.

Also, as a form of public innovation, the government of Ghana can intervene on smallholder farmers' risk management from both natural and transaction risks. For example, it can create emergency support for farmers in the form of insurance against natural risks and other events. Moreover, the government should provide information to smallholder farmers on how to avoid high transaction risks (Ruete, 2015; OECD, 2013).

Cankar (2013) discovered that "Collaboration between public and private entities creates better and more effective public and private services and products." He further mentions that "Collaboration enables the participants to exchange and share knowledge, experiences, know-how and expertise."

In view of the above, it is possible for public and private institutions in Ghana to collaborate to come up with innovations likely to reduce high transaction costs and risks affecting smallholder farmers market access. Moreover, the collaboration between innovative public and private institution can result in the discovery of alternative livelihoods for smallholder farmers in Ghana.

It seems one of the best ways of achieving innovative public and private institutions contribute to the reduction in high transaction costs and risks between smallholder farmers and traders in Ghana is through 'innovation triangles' approach.

According to Pant and Odame (2010), "innovation triangles are the tripartite linkages of the public, non-profit private, for-profit private and informal sector stakeholders that transcend beyond R&D to complement the new paradigm shift toward the innovation

systems in recent years." Indeed, the technological triangle is explained as "the tripartite linkages of public sector research, government-orchestrated extension and rural farming communities." In contrast, unlike the technological triangle that combines agricultural R&D and a limited range of stakeholders, the 'innovation triangles' use multi-stakeholders to address smallholder agriculture problems.

Indeed, the innovation triangles approach can help to address many of the age-old challenges facing smallholder farmers in rural parts of Ghana, such as high transaction costs, lack of ready market, price fluctuation and lack of bargaining power (Obi, et al., 2012; Kirsten, et al., 2012). In fact, using a range of stakeholders to address smallholders' problems will not only bring experts on board to address the problems but will give the smallholder the opportunity to bring out specific issues affecting them and contribute to decisions likely to address those problems. Furthermore, Pant and Hambly-Odame (2010) realised that the approach will create a platform for the stakeholders to learn from each other without compromising learning and innovations through stringent intellectual property rights (IPR) regulation.

Orden, et al., (2004) argue that it is an undisputable fact that institutional infrastructure designed to promote market exchange is very important to countries currently experiencing the setbacks of market liberalisation, specifically for smallholder agriculture.

The UN Millennium Development Project (2005) Task Force on Science, Technology, and Innovation report points out that the immediate problem developing countries face is not the creation of new knowledge but the efficient application of existing technologies. Thus, innovation systems approach, with a framework of integrated and supportive government innovation policies, is argued to assist the process of modifying

and adapting existing technology to local contexts (Poole and Buckley, 2006). This approach may help to extricate many developing countries from poverty traps, including those of their smallholder farmers.

Institutional innovations for rural agriculture affecting the competitiveness of agriculture in sub-Saharan Africa's small-scale producers and rural communities when compared to large-scale producers and the urban dwellers have largely proven to have only minimal influence and participation in policymaking (Herbel, et al., 2012; Curtis, 2013). The minimal effect of institutional innovations on policymaking continues to be perceived as an obstacle to poverty alleviation and rural development in many African countries, including Ghana. Nonetheless, it is possible through the adoption of certain institutional innovations in rural agriculture for many rural smallholder farmers to contribute to major decision making especially on market access which may, in turn, promote markets access in the domestic, regional and international levels.

Again, institutional innovations for rural agriculture can take many forms. The following are some of the institutional innovations identified for smallholder rural farmers. The public and private sector stakeholders' participation in policy making on rural agricultural development, such as smallholder farmers market access, can be seen as an institutional innovation. The partnerships of producer and non-governmental organisations (NGOs) and public and private actors can help small-scale producers to develop appropriate skills, enhance information access and knowledge to innovate and adapt to changing markets (Herbel et al., 2012). For instance, a case study of Andean potato farmers revealed a success of state and non-state participation in the commodity value chain (Markelova and Meinzen-Dic, 2009).

However, mere state and non-state participation will not address the dilemma smallholder farmers find themselves in, such as price fluctuations, poor rural infrastructure, weak institutions, constant increased pressure on the natural resources and limited government support (Rwelamira, 2015). This is especially true in connection with attempts to access improved markets (national, regional or international). Escobal (2003) reveals that public and private sector participation can be seen as an ordinal instrument for diversification. However, to be effective a range of strategies needs to be in place for many social actors to facilitate wide dialogue in order to promote inclusion. This view seems logical since, without proper negotiation powers, skills and strategies for private participants, such farmers cannot constructively engage with non-state actors, private and public sectors and participate in major decisions such as markets access. As a result, smallholder farmers are not likely to be effective in overcoming barriers to new markets and improve their standing within existing markets.

While some researchers recommend domestic and regional markets for smallholder farmers market access, Diao and Hazell (2004), in their study "Exploring Market Opportunities for Smallholder Farmers", point out that the role of institutions supporting trade in domestic and regional markets for staple foods is weak and public policies are ineffective in facilitating informal trade and small-scale trading.

This shows that institutional innovations are indispensable if smallholder rural farmers are to access new markets in the domestic and regional levels. One such institutional innovation is public and private participation in decisions on smallholder rural farmers' market access. However, an appropriate incentive must be in place to encourage such participation, for instance, the provision of specialised training for participants is a necessary incentive for the smooth design of the marketing scheme (Markelova and Meinzen-Dic, 2009).

Since existing institutions are less likely to improve the livelihoods of smallholder farmers, including state and non-state participation, institutional innovation may be the answer to smallholder rural farmers' participation.

2.7 Transaction risks

The term transaction risks can be defined as risks to buyers and sellers that threaten the success of transactions (Dorward, et al., 2004). Geyer (1984) on the other hand defines it as the risk of not receiving the goods or the money for which one traded.

Dorward and Kydd (2002) classified transaction risks into four categories: risks of natural shocks, price risks, economic coordination risks and risks of opportunism. Geyer argues that price risk is the common transaction risk farmers are exposed to, which is very often associated with the sale of farm products. Hence, it is linked to volatility associated with commodity prices. This also makes agriculture markets rather riskier compared to any other agricultural activity (Kang, 2005). As Kang and Mahajan (2006:1) observe, this is because "Price volatility leaves a farmer uncertain whether he will receive a high price or a low price at the time of sale." They further explain that "The problem is, however, not limited to how much cash a farmer receives for his harvest. Every investment decision a farmer makes during the crop cycle is a difficult one because he does not know whether he will be able to pay back the loan for the investment (i.e. labour, fertilizer, equipment and repairs)."

Smallholder farmers, especially in rural areas in SSA like those in rural parts of Ghana with no access to storage facilities and financial services are particularly vulnerable to the above risk (Vargas-Lundius, 2009). Besides, many smallholder farmers' livelihoods are based on sales of commodities. Hence investment decisions made by many of them during the cropping seasons can lead to failure.

Additionally, high risks are associated with production while cycles of oversupply and price depression create financial risks throughout the distribution chain of smallholder
farmers, which prevent investment and access to capital. The problem is further worsened by monopolistic practices in local markets, corruption, and excessive regulations at the rural marketplace (Torero, 2011). All the above risks seem to contribute to transaction risks experienced by smallholder farmers', including those in Ghana.

Transaction risks can easily lead to transaction failure. In view of this, Dorward and Kydd (2004) realised that the purpose of institutional arrangements is not to minimise transaction costs, but rather to minimise transaction risks encountered by parties in an exchange or transaction because these risks could result in transaction failures. They further explain that in an attempt to avoid transaction failures, the parties may, therefore, need to incur costs to protect themselves against such transaction failure and these costs are termed transaction costs. In view of the above, it can be argued that transactions costs are the outcome of transaction risks. Besides, it means that the success of transaction between smallholders and traders will depend on how risks associated with the transaction risks, and costs are seen as threats to market access and success for smallholder farmers in rural parts of Ghana.

Furthermore, Dorward, et al., (2004) observe that "poor rural areas face two major types of transaction risks namely, coordination and risks of opportunism." They further explain that "The co-ordination risks are the risk of one party's investment (in production or in market services)." However, "Risks of opportunism arise where other parties which have made complementary investments may have possessed effective monopolistic or monopolistic position that enables them to set prices that depress returns to the first investor below his or her break-even point." This risk is known to exist in situations where there are a thin market and weak institutions protecting contractors from opportunism or information asymmetry (D'Haese, et al., 2003). The smallholder farmers in Ghana may be affected by both risks, however, the latter risk can pose more risk to the farmers due to limited economic activity, poor transport and thin markets (Dorward and Kydd, 2002b). Also, smallholder farmers' interactions with traders (market women) can be seen as an example of the risk of opportunism; the market women possessed monopolistic position that enables them to set prices that affect the profit margins of the farmers.

In their study, titled "Policy on Managing Risk in Agricultural Markets", Larson, et al., (2004) discovered that for decades governments have intervened to reduce risk in markets for internationally traded commodities. Over the past dozen years, however, many of the policies and supporting institutions used for that purpose were reevaluated and found to be not only ineffective and unsustainable but an impediment to growth. Most of these approaches have now been abandoned, but governments and policymakers still seek to understand how best to manage the negative consequences of volatile commodity markets because traded commodities remain an important source of export earnings for many developing economies and an important component of income and consumption for poor.

It can be argued from the above that risks in agriculture markets are unavoidable and difficult to measure. However, the impact of the risk can be alleviated through risk sharing. Aggarwal (2007) found that "risk sharing motivation for crop sharing has been the most popular argument in the theoretical literature, but ironically it is also the most difficult to test empirically."

Moreover, Deutsche Bank (2010) claims that "risk management in agriculture is important on several grounds. Even if reducing farming risk does not always improve farmers' welfare, failure to manage risks has direct repercussions on farmers' incomes, market stability and potentially food security". It further argues that "the latter is relevant in developing countries, but also for the most deprived in the EU, in case temporary short supply leads to dramatically higher prices." It is obvious from the above that risk management can promote market stability and food security for Ghana through smallholder agriculture. However, it is known the literature (Choudhary, et al., 2016) that the smallholder farmers are exposed to enabling an environment that poses risks instead of opportunities, hence, it could undermine risk management strategies for smallholder farmers.

Jack and Suri (2011) however discovered that "in developing countries, informal networks provide an important means by which individuals and households share the risk, although the insurance they provide is often incomplete." This, however, shows that partnership between individuals and households with policymakers can help to provide insurance of risks management for smallholder farmers in Ghana likely to promote market access and minimise transaction costs.

2.8 The transaction costs, transaction risks, and institution

This section discusses the core concepts of this study: institutions, transaction costs and transaction risks, including institutional innovations. The section begins by briefly looking at the relationship between transaction risks, transaction costs, and institutional arrangement. It further discusses in detail each concept listed above. In addition, it will look at lessons of institutional innovations of some smallholder farmers in Africa. The section will end by looking at specific institutional innovations likely to help to address transaction costs and risks in relation to smallholder farmers in Ghana.

2.8.1 Relationship between institutions, transaction costs and risks

According to the new institutional economics (NIE) perspective, there is a connection between transaction costs and institutional changes. Changes in the existing institutions tend to lead to changes in transaction costs, and the outcome of changes in transaction costs can lead to further institutional changes (North, 1997; Polski, 2001). In view of the above, Polski points out that scholarship in NIE offers the basis of different hypotheses on the relationship between transaction costs and institutional change. For example, she highlights one of the hypotheses that states that "institutional change induces changes in transaction costs." In other words, institutional changes or innovations can lead to a reduction in transaction costs, hence the current study aims to examine how institutional innovations can reduce transactions costs and risk between smallholder farmers and traders in rural Ghana. Thus, the current research topic is partly linked to the above hypothesis.

Additionally, institutions, as with transaction costs, influence market access (Hodgson, 2006; Shiferaw, et al., 2006; Doner, 2010). The institutions is can be seen as a tool for

reducing transaction costs (Orden, et al., 2004). Thus, Okoye, et al., (2016) established that there is a direct relationship between institutions and transaction costs from their study in Madagascar.

Also, a study carried out by Meijerink and Eaton (2009) titled 'Transaction risks and trust: A tale of two regions Sesame markets in Ethiopia' appears to show that there is a direct relationship between institution arrangement, transaction risks, and costs. The outcome of the institutional arrangement will determine the existing transaction costs and risks in the market. This can be seen from the diagram (Figure 7) below:



Figure 7:Diagrammatic representation of state of smallholder farmers in rural market of Ghana

Figure 7 gives a picture of conditions smallholder farmers find themselves in rural markets of Ghana, including interaction taking place between smallholder farmers, traders and commissioners and how the outcome leads to high transaction costs and risks. Also, it shows a disconnection between smallholder farmers and the enabling environment (support services). Besides, it shows the possible institutional innovations likely to facilitate smallholder farmers' market access.

2.9 Enabling environment

Thindwa (2001) defines an enabling environment as "a set of interrelated conditions such as legal, organisational, fiscal, informational, political, and cultural – that impact on the capacity of development actors." These interrelated conditions (enable environment) help smallholder farmers' innovations and they are made up of formal sector interventions and policies that reflect the realities (Bragdon and Smith, 2015). In the case of Ghana, the enabling environment comprises the government, the extension service (Ministry of Agriculture), non-governmental agencies (NGOs), banks (financial institutions), universities and research institutions.

Teng (2015) points out that "Together, the policies, rules, regulations, institutions, values, and conditions that surround the agribusiness sector create an environment that can support and enable more effective and beneficial links between smallholders and businesses." It is required to enable farmers and their dependents to respond to constant changes taking place in rural, national and regional markets in developing and emerging economies (Proctor and Ton, 2012). As a consequence, governments in East Africa have supported creating an enabling environment for agriculture, specifically for smallholder through policy discussions (Medius, et al., 2012). It is, therefore, not surprising to see a lot of smallholders having access to markets with more lessons of institutional innovations in East Africa when compared to West Africa. Also, it is one of the important elements for the success of financial institutions in supporting smallholders, especially in developing countries, although little is known about its importance in the literature (IFC, 2014).

Notwithstanding this, not all enabling environments for agriculture innovations or growth were considered positive enabling environments. For example, in Ghana, the enabling environment elements, such as government, extension, service, NGOs and banks are disconnected or malfunctioning. Moreover, Davis (2008:21) found that "Ghana modified their extension system in 2003, based upon a 1997 policy to decentralize. However, such modifications take a long time; hence, there is no information on its success."

This is an obstacle to smallholder farmers' market access. The Ghana case also does not help to discover institutional innovations likely to alleviate high transaction costs and risks linked with interactions between smallholder farmers and traders in rural markets of Ghana. According to Diaz-Bonilla (2014), genuine positive enabling environments are made up of the agricultural sector and economy-wide non-distorting stable policies, adequate provision of public goods, good governance through laws and regulations that are conducive to private-sector economic activity while addressing market failures, and strong and effective institutions through which government measures and actions are operationalised. However, the current enabling environment in Ghana does not offer the above conducive enabling environmental conditions to facilitate smallholder farmers' commercialisation. Rather, it poses risks based on weak capacity among state-level institutions responsible for managing and responding to the most important risks facing the agricultural sector (Choudhary, et al., 2016). Also, smallholder farmers lack the ability to lobby for investments in infrastructure or services that could enable them to improve their livelihoods, such as improvements to rural roads, market facilities and extension services (ASFG, 2013). Furthermore, an IFAD (2015) report titled 'Investing in rural people in Ghana' points out that "Small-scale farmers in Ghana's poor rural areas have limited access to the assets that would facilitate a shift from low-productivity subsistence farming to modern, commercial agriculture." It goes on to say, "Major constraints to their livelihoods include lack of infrastructure and insufficient access to equipment – such as agricultural inputs and technology, and facilities for storing, processing and marketing products."

Consequently, a functional and well connected enabling environment is needed in Ghana, to facilitate institutional innovations likely to reduce high transaction costs and risks involved in smallholders' interactions with traders. Similarly, DFID (2015:3) argues that "Successful agricultural transformation depends on a strong enabling environment being in place." Thus, without a strong enabling environment smallholder farmer in rural parts of Ghana will not be able to address their current predicaments.

2.10 Innovation system approach

The agricultural innovation systems can be explained as networks of different players, such as public agricultural research and other organisations like private sector or civil society organisations, who transient and emerge around specific challenges and tasks at particular points in time (Klerkx, et al., 2009). In other words, it is made up of organisations and enterprises, including individuals who jointly seek and supply knowledge and technology through rules and mechanisms that facilitate the agents' interactions. Besides, World Bank, 2007 realised that "The innovation systems concept does not focus only on the science suppliers but on the totality and interaction of actors involved in innovation." Figure 8 depicts a conceptual diagram of the innovation system.



Figure 8: Conceptual diagram of innovation system, source: Aerni et al., 2015

The evolving nature of institutions (Doner, 2010) has led to a new paradigm shift towards the innovation systems approach in agricultural and rural development in lowincome countries. This was demonstrated by pluralistic 'innovation triangles' also called 'metaphor innovation triangles' (Pant and Odame, 2010).

The innovation system approach is discovered in the current study to be one of the ways of promoting institutional innovations to address challenges faced by smallholder farmers in rural parts of Ghana, such as high transaction costs and risks. As the innovation systems framework offers a new stance on innovation processes that are fundamental to poverty reduction and improvement in food security (Spielman, 2005).

Again, an understanding of innovation systems can help policymakers to create approaches for building up innovative performance in the knowledge-based economies of today (OECD, 1997). Moreover, the approach offers a systemic intervention to make a system work, whereby different actors and functions are combined for an overall purpose of addressing certain innovation challenges, technically, socially or otherwise (Ngwenya and Hagmann, 2011).

In view of the above, an innovation system approach can help to discover better ways of addressing challenges faced by smallholder challenges faced by smallholder farmers in their market access in rural parts of Ghana, such as high transaction costs from information search, bargaining and negotiation costs (Hobbs, 1997), including market failures from transaction risks (Dorward and Kydd, 2004).

Similarly, it can enable policymakers, researchers, research managers, donors, entrepreneurs, and others identify and examine better ways of encouraging innovation through greater insight into the complex relationships between diverse actors,

processes of institutional learning and change, market and nonmarket institutions, public policy, poverty reduction, and socioeconomic development (Spielman, 2005).

Also, innovation systems perspective challenges the perception that technological change drives social and economic development. Rather, the innovative system concept determines the institutional context for technological change to occurs and drive development (Spielman, 2005). In view of this, innovative systems influence development; hence, it can be used for smallholder farmers' development in Ghana.

In view of the benefits associated with the innovation system approach, Clark (2001) notes that recent debates show that the national innovations system in agriculture has the potential to change the livelihoods of the poor farmers. However, the specific strategies required to adopt an innovation system approach to improve the livelihoods of smallholders in rural parts of Ghana are unknown.

Since an innovation system has the potential to change smallholder farmers' livelihoods, it is important to strengthen it. One of the possible ways of strengthening the innovation system approach is through Agricultural Education and Training (Rajalahti, 2011). According to Rajalahti (2011:9) "Education and training institutions are especially significant in an AIS because they develop human resources and at the same time serve as a source of knowledge and technology." However, Spielman, et al., (2008:2) argue that while Agricultural Education and Training (AET) is conventionally viewed as key to the development of human and scientific capital in the region (SSA), it is also has a vital role to play in building the capacity of organisations and individuals to transmit and adopt new applications of existing information, new products and processes, and new organisational cultures and behaviours."

Even in some places where innovations in agriculture are recognised by smallholder farmers, they do not refer to these specific innovations as beneficent. Poole and Buckley (2006), in their article "Innovation challenges, constraints, and opportunities for the rural poor", point out that innovation in agriculture and rural enterprise has happened for a millennium through chance and through the informal but purposive action of rural people seeking new and better ways of production and organisation. Rural people, therefore, have been a major source of new knowledge and practices encompassing both indigenous knowledge and organisation. Small-scale farmers' own creative responses continue to be important sources of improvement to agricultural productivity in many regions of developing countries. The above view shows that devising effective institutional innovation to address smallholder farmers' problems, such as market access, requires their participation (Enweze, 2005). The smallholders' participation may be achieved through an innovative system approach (Dolinska and d'Aquino, 2016).

2.10.1 Agricultural Innovative platforms

Homann-Kee Tui, et al., (2015:5) mention that "An agricultural innovation platform (IP) is a forum where a group of actors with different backgrounds and interests, including women and men farmers, extension, research, private sector, local and or national decision-makers come together to diagnose challenges and opportunities and to find solutions in a particular situation."

This concept has its origin from innovation systems theory, it promotes dialogue between the main local players in the value chain, such as farmers, input suppliers, traders, transporters, processors, wholesalers, retailers, regulators, the research and development fraternity (Rooyen and Homann,2010). Since IP brings actors and other stakeholders into dialogue, the approach can help smallholder rural farmers in Ghana to overcome some of their challenges, such as lack of market, transport, standardised pricing system and information (Obi, et al., 2012; Kirsten, et al., 2012). Rooyen and Homann (2010) claim that "Innovation Platforms improve markets by improving institutions related to the marketplace which will ensure organized, transparent markets and grading systems." Hence, IP can be used to address existing weak market institutions in Ghana affecting smallholder farmers market access and interactions with traders. For example, the IP is implemented in Southern Africa to improve livestock markets in some southern African countries, such as Mozambique, Zimbabwe and Namibia (Rooyen and Homann, 2010).

2.11 Definition of smallholder farmers

There is no explicit definition for small-scale producers or smallholder farmers since the definition of smallholder farmers is multifactorial, dependent on income level, demographic factors, and farmland size, among others. In addition, poor market access or low market orientation is part of the working definition of smallholders adopted by policy discussions (Chamber, 2007).

Singh, et al., (2002) define small-holder farmers as "those marginal and sub-marginal farm households that own or cultivate less than 2 hectares." This definition clearly shows that smallholder farmers are negligible compared to large-scale farmers. This is because they are "farming yet hungry" (Kent and Poulton, 2009). Also, the definition reveals one of the characteristics of smallholder farmers, which is access to less than 2 hectares of farming land.

Similarly, the World Bank (2003) defines smallholders as those with limited assets base and operating on less than 2 hectares of cropland.

Much of the existing literature on smallholder farmers (Singh, et al., 2002; World Bank, 2003; Thapa, 2009; Torero, 2011) uses a landholding of 2 hectares or less as a differentiator in their definitions. However, Chambers (2007) argues that different resources and risk conditions better define smallholder farmers compared to measures of landholdings. In view of the above, he argues that farmers with the same farm size, but producing crops with different market values, cannot be compared, hence the definition based on the landholding, rather than the risk conditions in which farmers find themselves, may be misleading.

Consequently, Maltsoglou and Tanyeri-Abur (2005) define smallholder farmers as a heterogeneous group with different resources, livelihood patterns and income sources. This definition is more acceptable in relation to Chamber's (2007) argument on landholding.

The working definition for smallholder farmers in this study is as follows: A group of farmers operating within 0.5 to 3 hectares of land, mostly acquired through family inheritance, who lack collateral securities to access loans for their farm's expansion projects and other farming activities and normally depend on a free (intensive) family labour source.

2.11.1 Some of the challenges faced by smallholder farmers in SSA

The smallholder farmers in SSA face challenges in accessing markets for their produce and agricultural commercialisation. In addition, the challenges are worst in remote parts. These challenges can stem from technical, institutional constraints, the socio-economic characteristics of the smallholder producers, lack of support services and high transaction costs. The above challenges are linked to factors such as poor infrastructure, lack of market, lack of transport, lack of market information, insufficient expertise, high standards, incomplete contractual agreements and poor organisational support (Obi, et al., 2012; Kirsten, et al., 2012).

Chianu, et al. (2008), on the other hand, considers slow growth in the use of modern agricultural inputs in the farming systems as the major challenge that smallholder farmers face in SSA. They further argue that the above has contributed to the lack of opportunities to increase Africa's agricultural production, productivity, and household incomes and welfare.

The High-Level Expert Forum (2009) on how to feed the world 2050 highlighted (similarly to Chianu, et al., 2008) the widening technology divide, or slow technology growth, as one of the challenges smallholder farmers face in SSA. In addition, they identified the slow development of input and output markets and associated market services, slow progress in regional integration, governance and institutional shortcomings in some countries, conflicts, HIV-AIDS and other diseases as other major challenges smallholder farmer in SSA face.

Another characteristic of smallholders in SSA is the lack of access to credit facilities. Normally, smallholder farmers lack collateral securities and written records necessary

for loan applications. Furthermore, the volume of a loan requested by smallholders tends to be small compared to large-scale farmers. In view of this, they are seen as unattractive customers by financial institutions (IFC, 2013).

On the contrary, Dorward, et al. (2004) claim that farmers' challenges in many poor rural areas, especially in Africa, come from two major policy changes during the past thirty years: a large reduction in agricultural development and diverted attention to liberalisation. Hence, they point out that rural parts of Sub-Saharan Africa (SSA) and South Asia are likely to remain in poverty perpetually. Many studies have predicted that the smallholders' contributions to the economic development, including their livelihoods, will be affected due to market liberalisation and globalisation (Low, et al., 2005; Low, et al., 2006; Jensen and Gibbon, 2007).

Moreover, many smallholder farmers are rural dwellers with poor market development and lack of market support institutions. In view of this, they are usually prone to very high transaction costs. This problem exists since rural producers and smallholders often find it difficult and costly to obtain appropriate information on market demand



Figure 9: Marketing channels for smallholder farmers produce, source: Jari and Fraser, 2012

(Bijman, 2007). Consequently, smallholder farmers sell their farm produce individually in local markets but use market intermediaries, in order to access international markets (Bijman, 2007). Typical marketing channels normally used by smallholder farmers are illustrated in figure 9.

Additionally, smallholder farmers face other problems in their activities, such as largely unorganised or low existence of co-operative societies, low level of education, lack of access to formal landholding, climate change, an ageing population and ineffective intercropping strategies (Clennan and Orr, 2014). These problems are likely to affect the productivity and competitiveness of smallholder farmers.

Similarly, Al-Hassan and Poulton (2009:4) found that "Those households relying heavily on agriculture [in Ghana] for their livelihoods are vulnerable in particular to climatic shocks, such as bushfires, droughts and floods, sometimes with more than one of these calamities falling in one year." It is obvious from this study that vulnerability analysis is required to discover possible strategies to address the vulnerability associated with highly dependent on agriculture by some households.

Nevertheless, it is possible for smallholder rural farmers of SSA to improve their livelihoods and overcome perpetual poverty by creating more economic opportunities, such as availability of new improved domestic and regional markets (Nigel and Buckley, 2006), improving their access to modern farming technologies and reducing their costs of production can make a direct and significant impact on poverty (Palmer, 2002). Many stakeholders such as policymakers and development practitioners still believe smallholders as the engine of economic growth and poverty reduction in Africa (AGRA, 2014).

2.12 The existing conceptual model (framework for linking smallholder to markets)

A conceptual model used in the current study is the Torero's "Framework for linking small farmers to markets." It is based on the notion that smallholder farmers due to the small volume of their production leftovers are prone to more risk and transaction costs. Hence, any institutional innovation that links 'farms to markets' reduces their transaction costs and minimised risk will help farmers' access markets (Torero, 2011). Also, Torero found that there are a lot of variations among smallholders from country to country. There are variations from region to region within a country on infrastructure and institutions requirements for smallholders' markets access (Torero, 2011). This means that there are variations of infrastructure and institutions to adequately address challenges faced by smallholder farmers to enable them to go beyond subsistence farming of a village economy to actively participate in provincial, national and international markets. There are variations from region to region to region within a country on infrastructure and institutions requirements for smallholders' markets is access (Torero, 2011).

Consequently, the framework captures all the variations among smallholders in three groups in order to identify and prioritise the types of institutions and infrastructure that each different type of smallholder requires to achieve markets' access. These three groups include: a small group of farmers, which is competitive in world markets (rural world 1); another major group which is engaged in primarily provincial and national markets (rural world 2); and the final group, which has those who are marginalized

even from their provincial economy and operate locally at the village level (rural world 3).

In summary, the framework provides three dimensions in analysing smallholder farmers' access to markets: The heterogeneity of small farmers and, therefore, their specific bottlenecks in connecting to markets; the complementarities of investment in rural institutions and infrastructure (capital intensive and post-harvest technologies)

may have in market development and in reducing poverty, and the level of market accessibility. The framework is diagrammatically presented in figure 10.



Figure 10: Framework for linking smallholder to markets, source: Torero, 2015/

The current study used this framework as a conceptual model for data collection (especially during the selection of different smallholder farmers from different study locations in Ghana. This approach helped to capture all the variations among smallholders in the study areas. Besides, it offered a theoretical lens (Grant and Osanloo, 2014) on an aspect of the literature, such as the role of institutions in promoting market access for smallholder farmers.

2.13 Unlocking markets to smallholders

A theoretical framework adopted in the current study is based on a book by Schalkwyk, et al., (2012), titled 'Unlocking markets to smallholder: lessons from South Africa'. The book offers guidance and lessons on smallholder market access to students and scholars in the domain of agriculture, agricultural economics and regional development with a keen interest in how to improve the market access of smallholder farmers in South Africa and other African countries (Schalkwyk, et al., 2012). Most of the lessons discussed in the book are relevant to the current study, in particular, a chapter on 'Market access, poverty alleviation and socio-economic sustainability in South Africa' by Obi et al (2012) is similar to the current study, hence, most of the frameworks used in the book, such as market structure analysis (Van Tilburg, 2010) and framework of analysis (Van Tilburg, et al., 2012) fit well with the current study. Similarly, the study objectives 1 and 2, methodology and data collection and analysis were guided by some of the lessons in the book.

The authors, regarding unlocking markets to smallholders, realised that specific research objectives of smallholders' study can be categorised into three levels, namely the micro, meso, and macro levels. The micro-level research objectives seek to identify key production and marketing constraints faced by smallholders and the investigation of the degree of participation of these smallholders in both input and output markets. The current study fits into micro objectives as it is aimed at discovering

institutional innovations to address high transaction costs and risks affecting smallholder farmers' transactions with traders in the rural markets of Ghana.

The meso-level research objectives, unlike the micro objectives, are meant to determine the kind of farmer-based structures and institutions needed to empower smallholder farmers to address their constraints and to investigate the feasibility of governance systems that can be used in the supply chains of farm commodities produced by smallholders.

The macro-level research objective, on the other hand, is to recommend to stakeholders and policymakers how to improve the institutional and policy environment of smallholders (Obi, et al., 2012).

2.14 The market structure analysis framework

According to Obi, et al., (2012), in unlocking markets to smallholders, the framework that can be used in smallholder market access to analyse bottlenecks regarding market access is market structure analysis, developed by Tilburg (2010). This framework helps to assess whether there is a level playing field in markets, market integration analysis to assess the correlations in market price developments in spatially separated markets, exchange or transaction theory to assess what affects the outcome of a transaction between trade partners, and analysis of vertical coordination in the supply chain to assess opportunities for primary producers to improve their market access and to streamline the flow and quality of products between the stages of primary production and final consumption. The framework is shown in tables 1 and 2.

Theoretical construct	Theme	Specification
Spot market coordination Organisational economics	industrial organisation: market performance	market structure analysis market integration
Vertical coordination Marketing	coordination in the supply chain or distribution channel	ownership contractual network
Organisational economics	coordination through transactions or contracts	contracts in a weak institutional environment

Table 2: Mode of supply Chain governance in relation to theoretical constructs, source: Tilburg, 2010

Table 3: Bottlenecks to smallholders' market access, source: Obi et al, 2012

Bottlenecks at what level	Bottlenecks		
At farmers level	lack of resources lack of horizontal coordination or group action lack of institutional support		
At market level	entry barriers lack of market opportunities		
At supply chain level	 lack of proper vertical coordination with: the agribusiness processing sector the retail sector the export sector 		

The serious bottlenecks for smallholders are categorised into three: lack of access to resources, lack of horizontal coordination or group action, and lack of institutional support. At the market level, two types of bottlenecks for market access have been prevalent: market entry barriers and the failure to make use of market opportunities. Also, bottlenecks at the supply chain level are lack of proper vertical coordination with the agribusiness processing sector, retail sector and export sector (Obi et al, 2012).

2.15 Framework of analysis

There are structural constraints affecting smallholder farmers in many developing countries, including Ghana, and they are embodied in high transaction costs for information, contract negotiation or contract enforcement resulting in barriers to market access (Van Tilburg, et al., 2012).

According to Van Tilburg, et al., (2012:219), "Delgado (1999) postulates that smallholders require improvements in access to assets, information, services and remunerative markets – implying overcoming high transaction costs – if they are to contribute effectively to economic growth." It can be deduced from this postulation that smallholders in Ghana require improved access to assets, information, services and remunerative markets, in order to overcome high transaction costs and contribute effectively to economic growth. Also, the authors discovered that there are three governance modes in relation to the supply chain, and they are categorised by Delgado to three main vertical integration forms: the independent smallholder operators (IS), small operators linked by contract to processors or marketers (CF) and large commercial operators that tend to be specialised and somewhat vertically integrated (LF) (Van Tilburg, et al., 2012). The factors influencing market access by type of governance mode in the value chain are shown in table 4.

Access to	Independent small operators	Vertical coordination by contracts between small operators and processors/marketers	Vertically integrated large farms or plantations
Assets Improving personal competencies 	Inadequate		Dependent on the
		Included in the terms of the contract	rules and regulations in the value chain
Matching differences in scale and quality	By the assembly trade	Included in the terms of the contract	Same
Physical costs of access	Dependent on distance and transport availability	Part of the contract	Same

Table 4: Factors influencing market access by type of governance made in the value chain, source: An Tilburg, et al., 2012

Information	Usually not		
Sharing production and marketing information		Included in the terms of the contract	Dependent on the rules and regulations in the value chain
 Sharing information social about the relia mutual contract partners. 	Depends on bility of capital and trust	Concluding a contract implies a certain level of mutual trust	Same
Services		Part of the contract	
 Sharing the risks of service delivery 	No		Dependent on the rules and regulations in the value chain
 Response to supply Dependent chain dynamics in on suppliers' 		Can be part of the contract	Same
demand	opportunities and constraints		
Remunerative markets	6	By contract	
How well are markets Depends regulated?			Dependent on the rules and regulations in the value chain
 Overcome economies By the assembly trade of scale and quality problems 		Through proper planning of the contract partners	Same

This framework of analysis was used to determine specific value chain available to smallholder

farmers in Ghana, including factors affecting their market.

2.16 Vulnerability Assessment

This section looks at MARISCO vulnerability assessment of the farming community of the study areas in Ghana. It begins by briefly looking at the meaning of vulnerability and vulnerability analysis or assessment within the scope of MARISCO methodology. Definition of vulnerability

According to Hoogeveen, et al., (2004), the literature on risk, vulnerability, and poverty is broad and extensive. This shows that there is no explicit definition of vulnerability, but the following are some of the commonly used definitions for development related study:

Wisner, et al., (2004) define the term vulnerability as the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a hazard. Morchain and Kelsey (2016) provide an alternative definition closer to this sense, "the term 'vulnerability' in VRA comprises hazards, but also the capacities of people and the environment to respond, adapt and overcome these hazards." In fact, both definitions have something in common. They suggest that vulnerability involves the hazards of a particular group of people, and how they cope with them from the group characteristics.

On the contrary, Cannon, et al., (2003) define vulnerability as a way of conceptualising what may happen to an identifiable population under conditions of particular risks and hazards. This definition, unlike the former two definitions, introduces risks in addition to hazards, yet it does not look at how the group characteristics or prevailing factors can enable the group to overcome the risks or the hazards.

In view of the above, the term vulnerability can be explained in the current study as the ability of a group of people to cope and overcome risks and hazards associated with their livelihoods based on their characteristics. This working definition is in line with the basic formula in most of the literature on vulnerability concept (Moret, 2014):

Risk + Response = Vulnerability

Similarly, Pierre and Hobson (2014) observe that "vulnerability has to be understood and analysed systematically as a phenomenon of complexly interacting processes." They go to say "Stresses, threats and their contributing factors-whether climate change-related or not-cannot be understood in isolation." As mentioned earlier, vulnerability cannot be observed physically, hence analysing it systematically can identify variables (e.g. stresses, threats, and contributing factors) that can form interventions in order to address the hazards and associated risks.

2.17 Vulnerability and risk assessment methods

GIZ (2013) points out that "Vulnerability Assessments (VA) are methods that measure the vulnerability of an exposure unit or system, e.g. the vulnerability of a community or a natural system like watersheds or ecosystems." It goes on to say "VAs identify, quantify and prioritize the vulnerabilities of that system. However, the vulnerability

cannot be measured or observed directly. It has to be deduced with the help of various variables for estimating the physical exposure, the sensitivity, and the adaptive capacity." In view of this definition, it can be argued that the vulnerability of a group of people can be visible through their involvement in vulnerability assessment.

2.17.1 The risk analysis

The reason for undertaking risk and vulnerability analysis or assessment is to create awareness and knowledge for decision makers, including those in charge of operations involving threats, risks, and vulnerabilities, in order to identify a basis for their own planning (Eriksson and Juhl, 2012).

The concept of vulnerability analysis is applicable to various disciplines (GIZ, 2013), hence its application in the current study, additionally, it appears to be very popular in the climate change adaptation communities.

There is a range of vulnerability assessment methodologies (Moret, 2014), but the preferred methodology in the current study is the MARISCO method. According to Ibisch and Hobson (2015), MARISCO stands for "adaptive MAnagement of vulnerability and RISk at COnservation sites". They claim that "true to its purpose, MARISCO is structured in a way that allows for flexible and adaptable delivery to cope with situations that are often both widely different and continuously changing".

It seems that the ability to adapt this methodology to a range of settings is the basis for calling it "MARISCO situation analysis". Besides, it has been applied extensively to a wide range of situations, such as in the field of development cooperation and applied conservation research (Ibisch and Hobson, 2014). For example, it was used in Namibia to devise strategies for promoting the sustainability of George Mukoya Conservancy and Community Forest and Muduva Nyangana Conservancy and Community Forest, in order to improve the livelihood of the local community, including smallholder farmers' activities.

The values of the participants represented in the current analysis reflected institutional innovations likely to promote a reduction in high transaction costs and market access for smallholder rural farmers in Ghana. Thus, its usage in the current study can help to close the knowledge gap in using MARISCO's methodology application in addressing agricultural marketing problems, such as the impact of high transaction costs on market access.

Additionally, smallholder farmers required risk and vulnerability assessment in order to improve their livelihoods and minimise hazards they are exposed to. Eriksson and Juhl (2012) found that the Vulnerability and Risk Assessment (VRA) amplify awareness and knowledge for decision makers and others in charge of operations of threats, risks, and vulnerabilities within their own areas of operations, as well as create a basis for their own planning.

Similarly, VRA methodology fosters a common understanding among a wide range of stakeholders about the main hazards and issues affecting people in a particular social-ecological landscape or a setting. These stakeholders eventually come together to design strategies likely to reduce risk, enhance well-being and promote resilient development in that setting or landscape (Oxfam GB, 2016).

Internationale Zusammenarbeit (GIZ, 2013) mentions that there are three approaches to vulnerability analysis, namely, top-down, bottom-up and integrated. The current study is an example of bottom-up approach as the unit of analysis is much smaller and more localised; the majority of the participants came from farming communities, which is one of the characteristics of bottom-up approaches (G1Z, 2013). GIZ further observes that "bottom-up approaches typically, but not necessarily, use other sources of data for instance from participatory processes. Participatory here means that the people are not only the subject of interest in the assessment. They also provide data and assist in analysing it. Such a process also assists in integrating local knowledge into planning."

The current study adopted a bottom-up approach to the vulnerability analysis, which is discussed in detail under the MARISCO design in the following section.

2.18 The conclusion of the literature review

The discussion in this chapter probed into the academic literature of the relative importance of institutional innovations in reducing high transaction costs and risks between smallholder farmers and traders in rural markets of Ghana, to promote market access. It began by looking at the concept of transaction costs, institutions, innovation, institutional innovations, transactions risks, including enabling environment for institutional innovation. In addition, the review looked at the differences between institutions and organisations, lessons of successful institutional innovations for smallholder farmers, possible institutional innovations, innovation, innovation system approach and agricultural innovation platform. The chapter ended by looking at characteristics of smallholder farmers, existing conceptual model and theoretical framework.

First, it was revealed from the literature review that there is no consensus on the definition of transactions costs and this presents ambiguity in its application. Yet, the central theme in many definitions on transaction costs generally sees it as costs associated with the act of exchanging ownership rights of economic assets. Also, high transactions costs have a range of sources, such as the cost of information search

and monitoring, coordination, arbitration, definitions of property rights, changing of institutional arrangements, decision, policing and enforcement of contract costs. In terms of its effects, it was brought to light that high transaction costs can impede smallholder farmers' access to better-paying markets, and the results can lead to entrenched poverty as smallholder farmers are forced to accept low prices for their produce in their market participation.

In the case of Ghana, it was discovered that overall little is known in the literature about the effects of high transaction costs on smallholder agriculture in Ghana especially on impacts on smallholder farmers and traders in rural markets. However, it was revealed that a lack of information or asymmetry of information is a problem in smallholder agriculture in Ghana. This problem causes 'low-level equilibrium poverty trap' (Doward et al., 2003; Maumbe and Okello, 2013), which locks up smallholder farmers into subsistence production, imperfect markets and trade in low volumes. It further prevents smallholder farmers from cultivating a range of crops, prevents diversification from producing 'low value 'staples food into 'high-value crops'. Consequently, it can be argued from the findings that high transaction costs can prevent smallholder farmers in rural markets in Ghana from commercialisation and market participation.

In addition, transaction risks, unlike transaction costs, are not widely discussed in the literature. Four categories of transaction risks were discovered in the literature search and they include natural shocks, price risks, economic coordination risks and risks of opportunism. In fact, all four categories of transaction risks can affect smallholder farmers and can easily lead to transaction failure. Consequently, the purpose of institutional arrangements or institutional innovations is not to minimise transaction

costs, but rather to minimise transaction risks encountered by parties in an exchange (Dorward and Kydd (2004). Moreover, it was discovered that any costs incurred to address market failures from transaction risks will lead to high transactions costs. In view of this, both it was observed from the review that transaction costs and transactions risks are closely linked together. Again, it was revealed that poor rural areas face two major types of transaction risks namely, coordination and risks of opportunism, hence smallholder farmers in rural Ghana are likely to experience both types of transaction risks in their market interactions.

Additionally, there is a lack of an agreement on the definition of the institution, although, it has a wider application in the literature. Thus, it can be interpreted differently by different actors. However, the lack of consensus in the application of the term risks ambiguity. North (1990) definition stood out among all the definitions of institutions. Furthermore, some authors defined institutions around North's definition. He explains institutions as formal rules, informal constraints (norms of behaviour, conventions, and self-imposed codes of conduct), and the enforcement characteristics of both. It was revealed from the literature review that institutions play a crucial role in the livelihoods of smallholder farmers. It can either present a constraint or enable the behaviour. Moreover, some authors believe that a constraint associated with institutions can open up possibilities: it may enable choices and actions that otherwise would not exist. In addition, it was discovered from the literature review that an institution can lead to changes in transaction costs, management of risk, the creation of social capital, enabling collective action and redressing missing markets. As a result, it improves market access for smallholder farmers.

Nevertheless, state institutions for the agriculture sector in some Africa countries, especially the poorest countries, were discovered to be weak. In view of this, smallholder farmers face a range of institutional constraints associated with their access to input and output markets, to credit and information, and to technical assistance and innovation options, including lack of enabling institutions. In view of this, institutional innovations are required to effectively address high transaction costs existing between smallholder farmers and traders in rural markets of Ghana.

Also, there are contrasting views on institutions and organisations. Some authors treat institutions and organisations as the same concepts. However, much of the literature convincingly shows that institutions and organisations are different concepts. Institutions are the rules of the game, while organisations are seen as the players and the interaction between the two shapes of institutional change.

In terms of the definition of smallholder, much of the literature uses farm size of fewer than 2 hectares to define smallholder farmers in Africa. Since most smallholder farmers in Ghana operate on farms smaller than 2 hectares, the definition is particularly appropriate for smallholder farmers in Ghana.

Also, the literature review has pointed out that smallholder farmers are faced with a lot of challenges that prevent them from market access. In other words, the problems affecting market access are multifaceted in nature. For example, African smallholder farmers group (ASFG, 2015) lists among the challenges that smallholder farmers in Africa face the unsecured rights to land and natural resources, lack of access to quality inputs and financial services, inadequate support from research and extension services, and high transaction costs associated with poor rural infrastructure. However, none of the literature discussed transaction costs and risks, institutions or institutional innovations on smallholder farmers' challenges in the current study offered a feasible solution likely to address the above multifaceted and interconnected problems.

Furthermore, Hubbard (1997) concludes that one of the weaknesses of transaction costs analysis is its inability to assess the impact of institutions on the market. It only offers tools for examining the impact of the market on contract. It is therefore not a surprise that ASFG sees it as fit for contract analysis.

Additionally, climate change is seen as another important factor affecting agricultural productivity (Pedercini, et al., 2012). Increasing temperatures and decreases in water availability tend to affect potential yields for most crops. Similarly, Glatzel (2015) realises that increasing temperatures imply more extreme weather events that will put lives and livelihoods at greater risk, increasing smallholders' vulnerability to drought, famine, and disease. He goes on to claim that "climate change affects not only yields, but also food quality and safety, and the reliability of its delivery to consumers."

Consequently, an alternative method is required to assess the viability of existing institutions and other range factors impacting on smallholder farmers' market access in rural parts of Ghana. One of the approaches identified in the current study with a potential of addressing other challenges besides transaction costs and risks affecting smallholder farmers is "risks vulnerability analysis." This approach can help to discover the root cause of most smallholder farmers' problems. The detailed discussion and specific vulnerability analysis (MARISCO) adopted in the current study can be seen in part II of the methodology.

The gaps discovered in the literature in relation to the current study are summarised as follows:

- How high transaction costs affect smallholder and traders in rural markets in Ghana are unknown in the literature.
- Transaction risks can lead to market failures, yet little is known in the literature about the impact of transactions risks on smallholder farmers especially in their interaction with traders in rural markets.
- 3. Institutional innovations were discovered to be an effective way of addressing high transaction costs. However, little is known from the literature search on how institutional innovations can reduce high transaction costs between smallholder farmers and traders in rural markets of Ghana.
- The innovative public and private institutions' role to reduce transaction costs and risks, and alternative sources of livelihoods to benefit smallholder farmers.

Consequently, the current study intended to address the above gaps. The outcome of this study could benefit future studies on smallholder agricultural markets. It could help to discover specific institutional innovations likely to address high transaction costs and risks affecting smallholder farmers market access in rural parts of Ghana.
3 Methodology

3.1 Introduction:

This chapter describes the study locations, research design, research strategy, data collection instruments used, including sampling techniques and sample sizes. It further discusses the statistical procedures adopted to analyse the data, MARISCO vulnerability analysis and limitations of the methodology. The chapter concludes with an overview of some of the ethical considerations linked to this study.

3.2 Research setting (The study location)

The study was carried out in Ghana in West Africa. This country is situated on West Africa's Gulf of Guinea, a few degrees latitude north of the Equator, hence, it has a warm (or a tropical) climate. Due to its position along the eastern edge of the North Atlantic Ocean and associated ocean currents, and the Sahel, its climatic conditions vary slightly from many West African countries. The eastern part of the country has rain forest that exhibit both wet and cool weather conditions compared to the northern part of the country, which has a hot and dry climatic condition for several months annually.

A map of West Africa showing Ghana's position in the West Africa sub-region is shown in figure 11:



Figure 11: Map of West Africa, source: Cambridge Graduate University, 2013

Moreover, the country has two major seasons, the wet and dry seasons. The wet season is a time of the year when the country experiences strong thunderstorms, heavy rain, wind gusts, and lightning. The dry season, on the other hand, is the time of the year characterised by very hot and humid in the South and very hot and dry in the Northern part of the country. In addition, temperatures vary throughout the year, ranging from 23°C and 31°C.

The heavy rains start in April and continue into June and July. The rainfall starts again between September and October in the Southern part of the country. In addition, it experiences drier weather around December and January. This is known as harmattan; the dust-laden wind carried down from the Sahara to the country. The severity of the above seasons varies from year to year (PSU-Ghana, 2011). Agriculture is seen as the backbone of Ghana's economy as discussed earlier during the literature review. It contributes more than 30% of the total GDP and appears to be the main source of income for rural dwellers (Diao, 2010). Currently, the country is the second-largest producer of cocoa and supplies about 15% of the world market.

In addition, Ghana is seen as the gateway to West Africa, as reflected by its strong GDP growth and increasing oil production volumes, political stability, and democracy (Gorjão, 2013). In view of the above, Ghana is arguably the most suitable country for the current study.

3.2.1 The agriculture sector in Ghana

The agriculture sector of Ghana is dominated by smallholders, and the majority of the farmers use family labour. Also, they tend to employ basic technology in their farm activities and contribute to about 80% of Ghana's total agricultural output. It is estimated that about 2.74 million households operate a farm or keep livestock. According to the 2000 census, 50.6% of the labour force, or 4.2 million people, are directly engaged in agriculture. About 90% of farm holdings are less than 2 hectares in size. Larger scale farms and plantations produce mainly oil palm, rubber and coconut and to a lesser extent, maize, rice and pineapples. Agricultural production is generally dependent on rainfall, although an estimated 6,000 farm enterprises nationwide were using some means of irrigation in 1999. In 2002, the total area under formal irrigation was around 11,000 hectares whereas the potential area – including inland valleys – that could be 5 developed for irrigation is estimated at 500,000 ha. The Ghana Irrigation Development Authority (GIDA) in 2000 identified 32,000 hectares of under-developed inland valleys throughout the country that could benefit from

moisture improvement technologies for food production. Ghana produces 51% of its cereal needs, 60% of fish requirements, 50% of meat and less than 30% of the raw materials needed for agro-based industries. Production of roots, tubers and vegetables such as tomatoes and onions, the most widely used staple food crops, is rather erratic and vacillates between scarcity, sufficiency and glut, depending on the vagaries of the weather. Agriculture continues to contribute the largest share to the Gross Domestic Product (GDP), even though the share of the sector in national output declined from 44% in 1990 to 37% in 2005. Since 2000, the contribution of agriculture to total GDP has varied between 35.8% and 37%. Agricultural growth increased from about 4% in 2000 to 6% in 2005 but much of the recent growth has been stimulated by the cocoa industry.

3.2.2 Agriculture development policy (the FASDEP II)

This section discusses some measures the government of Ghana has introduced to improve agricultural productivity in Ghana, which is also known as the Food and Agricultural Development Policy version II (the FASDEP II). Also, this section assesses the implication of the policy on smallholder farmers.

The FASDEP II is based on previous policies, namely: the 2002 FASDP I and the 1996 Accelerated Agricultural Growth and Development Strategy. The FASDEP II emerged from stakeholder consultations (Sharma, 2009). In view of this, FASDEP II is a revised policy or improvement of the previous agriculture policies. Also, unlike the previous policies, it focuses on the sustainable utilisation of all resources and commercialisation of activities in the sector with market-driven growth in mind (MoFA, 2007). In addition, it is meant to create a conducive environment for all categories of farmers' activities, while targeting poor and risk-prone and risk-averse producers (MoFA, 2007). It seems the latter aim could improve the livelihoods of smallholder farmers in rural parts of Ghana compared to the former. Furthermore, Sharma (2009: 157) points out that, "The main building blocks of the new strategy [under FASDEP II] will be commercialisation of agriculture, linking farmers to markets through value chains, value addition at every stage, private sector-led provision of inputs and services, and food security and social protection." She goes on to say, "There is also a strong recognition of the food sector, in view of its large linkages and multipliers throughout the rural economy and beyond."

Overall the FSADEP is looking more promising especially so far as smallholder livelihood improvements are concerned. For example, Sharma (2009:158) discovers that it "rejects the past model of public sector-led provision of inputs and services in favour of the private sector-led provision, with the government facilitating the process." Also, the approach could help to prevent the past experience from repetition itself whereby private sector was not well engaging, the government needs to do more to bring the private sector players on board, hence facilitating the process in the FSADEP II (Sharma 2009).

3.2.3 Study locations in Ghana

The study took place in two Regions (Ashanti and Brong Ahafo) of Ghana. The towns and villages selected under Ashanti Region for the study include Akumadan, Daban, Gyinase, Karikari farms and Kumasi-Tanoso (UEW-K Campus). With the exception of Akumadan, all the study areas in Ashanti Region are suburbs of Kumasi (the second city of Ghana). Also, the towns and villages selected under Brong Ahafo for the study include Asueyi, Aworowa, Tanoso, Tuobodum and Oforikurom. All the towns and villages are not far from Techiman (the second capital city of Brong Ahafo Region). The study locations are shown in table 5.

Brong Ahafo Region	Ashanti Region
Asueyi	Dabaa
Aworowa	Akumadan
Tanoso	Gyinase
Tuobodum	Gyinase-Karikari farms
Oforikurom	Kumasi-Tanoso (IPT), University of
	Education Winneba, Kumasi Campus

Table 5: The study locations in Ghana

The specific reasons considered before choosing the study locations are as follows: Both regions have many rural farming communities. Moreover, Kumasi and Techiman are among the few cities in Ghana with large open markets for rural farming communities. These markets are accessed by traders (mostly market women) from local, national and some member countries of the Economic Community of West African States (ECOWAS), such as Togo, Benin, Cote D'Ivoire, Burkina Faso and Mali. Additionally, the Ministry of Agriculture (MOFA, 2015) classified Techiman's open market as an international market as it is very popular in Ghana and West Africa as a whole. Furthermore, farming is the main occupation of the people living in towns and villages selected for the current study. For example, farming constitutes about 94.4% of households in towns and villages near Techiman (Ghana Statistical Service, 2014). In view of this, the Techiman market is the main market for many smallholder rural farmers in the Brong Ahafo Region. The farmers constantly engage in market transactions with the traders (market women, also known as "market queens") across the country and with traders from neighbouring countries.

Similarly, Kumasi is regarded as the commercial capital of Ghana, with the largest open-air market in West Africa (Devas and Korboe, 2000). Additionally, as the second city of Ghana, it is more urbanised than Techiman. As a result, it attracts most sales of agricultural products for the sub-region (MOFA, 2015). Many smallholder rural farmers in this location can be classified under Rural World 2 under the framework of linking small farmers to markets (Torero, 2011).

Figure 12 is the map of Ghana showing both Brong Ahafo and Asanti Region. Also, the specific study locations within both Regions are a highlight in red in table 12 and 13



Figure 12:Map of Ghana, source: UN Cartographic section 1



Figure 13: Map of Brong Ahafo showing study locations in Techiman, Source: Techiman Municipal Assembly (2011)

3.3 Research design

Obi, et al., (2012) argue that there are three main research designs for smallholder farmer studies. These include welfare optimisation of producers, analysis of smallholder farmers' market access and institutional analysis. The current study combines the second and third designs in order to address the research objectives discussed in the introduction.

Consequently, the current study adopted a mixed-method case study approach. According to Johnson et al., (2007:1230):

"Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration."

Also, there are advantages for choosing a mixed method over other research designs in the current study. For example, the combined elements of both quantitative and qualitative research methods can help to draw from the strengths of both approaches (John, et al., 2007). Besides, by using the integration of both quantitative and qualitative methods, a study can be benefited from additional information, whereas information obtained from only one method was found to be insufficient. Additionally, the approach could help to obtain divergent views of the phenomenon (Chang, 2006). Therefore, it was found to be the best method to identify the root cause of high transaction costs and risks in the market interactions between smallholder farmers and traders in rural agricultural markets in Ghana. Furthermore, the rationale of using a case study as the main research design is that it constitutes an empirical investigation of a contemporary phenomenon within its natural context using different sources of evidence (Yin, 2003). Indeed, this approach is known to be particularly valuable and the best design for investigating important issues not easily covered by other methods. Specifically, it is also known to be the best design when a situation needs an in-depth understanding or when intensive examination of the setting is crucial to the findings (Yin, 2014; Bryman, 2001). The current study met all the above criteria, hence it was deemed to be the most suitable research design.

Additionally, the study was expected to prove most effective due to benefits associated with the approach, such as comparative flexibility, contextualisation and data credibility (Baxter and Jack, 2008, Yin 2003). For example, the flexible nature of a case study design allows it to be a useful design for either a qualitative or quantitative study, or a mixture of both quantitative and qualitative research also known as mixed methods (Cavaye, 1996; Bryman, 2001; Yin, 2004). Stake (1998) suggests that what is important to case study research is the objective of the study or a case under investigation instead of the methods of investigation, even though other case study researchers, such as Yin (1994), rather pay more attention to the methods and techniques that together constitute a case study.

The specific case study type employed in this research is the "critical case" since the study had a hypothesis prior to the data collection. In addition, it is an optimal case study design for investigating more than one study sites for the purpose of examining a situation with little or no interest in generalisation. Furthermore, it is a useful approach for answering cause and effect questions (Bronwyn, *et al.*, 2016).

3.4 Research Strategy (mixed methods)

The research strategy adopted considering the mixed method approach used is a triangulation. It is known to be one of the four mixed methods designs (Creswell and Clark, 2007). Also, it is the best approach for promoting the validity of evaluation and research findings (Mathison, 1998; Johansson, 2003). Besides, it can help to overcome intrinsic biases (measurement bias, sampling bias and procedural bias) and other problems associated with a single research method (Yeasmin and Rahman, 2012).

Additionally, triangulation is based on a principle used in social research to explain how viewing something from more than one viewpoint can facilitate an understanding of a situation (Denscombe, 2007). Hence, it is an optimal strategy to generate data from participants (various stakeholder groups) in both study areas (Brong Ahafo and Ashanti Regions) to understand the specific institutional innovations likely to reduce high transaction costs and risks associated with smallholder farmers and traders' interactions in Ghana.

Also, methodological triangulation was an approach chosen out of a range of triangulation approaches. This approach refers to the use of more than one method for gathering data. The approach can be classified further under 'between' and 'within' (Hussein, 2009; Denzin, 1970). The 'within' approach of triangulation uses one method with different strategies within it. The 'between' approach, however, combines both qualitative and quantitative methods in a single study. The current study uses the latter to collect relevant data from a range of sources to answer the research questions.

3.5 The positionality of the researcher

According to Qin (2016), "Positionality is the practice of a researcher delineating his or her own position in relation to the study, with the implication that this position may influence aspect of the study, such as the data collected or the way in which it is interpreted."

In view of this, Merriam et al., (2011:405) explain that "All researchers begin data collection with certain assumptions about the phenomenon being investigated, situations to be observed, and people to be interviewed." They go on to say, "The more one is like the participants in terms of culture, gender, race, socio-economic class and so on, the more it is assumed that access will be granted, meanings shared, and validity of findings assured." In view of this, a researcher can be either insider or outsider (Flores, 2018; Merriam et al., 2011; Ritchie, et al., 2009); in the current study, I assumed both positions. In relation to smallholder farmers who participated in the study, I was an insider based on my cultural background as I was born and lived in Ghana until I finished my undergraduate degree. In addition, I have family members living in Techiman. In view of this, many smallholder farmers and market women especially in Techiman trusted me and did not see me as a stranger. In fact, this helped me to gain access and more participants for the study. However, I approached the interviews with smallholder farmers from an outsider perspective to enable me to collect relevant data to address the study objectives. Flores (2018:7) advises that "Although you may feel that you share much in common with your participants, you are still an outsider who is conducting research and writing about them." Also, this approach helped me to avoid a bias in the data collection.

In terms of key informants' interviews, most of the participants saw me as an outsider especially those with leadership positions. Furthermore, many public organisational heads had a low level of trust for me and did not see me as a PhD student born and raised in Ghana. In fact, many of them do not carry out their duties without transparency due to corruption. In view of this, many of them found the study to be a threat to their jobs, even though, it was clearly written in the consent form that no participant will be affected from the study. As a result, some of them refused to participate in the study.

3.6 Sampling Design

The sampling technique used in this study is a "Mixed Purposeful" sampling. It is a combination of more than one sampling strategy for selecting participants for a research investigation. It helps to compare the outcomes emerging from both samples (Onwuegbuzie and Collins, 2007). The specific sampling strategies employed in the current study were a combination of probability and non-random sampling strategies. They include simple random and purposive sampling techniques respectively.

First, the Ministry of Agriculture (MOFA) offices in both study locations were contacted with consent forms. Two extension officers, one from each study area, volunteered to contact the small farmers and helped to arrange dates for the interviews with farmers belonging to co-operative societies and those outside co-operative societies. The above approach was meant to ascertain whether a membership in farmer co-operative influence high transaction costs and risks in smallholder market transactions. The farmers contacted agreed to participate in the study. However, it was ultimately discovered that most of them, about 85%, had no membership of any farmer association.

In order to avoid selection bias, an attempt was made to contact an NGO working with smallholder farmers in both study locations. The director of the NGO contacted the leaders, or "gatekeepers", of some farmers' associations directly and explained the purpose of the study and arranged possible dates with them for the interviews. All of the association members were willing to participate in both quantitative and qualitative studies.

Consequently, a simple random sampling technique was used to select participants (smallholders) from both farmers' associations and those without any association memberships. This approach ensured that all smallholder farmers in the study area have an equal and independent chance of being included in the study (Jawale, 2012). Also, it was hoped that the above sampling technique will minimise bias from participants' responses. One hundred and thirty-two smallholder farmers were selected from Techiman Municipal and Kumasi Metropolitan Assemblies respectively for the quantitative study.

Also, ten market women were selected randomly from both TMA and KMA to participate in the study. Five out of the ten participants were interviewed face-to-face with questionnaires at the open market. The remaining four participants were interviewed at farmgate in TMA and KMA respectively.

In terms of the qualitative study, a purposive sampling technique was used to select the key informants (participants) for both key informants' interviews and focus groups discussions. Purposive sampling techniques are mostly used in qualitative (QUAL)

studies. It can be explained as selecting units of study (such as individuals, groups of individuals, institutions) based on specific purposes associated with addressing a research question (Teddlie and Yu, 2007; Dolores, 2007). In addition, a purposive sampling technique offers an initial understanding of the situation under investigation, and a way to identify and differentiate the needs of one or more relevant groups (acaps, 2011). The above is the main reason for choosing purposive sampling.

The participants of the qualitative study comprise of MOFA members of staff, employees from the NGO, traders (middlewomen), the executives of farmers' association's executives and employees from a financial institution and agronomists. In total, forty-five participants took part in the study. Ten participants took part in two separate focus group discussions, and thirty-five participated in key informants' interviews.

3.7 Data collection

This section discusses the data collection specific tools used for collecting both quantitative and qualitative data from the participants. It will initially look at the approach used for the quantitative data. The section ends by looking at the approach used for qualitative data collection.

The study was a cross-sectional study, and all the participants were engaged in the study at the same time. Thus, the concurrent (or parallel) mixed method design was adopted, where qualitative and quantitative (QUAL and QUANT) data collection methods were conducted alongside one another.

The combination of qualitative and quantitative approaches in case study designs is very popular, even though using both approaches is not free from challenges regarding quality, standards, applicability, consistency, and neutrality (Johansson, 2003). In order to minimise the challenges, a pilot study was carried out prior to the study. The specific quantitative and qualitative approaches used in the study can be seen in the timeline of the data collection in table 6 and table 7.

Table 6: Timeline of field data collection in Ghana in August 2014, Source: Author

Travel from the UK to Ghana										
Given out of consent forms to gate keepers in the Brong Ahafo and Ashanti Regions of Ghana										
Meeting with gate-keepers										
Training of 3 research assistants										
planning of interviews in both Brong Ahafo and Asanti Regions.										
Aug.2014	23 th	24 th	25 th	26 th	27 th	28 th	29 th	30	31 th	31 st

Table 7: Timeline of data collection in September 2014, source: Author

Interviews of smallholder farmers in Asueyi															
Key informants' interviews in Techiman MOFA office															
Smallholder farmers interviews in Tanoso															
Focus group discussion with traders in Techiman															
MARISCO vulnerability analysis meeting (day 1 and 2) in Tuobodum with participants from both Brong Ahafo and Asanti Region.															
Smallholder farmers interviews and focus group discussion in Tuobodum.															
MARSICO vulnerability analysis (day 3) and smallholder interviews in Akumadan															
Smallholder farmers interviews in Oforikurom															
Smallholder farmers and traders' interviews in Kumasi-Tanoso (IPT)															
Smallholder farmers and key informants' interview at Gyinase															
MARISCO vulnerability analysis at Gyinase/Gyinase Karikari farms															
Smallholder farmers interviews at Gyinase-Karikari															
Smallholder farmers interviews at Dabaa															
Key informants' interviews at Dabaa															
Cleaning of the data and editing field data collection notes															
Sept. 2014	1 st	2 nd	3 rd	4 th	5 th	6th	7th	8 th	9 th	10 th	11th	12 th	13 th	14 th	15 th

3.8 Quantitative data collection

The quantitative data was collected from smallholder farmers and some traders (market women) in a questionnaire survey. A face-to-face interview approach was used to interview the participants on the spot. The above approach proved to be labour intensive, yet it is known to promote high-quality data collection as the interviewer can explain certain questions the respondents find difficult to answer (Mathers, et al., 2007; Phellas, et al., 2011). The face-to-face approach used to interview participants did not only elicit answers to the questionnaires but also encouraged high participation since most of the participants had little or no education, thus explaining the questions face-to-face was a form of motivation for the participants.

Similarly, closed-ended questions were used on the questionnaires to encourage high participants' involvement in the study. Generally, smallholder farmers and traders tend to be very busy people, and many of them deemed it difficult to complete questionnaires at their own pace if open-ended questionnaires were used.

Above all, the questionnaires were tested in a pilot study as discussed earlier. This helped to assess the viability of the close-ended questions used on the questionnaires. Besides, it was the best way to predict the success or failure of the main study. Additionally, it revealed specific questions with which participants had difficulty. In view of the above, the pilot study was deemed highly recommended before the main study (Teijlingen and Hundley, 2002). For example, many smallholder farmers, who participated in the pilot study asked for an explanation of terms such as transaction costs, hence those terms were clearly explained in the actual study.

The questions used in the questionnaires were also categorised according to themes of which there were 12 in total and they included examples such as (provide examples of themes) purposely devised from the research objectives and questions. This approach helped to gather relevant data from the participants in relations to all the research objectives. A full list of the 12 themes is provided in Appendix 2. Samples of questionnaires used in the study can be seen at appendix 2.

3.9 Qualitative data collection

Driscol, et al., (2007) found that "The qualitative data provide a deep understanding of survey responses, and statistical analysis can provide a detailed assessment of patterns of responses." In view of this special attention was given to the qualitative data collection.

The sources of the qualitative data component of this study were based on the input of the key informants in the key informants' interviews, focus group discussions for traders and vegetable growers' association and vulnerability analysis.

First, the semi-structured interviews began after the gatekeepers were contacted with consent forms and agreed on interviews dates in both study Regions. The first key informant interview was conducted in Techiman immediately after smallholder farmers' interviews in Asueyi. Other dates devoted to key informants' interviews can be seen in table 5.

The semi-structured interviews used to generate information from the key informants are known to offer a degree of uniformity from all interviewees (Thomas, 2009). Hence, it was adopted as the best interview approach in the study to get similar responses to the research questions across all participants. The participants for the key informant interviews include executives of farmers' co-operative societies, agents (or traders), Ministry of Agriculture (MOFA) and NGOs in both study areas (Kumasi and Techiman). Another reason for choosing this approach was that, unlike structured interviews, they permit the interviewer to be flexible on the order of the questions, or topics covered in the interviews. This encourages the interviewee to develop ideas and speak more widely on issues raised by the investigator (Denscombe, 2008).

Moreover, open-ended questions were also used in the semi-structured interviews. This gave the participants freedom to reply in whatever way they wished to express their views on the research questions. Moreover, face-to-face interviews were adopted to gain a clear understanding of the respondents. It gave them an opportunity to ask for clarification on questions they found to be too technical.

In the same manner, one focus group discussion with five participants was organised for market women (traders) in Techiman Market. Another focus group discussion with 5 participants was organised for some executives of the Vegetable Growers Association for Brong Ahafo and Asanti Regions prior to the vulnerability analysis. The focus groups discussions were intended to explore the research questions in more detail, in order to understand how the research problems can be addressed through MARISCO vulnerability analysis.

Also, MARISCO vulnerability analysis was used to engage different stakeholders in a form of focus group discussions in different locations in the Brong Ahafo and Asanti Regions of Ghana. The MARISCO vulnerability approach is known to be a useful tool for exploring attitudes and feelings and for highlighting issues that have not been surfaced. This strategy is effective when dealing with a group ranging from six to

twelve stakeholders (Preskill and Jones, 2009). Hence, it was organised in the form of focus groups in both the Brong Ahafo and Ashanti Regions with 12 participants for each session.

The MARISCO vulnerability analysis helped to elicit qualitative information on the impact of high transaction costs on smallholder farmers, institutional innovations to address high transaction costs, marketing challenges, environmental challenges and other external environmental factors affecting smallholder farmers in the study areas and in Ghana as a whole. The detailed information on how MARISCO vulnerability was organised, interpreted and analysed can be seen on pages 157 to 160 and 260 to 268, including the gap analysis spreadsheet attached to the back of this dissertation report.

Last of all, since the concurrent mixed methods approach was adopted in the current study, all the data collections methods were carried out simultaneously. This is can be seen in figure 15.

The quantitative (QUAN) was collected through smallholder farmers and traders' questionnaire interviews with closed-ended questions, while qualitative (QUAL) data was collected through key informants' interviews with semi-structured (contained both opened and closed-ended questions) questionnaires and MARISCO vulnerability analysis. All the dataset was analysed simultaneously within the same timeframe. The final analysed data were converged during the analysis and interpretation stage.

The diagram below summarises research design adopted:



Figure 15:Concurrent (or parallel) design Source: Creswell, 2003

The quantitative (QUAN) was collected through smallholder farmers and traders' questionnaire interviews with closed-ended questions, while qualitative (QUAL) data was collected through key informants' interviews with semi-structured (contained both opened and closed-ended questions) questionnaires and MARISCO vulnerability analysis. All the dataset was analysed simultaneously within the same timeframe. The final analysed data from quantitative and qualitative sources were converged during the analysis and interpretation stage.

3.10 Data analysis

There are many processes a researcher can use to integrate both quantitative and qualitative data. The current study used integrative data analysis in order to meet the criteria for concurrent (or parallel) mixed method design. Again, integrative data analysis strategy was found to be the best approach to fairly address various aspects of the study. A success story of this approach can be found in a study carried out by Larner, et al. (1987). They applied an integrative data analysis strategy in their implementation evaluation study, whereby different methods were employed to assess different aspects of program implementation (an expansion purpose).

The study analysed the qualitative data by using" quantitising" or quantifying the openended responses. The term quantitising refers to the process used to transform coded qualitative data into quantitative data (Driscol, et al., 2007; Tashakkori and Teddlie 1998). This was done by dummy coding, or binarising (Keith Wurtz). This is where codes are assigned to the responses or variables.

3.11 Analysis of quantitative and qualitative data

The data generated from the questionnaire survey with closed-ended questions (quantitative part) were initially cleaned to ensure that it is free from errors, including gaps that could contribute biases.

The cleaned data was finally coded with numbers for the responses and various variables used in the study. The coded responses were entered into SPSS (statistical software).

The qualitative data from the key informants' interviews were cleaned in the same way as the quantitative data. This helped to ensure that all questions were answered as expected.

Further to the above, categories (themes) were created from the data on a spreadsheet. The data was coded on the same spreadsheet for the final interpretation stage (consolidation). The process is known as "quantitising", which means quantifying the open-ended responses. This was done by dummy coding (binarising).

3.12 Data transformation and consolidation

It is known that the quantification of qualitative data makes it easy to compare quantitative results with the qualitative data (Creswell, 2003). In view of this, all the coded quantitative data in SPSS was imported into Excel (spreadsheet).

The data from smallholder farmers and key informants were merged (or consolidated). Caracelli and Greene (1993) mention that consolidated data can be expressed either as quantitative or qualitative for further analysis. In view of this, both data sets (key informants and smallholder farmers) were merged for further analysis through the Principal Component Analysis (PCA). This is a multivariate technique designed to interpret data from observations that is described by several inter-correlated quantitative dependent variables. Most of the goals for running the PCA were discovered to be crucial to the current analysis, hence, it was chosen out of various statistical methods for the final analysis, in order to address the research problem appropriately. Examples of PCA goals highlighted by the current study include the extraction of the important information from the dataset, such as correlations, or similarities as points in maps; simplification of the description of the data set; keeping of important information in the data set and analysis of the structure of the observations and the variables (Abdi and Williams, 2010).

The PCA results rendered a clear picture of the research problem and easily lend themselves to a MARISCO Vulnerability analysis.

3.13 MARISCO Situational analysis

this section discusses how MARISCO was conducted in the current study with stakeholders, such as smallholder farmers, key informants (extension officers, executives of farmers' co-operative) and market women (traders) in both study areas in Ghana.

MARISCO situation-analysis method uses four interrelated phases, namely: preparation and initial conceptualisation, systemic vulnerability and risk analysis, implementation and (non-) knowledge management, comprehensive evaluation prioritisation and strategy formulation with several steps, which are normally handled by the team of coaches, organisers and the participants of the workshops (Ibisch, et al., 2015). The current study, however, customised these steps to the findings to better address the aim and objectives of the study.

Again, another reason for the customisation of the traditional MARISCO methodology in the current study is that conservation of natural resources is not the main aim of the current study. MARISCO was originally designed for conservation issues (see Ibisch and Hobson, 2014). In view of the above, some of the phases of MARISCO methodology were less relevant to the current study. Besides, as mentioned earlier MARISCO is called situational analysis (Ibisch and Hobson, 2015), hence, it is easily adapted to every setting, including the current study. The current study MARISCO approach took a form of focus groups discussions and step-by-step followed is discussed below:

In the current study, the MARISCO design followed the four steps used conducting VRA, as identified by Morchain and Kelsey (2016). Moreover, the approach adopted is very similar to focus group discussions. All four steps are discussed below:

The first step is "the initial vulnerability assessment (IVA)". This step enables the Knowledge Group to analyse the exposure and sensitivity of a social group or a livelihood activity with respect to relevant hazards and issues. The second step is "the impact chain exercise (ICE)". This step helps the Knowledge Group to determine the impacts of hazards and issues and their implications over time, through mapping of their impacts throughout the system. The third step is "the adaptive capacity analysis (ACA)." This step allows the Knowledge Group to explore further the measures to reduce vulnerability identified in step 2 (ICE) and to test their viability to risk reduction and resilience over the longer term, by applying an adaptive capacity lens. The final step or the fourth step is "the aligning findings with opportunities (AFO)." This is the fourth step it allows the Knowledge Group to work in partnership with local leaders or stakeholders to consider which of the measures identified could be included into existing or new development Plans for the community, municipality, district or another level of the landscape.

Three days were allocated for each of the four steps MARISCO vulnerability analysis carried out in the study areas (Brong Ahafo and Ashanti Regions). The day one and two activities were carried out in Tuobodum a suburb of Techiman. The session was

hosted by some of the executives of Brong Ahafo and Ashanti Regions Vegetable Growers Association. The day three activities were hosted by the same association executives in Akumadan, which is in the Ashanti Region but close to Techiman. All the two vulnerability analyses carried out in the study areas were facilitated by research assistants (facilitators) who helped in smallholder farmers and key informants' interviews in the study areas.

All the steps followed in the Brong Ahafo Region was repeated in the Ashanti Region. IVA in the Asanti Region was hosted by both Gyinase and Gyinase-Karikari farms farmers' association (see plate.3) The third-day MARISCO activities were hosted by Dabaa farmers (1). The detailed discussion on activities carried out can be seen in the subsequent sessions. The steps involved in conducting MARISCO vulnerability analysis is summarised in figure 16.



Figure 16: The vulnerability and Risk Assessment Process, Source: Morchain and Kelsey (2016)

Preparation stage

The current study's preparation stage began during a meeting with the gate-keepers for the entire study at both study locations (Brong Ahafo and Ashanti Regions). The knowledge groups were selected with the help of both MOFA director and a CEO for an NGO in Techiman. The Knowledge group members in Brong Ahafo comprised extension officer, NGO employee, Brong Ahafo and Ashanti Region Vegetable Growers Association executives (Tuobodum), Yam Growers Association (Oforikurom), executives of Market Women Association (Techiman market) and experience farmers without access to the association.

Similarly, the Ashanti Region knowledge group members were selected with the helped of two extension officers in the Ashanti Region. The knowledge group (participants) have many things in common to those selected in the Brong Ahafo region. The knowledge group members were made up of extension officers, executives of farmer associations, agronomist, an employee of the credit union and market women.

In addition, some of the members of the knowledge group members participated in the key informants' interviews, hence, this approach enabled them to prepare to reflect on the smallholder farmers' challenges and possible solutions for actual vulnerability analysis.

Additionally, two weeks were devoted to the preparation stage for the formation of knowledge group, gathering resources, identification of suitable venues in the both Brong Ahafo and Ashanti Regions.

The initial vulnerability assessment (IVA)

The first IVA session was carried out in Tuobodum in Brong Ahafo Region. A whole day was devoted to the session. It began with the introduction of members, expectations, rule for the session and clarification of objectives. The participant used the introductory session to learn about themselves. The above process was repeated in the Ashanti Region one week before the vulnerability analysis was carried out in the Region. Plate 1, 2 and 3 show all the processes followed to carried out in the Brong Ahafo and Ashanti Regions respectively. The knowledge group (participants) spent the remaining of day one to conceptual or



Plate 4:: Knowledge group meeting with gate-keepers



Plate 4:Participants at Gyinase, KMA



Plate 4:MARISCO participants at Dabaa



Plate 4: Participants from Oforikurom

develop a common understanding of the hazards that have posed the highest risk and treats to smallholder farmers activities, ecosystem and their livelihoods.

The impact chain analysis (ICE) and the adaptive capacity analysis (ACA)

The day two combined step 2 (ICE) and step 3 (ACA) together. In view of this, day two was divided into morning and afternoon sessions. The participant began the morning session by determining the impacts of hazards (contributory factors, threats) and issues (stresses) and their implications on smallholder farmers over time, through mapping of their impacts throughout the system.

The knowledge group or participants used the afternoon session to explore further (brainstorm) the measures or strategies likely to reduce vulnerability identified in step 2 (ICE) and to test their potential to reduce risk and promote resilience for a longer period. of time. A similar process was followed during the vulnerability analysis in the Ashanti Regions.

The aligning findings with opportunities (AFO)

The day three was used by the Knowledge Group in collaboration with other local smallholder farmers and other stakeholders) in Akumadan to determine existing and new strategies that can be used to address contributing factors, threats and stresses identified at day one. This process is also known as gap analysis in MARISCO vulnerability analysis (Ibisch and Hobson, 2014).

The knowledge group or participants further classified the threats, stresses, contributory factors and associated strategies according to criticality, knowledge and manageability. Also, the levels of criticality, knowledge and manageability are distinguished from each other based on colour coding (see page 276).

The result for the MARISCO vulnerability analysis, such as the outcome of the critical analysis can in pages 274 to 281 of this report. Also, further information can be seen in the poster attached to this dissertation report,

4 Results and analysis

The current chapter gives a detailed account of the findings from the mixed methods of data collection. It is categorised into three parts: the first part of this finding discusses the descriptive statistics of all participants in both study locations (Brong Ahafo and Ashanti regions in Ghana. Findings from smallholder farmers in both the Brong Ahafo and Ashanti Regions will be analysed. In addition, findings from the traders (marketing agents) will be analysed. The second part of this section focuses on the findings of the key informant's interviews from both study areas. The final findings of this chapter will look at MARISCO vulnerability analysis based on focus group discussions. The methodology adopted for this study discussed in detail in the previous chapter has helped to arrive at these results presented in this section. The focus of this chapter is to present and discuss the results of the three phases of data collection and compare them with the relevant academic literature in Chapter 5.

4.1 Findings from smallholder farmers' questionnaire survey in both study areas

The sample size for the smallholder farmers' questionnaire survey was 130, who were selected from 10 farming communities (villages and town) in both Brong Ahafo and Ashanti Regions of Ghana as mentioned earlier in chapter 3. The number of participants and their village or town is shown in table 8.

Participants village/town * Region in Ghana Crosstabulation									
Count									
		Regions	in Ghana						
		Brong Ahafo		Total No.					
		Region	Asante Region	of farmers					
Participants village/town	Asuyei	18	0	18					
	Dabaa	0	11	11					
	Aworowa	12	0	12					
	Tanoso	9	0	9					
	Tuobodom	20	0	20					
	Oforikurom	7	0	7					
	Akumadan	0	12	12					
	Gyinase	0	13	13					
	Gyinase-Karikari farms	0	15	15					
	Kumasi-Tanoso (IPT)	0	13	13					
Total		66	64	130					

Table 8: Study location in Ghana showing the number of participants

Most of the participants came from Tuobodom, a suburb of Techiman City with a total of 20 participants. The second highest participants group came from Asueyi with a total number of 18, which is another farming community (village) near Techiman Town. The third highest number of participants came from Gyinase-Karikari farms in the Kumasi Metropolitan Assembly with a total number of 15 participants. The fourth highest participants (smallholder farmers) with a total number of 13 came from Gyinase, a suburb of Kumasi. Aworowa and Akumadan in Brong Ahafo and Asanti Region respectively had the fifth highest participation of 12. The least participating smallholder farmers came from Oforikurom in Brong Ahafo Region (under Techiman Municipal Assembly) with a total number of 9 participants.

4.2 The gender of the participants

In terms of gender, male participants were 115 (equivalent to 88.5%) and female participants were 15 (equivalent to 11.5%). Thus, male participants were many compared to the female participants in the entire study. This can be seen in table 9.

Table 9: Gender of the participants

Crosstab									
			Region i						
			Brong Ahafo						
	-		Region	Asante Region	Total				
Gender of participant Male		Count	54	61	115				
		Expected Count	58.4	56.6	115.0				
	Female	Count	12	3	15				
		Expected Count	7.6	7.4	15.0				
Total		Count	66	64	130				
		Expected Count	66.0	64.0	130.0				

The table shows out of 130 participants 115 of them were males (61 came from the Ashanti Region and 54 of them came from the Brong Ahafo Region). The female participants were 15 (12 females came from the Brong Ahafo Region and 3 females came from the Ashanti Region).

Table 10: Chi-square test for the gender of the participants.

Chi-Square Tests									
			Asymptotic Significance (2-	Exact Sig. (2-	Exact Sig. (1-				
	Value	df	sided)	sided)	sided)				
Pearson Chi-Square	5.797ª	1	.016						
Continuity Correction ^b	4.550	1	.033						
Likelihood Ratio	6.178	1	.013						
Fisher's Exact Test				.026	.015				
N of Valid Cases	130								

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.38.
b. Computed only for a 2x2 table

Chi-square test (P=.016) indicates statistical significance between the gender of male and female participants. It seems that the existing culture reflected in the variations in the males and females who participated in the study.

4.2.1 Comparison of levels of Education for all participants (smallholder farmers)

The participants (smallholder farmer) levels of education were compared to determine how they influence research findings. The educational levels are shown per the villages or towns the participants came from Ghana in table 11.

Crosstab						
			Region in Ghana			
			Brong Ahafo Region	Asante Region	Total	
The educational	No Education	Count	10	8	18	
level of		Expected Count	9.1	8.9	18.0	
participant's	Primary	Count	26	44	70	
		Expected Count	35.5	34.5	70.0	
	Secondary	Count	18	7	25	
		Expected Count	12.7	12.3	25.0	
	Vocational/technical	Count	2	4	6	
		Expected Count	3.0	3.0	6.0	
	Degree	Count	1	0	1	
		Expected Count	.5	.5	1.0	
	Dropped out	Count	7	1	8	
		Expected Count	4.1	3.9	8.0	
	Other	Count	2	0	2	
		Expected Count	1.0	1.0	2.0	
Total		Count	66	64	130	
		Expected Count	66.0	64.0	130.0	

Table 11: Comparison of Educational levels of participants in Brong Ahafo and Ashanti Regions of Ghana

The table shows that the total number of participants without any form of education were 18 (14%) of the entire participants' population, and this is significantly smaller than those with any form of education (p = 0.007, see table 12). Out of this number, 10 of them came from the Brong Ahafo Region and 8 (4%) of them from the Brong Ahafo Region. In terms of primary education, 70 (54%) of the participants confirmed that they have primary education. Out of this number, 26 (20%) of them came from the Brong Ahafo Region and the remaining 44 participants came from Ashanti Region. Twenty-five participants' have secondary school certificate of which 18 of them came from the Brong Ahafo Region and 7 of them came the Ashanti Region.

Six (5%) of the entire participants had vocational or technical education. Out of the above number, 4 (2%) of them came from the Ashanti Region and 2 of them came from the Brong Ahafo. One participant has a degree and he came from the Brong Ahafo Region. The participants who dropped out of school were 8. Out of this number, 7 of them came from the Brong Ahafo Region and 1 came from Ashanti Region. Table 12 depicts the chi-square test for participants' educational levels.

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)		
Pearson Chi-Square	17.831ª	6	.007		
Likelihood Ratio	19.783	6	.003		
N of Valid Cases	130				

Table 12: Chi-square test for the educational levels of participan
--

4.3 Farm sizes of the participants

The average farm size and standard deviation for smallholder farmers from both the Ashanti and Brong Ahafo Regions who participated in the study were found to be 1.9692 hectares \pm 1.58451 respectively. The average and standard deviation of farm size for farmers from Ashanti Region alone were found to be 1.7969 and \pm 1.63474 respectively, while that of Brong Ahafo Region were 2.1364 and \pm 1.52806 respectively. The mean or average for farm size is bigger for Brong Ahafo Region compared to the Ashanti Region by 0.3395. In addition, the standard deviation of the Brong Ahafo smallholder farmers is bigger than that the Ashanti Region by 0.3395. However, the standard deviation for the Ashanti Region farm size is bigger compared to the Brong Ahafo Region by 0.10668. Table 10 summarises the descriptive statistics of farm size for participants.

Descriptive Statistics

Report						
Farm size of participants						
Region in Ghana	Mean	N	Std. Deviation			
Brong Ahafo Region	2.1364	66	1.52806			
Asante Region	1.7969	64	1.63474			
Total	1.9692	130	1.58451			

Table 13: Average and standard deviation for farm size of participants

In terms of cross-tabulation, Brong Ahafo Region had a total farm size of 66 hectares, but Asante Region had a total of 64 hectares. The total count for farm size for Brong Ahafo Region is 66 and the expected count is 66. Also, the total count for farm size is 64 for the Ashanti Region and the expected count is 64. The farm sizes of the participants are shown in table 14

Crosstab						
			Region i	n Ghana		
			Brong Ahafo			
	_		Region	Asante Region	Total	
Farm size of participants	1-3	Count	30	45	75	
		Expected Count	38.1	36.9	75.0	
4-7		Count	19	10	29	
		Expected Count	14.7	14.3	29.0	
	4-7	Count	6	0	6	
		Expected Count	3.0	3.0	6.0	
	8-11	Count	6	2	8	
		Expected Count	4.1	3.9	8.0	
12-15 Co Ex 16-18 Co		Count	2	3	5	
		Expected Count	2.5	2.5	5.0	
		Count	0	1	1	
		Expected Count	.5	.5	1.0	
	19+	Count	3	3	6	
		Expected Count	3.0	3.0	6.0	
Total		Count	66	64	130	
		Expected Count	66.0	64.0	130.0	

Table	14: Comparison	of farm sizes o	f participants	in Brong Ahafo a	and Ashanti Regions of	Ghana
				9		

Table 15: Chi-square test for farm size of the study areas

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)		
Pearson Chi-Square	14.966ª	6	.021		
Likelihood Ratio	17.828	6	.007		
Linear-by-Linear Association	1.492	1	.222		

N of Valid Cases	130	

a. 10 cells (71.4%) have expected count less than 5. The minimum expected count is .49.

The difference between farm size for Brong Ahafo and Ashanti Regions were discovered to be statistically significant (P = .021, see table 9). Framers in the Brong Ahafo Region have bigger farm size than those in the Ashanti Region.

4.4 Ages of the participants

The current section looks at the age range of the participants in the study from both Brong Ahafo and Asante Regions of Ghana from cross-tabulation. Also, the differences between the participants in relation to their ages from both study locations will be looked at in this section through the chi-square test. The ages of the participants are summarised in table 16.

Crosstab							
			Region in G	Region in Ghana			
			Brong Ahafo	Asante			
			Region	Region	Total		
Participant's age	10-19	Count	1	0	1		
		Expected Count	.5	.5	1.0		
	20-29	Count	4	7	11		
		Expected Count	5.6	5.4	11.0		
	30-39	Count	21	19	40		
		Expected Count	20.3	19.7	40.0		
	40-49	Count	24	18	42		
		Expected Count	21.3	20.7	42.0		
	50-59	Count	10	15	25		
		Expected Count	12.7	12.3	25.0		
	60+	Count	6	5	11		
		Expected Count	5.6	5.4	11.0		
Total		Count	66	64	130		

Table 16: Age range of participants in the study areas (Brong Ahafo and Asanti Regions)

		Expected Count	66.0	64.0	130.0
--	--	----------------	------	------	-------

Table 16 indicates that a range 40-49 has the highest participants from both Asante Region and Brong Ahafo Regions with a total of 42 and it is the same for the expected count and actual count. This value shows that many people with 40-49 tend to become farmers compared to others. The second highest of participants were within ages 30-39 from both Asante and Brong Ahafo and found to be 40 participants out of 130 participants. The third largest farming age group came from participants between the ages of 50 to 59 in the study areas and, they were 25 in total. The fourth age group discovered to be practising smallholder farming in study areas came from participants in total. There was only one participant within ages 10-19. Thus, people within that age range 10-19 are not normally involved in farming activities since many of them are still learning in school.

Additionally, the total count and expected count for the ages of the smallholder farmers in the Brong Ahafo Region were found to be 66 and 66.0 respectively. Also, the total count and the expected count for the ages of participants in Ashanti Regions were 64 and 64. Thus, there are no major differences between the ages of the participants from both regions

With regards to the Chi-Square test, there is no statistical significance difference (P=0.573, see table 11) between farmers in Brong Ahafo Region ages and those in the Asanti Region.

	<i></i>	
Table 17: Chi-Square test for ages	of participants in Brond	Anato and Asante Regions

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square	3.836ª	5	.573			
Likelihood Ratio	4.242	5	.515			
Linear-by-Linear Association	.018	1	.892			
N of Valid Cases 130						
a. 2 cells (16.7%) have expected count le	ess than 5. The minim	um expected c	ount is .49.			

The outcome of the chi-square test (P=0.573) means that the data of ages of farmers from both Brong Ahafo and Ashanti Regions does not fit very well. In other words, the ages of the smallholder farmers in both study areas are alike.

4.5 Reasons for entering farming

г

The participants were asked about their main reasons for entered into farming business in both the Brong Ahafo and Ashanti Regions. The responses given by the participants are depicted in table 18.

Crosstab									
Count									
			Reaso	ns_for_farm	ing				
						Lack of			
		Income	Food for family	Hobby	Other	education	Total		
Region in Ghana	Brong Ahafo	34	6	0	19	7	66		
	Region								
	Asante Region	31	5	5	14	9	64		
Total		65	11	5	33	16	130		

Table 18: Reasons for entered into farming in Brong Ahafo and Ashanti Regions of Ghana

Table 18 shows that the majority (65) of the participants use farming as a source of income. In other words, they see farming as a business venture. Out of this number, 34 of the responses came from the Brong Ahafo Region and 31 of the responses came from participants in Ashanti Region. Other reasons, such as inheritance, had the second highest responses (33) from the participants. 19 of the responses came from participants in Brong Ahafo Region and the remaining 14 responses came from participants in the Ashanti Region. Lack of education was seen the third highest reason for some participants to enter into the farming business. Overall. 16 participants responded to it and out of this number, 9 responses came from the Ashanti Region and the remaining 7 responses came from participants in the Brong Ahafo Region. The fifth highest responses on the reason for farming was on food for the family, and the responses came from 11 participants of which 6 participants came from the Brong Ahafo Region and remaining 5 responses came from the participants in the Ashanti Region. However, 5 participants from the Ashanti Region mentioned that some smallholder farmers entered into farming as their hobby. The specific responses from participants in towns and villages under Brong Ahafo and Ashanti Regions who participated in the study can be seen in table 16. The outcome of the chi-square test for participants' reason for undertaking farming in the study areas is shown in table 19.

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	6.208ª	4	.184					
Likelihood Ratio	8.141	4	.087					
N of Valid Cases	130							

Table 19: Chi-square test for the reason for farming by participants in Brong Ahafo and Ashanti Regions of Ghana

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.46.

The outcome of the chi-square test (P=0.184) shows statistical insignificance from participants' reasons for undertaking farming in the Brong Ahafo and Ashanti Regions of Ghana.

		С	rosstab				
Count							
			Reasons	_for_farm	ning		
						Lack of	
		Income	Food for family	Hobby	Other	education	Total
Participants	Asuyei	11	2	0	2	3	18
village/town	Dabaa	4	0	2	3	2	11
	Aworowa	6	1	0	4	1	12
	Tanoso	4	0	0	5	0	9
	Tuobodum	11	0	0	6	3	20
	Oforikurom	2	3	0	2	0	7
	Akumadan	3	1	0	4	4	12
	Gyinase	6	0	2	4	1	13
	Gyinase-Karikari farms	9	3	1	1	1	15
	Kumasi-Tanoso (IPT)	9	1	0	2	1	13
Total		65	11	5	33	16	130

Table 20: Reasons for participants engaging in farming in villages/towns in Brong Ahafo and Ashanti Regions

In relation to the responses from specific villages or towns, out of the 65 highest responses on reason for farming for income, 11 responses came from participants in Asueyi and Tuobodum; 9 responses came from participant in Gyinase-Karikari farms and Kumasi-Tanoso (IPT); 6 responses came from participants in Aworowa and Gyinase; 4 responses came from participants in Dabaa and Tanoso; 3 responses came from participants in Akumadan and 2 responses came from participants in Oforikurom.

Also, out of the 33 responses on other reasons for taking farming as occupation, 6 responses came from Tuobodum participants; 5 responses came from Tanoso participants; 4 responses each came from participants in Aworowa, Akumadan and gyinase; 3 responses came from Gyinase;2 responses each came from Asueyi, Oforikurom and Kumasi-Tanoso (IPT) and 1 response came from a participant in Gyinase-Karikari farms.

The participants (16) who discovered a lack of education as the reason for undertaking farming, 4 responses came from participants in Akumadan; 3 responses each came from Asueyi and Tuobodum; 2 responses came from participants from Dabaa and 1 response each came from participants in Aworowa, Gyinase, Gyinase-Karikari farms and Kumasi-Tanoso (IPT).

Again, food for the family was seen as the fourth reason for undertaking farming in the study areas. Out of the 11 responses, 3 responses each came from participants in Oforikurom and Gyinase-Karikari farms; 2 responses came from participants in Asueyi; 1 response each came from participants in Akumadan and Kumasi-Tanoso (IPT) and no response from participants in Tanoso, Tuobodum and Gyinase.

Out of the 5 responses from the participants who saw hobby as a reason farming, 2 responses each came from participants in Dabaa and Gyinase and 1 response came from and a participant in Gyinase-Karikari farms. The remaining participants from Asanti Region (Akumadan and Kumasi-Tanoso) and none of the participants from Brong Ahafo Region (Asueyi, Aworowa, Tanoso, Oforikurom and Tuobodum) saw a hobby as a reason for taking farming as an occupation.

The chi-square test for the participants' responses at villages/towns in Brong Ahafo and Asanti Regions of Ghana can be seen in Table 21.

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	51.618ª	36	.044					
Likelihood Ratio	50.703	36	.053					
N of Valid Cases	130							
a. 41 cells (82.0%) have expected count less than 5. The minimum expected count is .27.								

Table 21: Chi-square test for participants at villages/towns level in Brong Ahafo and Asanti Regions

The outcome of the chi-square test (P=0.044) indicates statistical significance on reasons for undertaking farming as an occupation in the study areas in Brong Ahafo and Ashanti Regions of Ghana.

4.6 Farming knowledge rated by participants

The participants were asked to assess or rate their own knowledge in relation to farming practices. The responses of the participants at the regional level are depicted in table 22.

Crosstab									
Count									
Rate farming knowledge									
		Very good	Good	Poor	Total				
Region in Ghana	Brong Ahafo Region	29	35	2	66				
	Asanti Region	20	40	4	64				
Total		49	75	6	130				

Table 22: Rated farming knowledge by the participants at the regional level

The table shows that 75 (58%) of the participants rated themselves as having good knowledge of farming practices. Out of this number, 40 of the responses came from the Ashanti Region and 35 responses came from the Brong Ahafo Region. However, 49 (38%) of the participants rated themselves as having a very good farming practice. Out of this number, 29 of the responses came from the participants in the Brong Ahafo Region. Only 6 participants rated themselves as having poor farming knowledge, of which 4 responses came the Ashanti Region participants and the 2 responses came from the participants in the Brong Ahafo Region.

The specific responses from participants in villages and towns represented in the study in both Brong Ahafo and Ashanti Regions are depicted in table 23.

	Cross	stab			
Count		-			
		Rated f	arming know	ledge	
		Very good	Good	Poor	Total
Participants village/town	Asuyei	7	10	1	18
	Dabaa	0	7	4	11
	Aworowa	4	8	0	12
	Tanoso	5	4	0	9
	Tuobodom	11	9	0	20
	Oforikurom	2	4	1	7
	Akumadan	4	8	0	12
	Gyinase	4	9	0	13
	Gyinase-Karikari farms	5	10	0	15
	Kumasi-Tanoso (IPT)	7	6	0	13
Total		49	75	6	130

Table 23: The rated farming knowledge in the towns (villages) level in Brong Ahafo and Ashanti Regions of Ghana

The table reveals that out of the 75 (58%) respondents who rated themselves as having good farming knowledge, 10 responses each came from participants in Asueyi

and Gyinase-Karikari farms; 9 responses each came from participants in Tuobodum and Gyinase; 8 responses each came from participants in Aworowa and Akumadan; 7 responses came from the participants in Dabaa; 6 responses came from participants in Kumasi-Tanoso (IPT) and 4 responses each came from participants in Tanoso and Oforikurom respectively.

In relation to the second highest rating (very good farming knowledge), out of the 49 responses, 11 responses came from participants in Tuobodum; 7 responses each came from Asueyi and Kumasi-Tanoso (IPT); 5 responses each came from participants in Tanoso and Gyinase-Karikari farms; 4 responses each came from participants in Aworowa, Akumadan and Gyinase and 2 responses came from participants in Oforikurom. No response for a very good farming knowledge came from a participant in Dabaa.

Last, the out of the 6 participants who rated themselves as having poor farming knowledge, 4 of the responses came from participants in Dabaa and 1 respondent each came Asueyi and Oforikurom.

The chi-square test for the rated farming knowledge under towns or villages levels are depicted in table 24:

Chi-Square Tests									
	Value	df	Asymptotic Significance (2-sided)						
Pearson Chi-Square	39.794 ^a	18	.002						
Likelihood Ratio	32.945	18	.017						
N of Valid Cases	130								
	· · · · · ·								

Table 24: Chi-square test for rated farming knowledge at village/town level

a. 18 cells (60.0%) have expected count less than 5. The minimum expected count is .32.

The outcome of the chi-square test (P=0.002) shows statistical significance for rated farming knowledge at village/town level Thus, farming knowledge appears to have an impact of smallholder performance.

4.6.1 Training requirements for smallholder farmers

The participants were asked whether they need the training to develop their farming knowledge further and their responses are shown in table 25.

Crosstab									
Count				1					
		Require	d training						
		Yes	No	Total					
Region in Ghana	Brong Ahafo Region	65	1	66					
	Asante Region	63	1	64					
Total		128	2	130					

Table 25: Cross tabulation for participants responses on further training requirements at the regional level

The table 25 shows that participants see training as very crucial to their farming activities. Hence, 128 (98%) of them when asked whether they need further training responded yes. Out of this number 65 (50%) of the responses came from the participants in the Brong Ahafo Region and the remaining 63 (48%) of the responses came from the participants in the Ashanti Region. However, 2 participants, one each the Brong Ahafo and another from the Ashanti Region responded no to the further training.

The specific responses on the need for further training from participants at villages or towns in the Brong Ahafo and Ashanti Regions are depicted in table 27.

	Crosstab			
Count				
		Required_	_training	
		Yes	No	Total
Participants village/town	Asuyei	17	1	18
	Dabaa	11	0	11
	Aworowa	12	0	12
	Tanoso	9	0	9
	Tuobodom	20	0	20
	Oforikurom	7	0	7
	Akumadan	12	0	12
	Gyinase	13	0	13
	Gyinase-Karikari farms	14	1	15
	Kumasi-Tanoso (IPT)	13	0	13
Total		128	2	130

Table 26: Participants responses for further training at villages/towns level

The table shows that out of the 128 yes responses for further training on farming, 20 responses came from the participants in Tuobodum; 17 of the responses came from the participants in Asueyi; 14 responses came from participants in Gyinase-Karikari farms; 13 responses each came from participants in Gyinase and Kumasi-Tanoso (IPT); 12 responses each came from participants in Aworowa and Akumadan; 9 responses came from participants in Tanoso and 7 responses came from participants in Oforikurom. Only 2 participants claimed they did not need further training. Out of this response, 1 participant each from Asueyi and Gyinase-Karikari farms respectively.

4.7 Crops cultivated by the participants

The participants were interviewed about the types of crops they cultivate in their farms. The participants' responses are summarised in table 27.

Count									
			Types of crops grown besides vegetable						
		Cereals	Сосоа	Root and tuber crops	Citru s	Mixed cropping	Other	Vegetable s only	
Region	Brong Ahafo	2	9	11	1	35	3	5	66
in	Region								
Ghana									
	Asante	2	0	0	0	19	0	43	64
	Region								
Total		4	9	11	1	54	3	48	130

Table 07. Oreas tabulation for	the second second subtly set	سليمة معراماته معيد مريط الممه	Drawn Abafa and Acanti Daviana
Table 27: Cross fabulation for	types of crops cultiva	teo dy darticidants in	i Brond Anato and Asanti Redions
	Spece of erepe culture	tod by participanto in	Breng / mare and / toant riegiene

Table 28 shows that most of the participants (54 out of the 130) practised mixed cropping. Out of this 35 of the participants, responses came from Brong Ahafo Region and the remaining 19 came from Ashanti Region. Thus, more farmers in Brong Ahafo Region practice mixed cropping compared to those in the Ashanti Region.

Vegetables were second highest crop cultivated by the participants. 48 of the participants were involved in vegetable cultivation. Out of this number 43 of the participants came from Ashanti Region and the remaining 5 participants came from the Brong Ahafo Region. This shows that smallholder farmers in the Ashanti Region are practice intensive vegetable cultivation compared to those in the Ashanti Region.

Root and tuber crops were second to vegetable cultivation. Root and tuber crops, such as cassava, yam was third highest cultivated crops by the participants. 11 participants responded to root and tuber cultivation and they all came from the Brong Ahafo Region. The fourth highest cultivated crop cultivation was cocoa. 9 farmers claimed they cultivate cocoa and they come from Brong Ahafo Region. Cereals were the fifth highest cultivated crop according to the farmers' responses and 4 of participants were cultivating cereals. Out of this number, 2 of the participants came from Brong Ahafo Region and remaining 2 participants came from Asanti Region. The least cultivated crop was found to be citrus. only 1 participant from Brong Ahafo Region was found to be cultivating the citrus crop. Further information on the crops cultivated by farmers from specific towns or villages in both Brong Ahafo and Ashanti Regions are shown in table 28.

Count									
			Types of crops grown besides vegetable						
		Cere	Сосо	Root and	Citru	Mixed	Othe	Vegetable	
		als	а	tuber crops	s	cropping	r	s only	Total
Participants	Asuyei	1	7	4	1	4	1	0	18
village/town	Dabaa	1	0	0	0	7	0	3	11
	Aworowa	0	0	1	0	11	0	0	12
	Tanoso	0	2	0	0	6	1	0	9
	Tuobodom	1	0	0	0	13	1	5	20
	Oforikurom	0	0	6	0	1	0	0	7
	Akumadan	0	0	0	0	9	0	3	12
	Gyinase	0	0	0	0	1	0	12	13
	Gyinase-	0	0	0	0	0	0	15	15
	Karikari farms								
	Kumasi-	1	0	0	0	2	0	10	13
	Tanoso (IPT)								

Table 28: Types of crop grown by participants from various villages/towns

Participants village/town * Types of crops grown besides vegetable Crosstabula
--

	Total	4	9	11	1	54	3	48	130
--	-------	---	---	----	---	----	---	----	-----

Table 29 reveals that majority of the farmers who practice mixed cropping came from Tuobodum. They were 13 in total. The second highest responses for mixed cropping came from 11 farmers from Aworowa. The third highest mixed cropping responses came from 7 farmers in Dabaa. The participants' responses reveal that they constitute the highest in mixed croppers in the Asanti Region. Also, the fourth highest responses on mixed cropping came from 6 participants from Tanoso. The fifth highest practice of mixed cropping came from Asueyi with 4 farmers' responses. The sixth highest responses of mixed cropping came from 2 participants from Kumasi-Tanoso (IPT). The seventh response came from Oforikurom and Gyinase with 1 participant each. No farmer responded to the question on mixed cropping from Gyinase-Karikari farm.

As mentioned earlier, vegetable cultivation was second to mixed cropping. 48 farmers who responded to the vegetable cultivation, and out of this 15 (highest) of the responses came from Gyinase Karikari farms, 12 farmers (second highest response) came from Gyinase and10 farmers (third highest) responded from Kumas-Tanoso (IPT) on vegetable cultivation. The fourth highest response for vegetable cultivation came from 5 participants from Tuobodum. This number is the highest for responses for vegetable cultivation in Brong Ahafo Region. The fifth highest responses for vegetable cultivation came participants from Akumadan and Dabaa with 3 responses for each of them. Participants who do not respond to vegetable cultivation came from Asueyi, Aworowa and Oforikurom.

Regarding the cultivation of root and tuber crops, the highest responses out of the total 11 responses came 6 farmers from Ofrikurom, who are noted for yam cultivation in the Brong Ahafo Region. The second highest responses for root and tuber cultivation came from 4 participants from Asueyi. The third response for root and tuber cultivation came 1 participant from Aworowa. The remaining participants did not respond to the cultivation of root and tuber crops.

Also, 9 participants responded for the cocoa cultivation. Out of this number, the highest responses came from 7 participants from Asueyi and remaining 2 responses came from Tanoso. Besides the above responses, none of the remaining participants involved in cultivation.

Similarly, 4 of the participants responded to cereals cultivation in the study areas. Only 1 participant responded from each of the following villages or towns to the cereal cultivation: Asueyi, Dabaa, Tuobodum and Kumasi-Tanoso.

4.7.1 The quantity of the produce consume at home

The participants were asked during the interview about the quantity (or percentage) of their farm produce consume at home by themselves and dependents. This question was meant to assess whether they are commercial or subsistence farmers. The responses given by the participants are shown in table 29.

129

			Cro	sstab				
Count								
			Percentage	of the prod	uce used a	t home		
		Half of the		Less than				
		products	One-fourth	one-	None of			
		(1/2 or	(1/4 or	fourth (<	the		30% of the	
		50%)	25%)	25%)	products	Other	products	Total
Participants	Asuyei	2	3	7	1	4	1	18
village/town	Dabaa	0	4	6	0	1	0	11
Aworowa		0	4	7	1	0	0	12
	Tanoso	0	3	4	2	0	0	9
	Tuobodom	1	9	3	7	0	0	20
	Oforikurom	0	6	1	0	0	0	7
	Akumadan	1	6	5	0	0	0	12
	Gyinase	0	4	9	0	0	0	13
	Gyinase-	0	7	6	2	0	0	15
Karikari farm								
	Kumasi-	0	3	5	5	0	0	13
	Tanoso (IPT)							
Total		4	49	53	18	5	1	130

Table 29: Quantity/Percentage of the produce used at home by participants

The table shows that 53 (about 41%) of the participants interviewed claimed that they consume less than ¼ (< 25%) of their farm produce. 49 (about 38%) of the participants' mentioned that they consume about 25% of their farm produce home. This means that about 75% of their produce is sold for income. 18 (about 14%) of the participant mentioned that they consume none of their produce. Thus, they produce for commercial purpose (income). 5 (about 4%) of the participants chose other as they could not give the estimated quantity of produce use at home. 4 (3%) of the participants, however, mentioned that they consume about 50% of their farm produce at home. Only 1 participant consumes 30% of the produce.

4.8 Sources of market information

This section discusses participants' views on the sources of marketing information for smallholder farmers in the study areas. Table 30 depicts their responses:

Pai	ticipants village/tow	n * Sources/ Crosst	of market infor abulation	mation f	or partic	pants						
Count	Count											
		Sour	ces of market inform	nation for p	articipants							
		market										
agent/buyers Extension officers Media Other None T												
Participants	Asuyei	7	6	1	2	2	18					
village/town	Dabaa	4	0	0	7	0	11					
	Aworowa	6	1	0	4	1	12					
	Tanoso	6	1	2	0	0	9					
	Tuobodom	12	0	3	5	0	20					
	Oforikurom	4	0	2	0	1	7					
	Akumadan	10	0	0	2	0	12					
	Gyinase	9	0	0	4	0	13					
	Gyinase-Karikari farms	10	0	0	5	0	15					
	Kumasi-Tanoso (IPT)	10	0	1	2	0	13					
Total		78	8	9	31	4	130					

Table 30: Cross tabulation for sources of market information for participants

Out of the 130 smallholders' farmers interviewed, 78 (60%) of the participants testified that traders (market women) are the source of market information for smallholder farmer in rural markets in Ghana. 31 (23.8%) of the participants pointed out that farmers use other (informal) sources to access market information, such as a conversation with other farmers through face-to-face and mobile phone. Also, 9 (6.9%) of the participants claimed that farmers' use media mostly FM (radio) stations

as another source of market information, such as prices of food produce in the local markets. However, 4 (3.1%) of the participants' selected none of the sources.

The kind of market information access by smallholder farmers

Again, the participants were asked the kind of market information they normally access to enable them to get buyers for their produce in the local markets. Table 31 shows the kind of market information access by smallholder farmers or participants.

Crosstab										
Count										
Kind of market information access										
Market All the										
		demand						information		
		for	Market					on the		
		products	opportunities	Buyers	Prices	Others	None	market	Total	
Region in	Brong Ahafo	11	3	6	24	19	2	1	66	
Ghana	Region									
	Asante	16	1	2	27	18	0	0	64	
	Region									
Total		27	4	8	51	37	2	1	130	

Table 31: Kind of market information access by participants at regional levels

Table 32: The kind of market information farmers normally access

Crosstab												
Count	Count											
		Kin	d of market	informatio	n access							
	Market						All the					
	demand						informatio					
	for	Market	Buyers				n on the					
	products	opportunities	(traders)	Prices	Others	None	market	Total				

Participants	Asuyei	3	1	1	6	6	1	0	18
village/town	Dabaa	0	0	2	6	3	0	0	11
	Aworow	3	0	0	5	4	0	0	12
	а								
	Tanoso	3	0	1	2	2	0	1	9
	Tuobod	1	2	3	7	6	1	0	20
	om								
	Oforikur	1	0	1	4	1	0	0	7
	om								
	Akumad	3	0	0	7	2	0	0	12
	an								
	Gyinase	5	1	0	3	4	0	0	13
	Gyinase	5	0	0	3	7	0	0	15
	-								
	Karikari								
	farms								
	Kumasi-	3	0	0	8	2	0	0	13
	Tanoso								
	(IPT)								
Total		27	4	8	51	37	2	1	130

Most of the farmers, 51 in total (approximately 39%) of the entire participants mentioned that smallholder farmers tend to access information on prices for their produce compared to other market information. The second highest access to market information identified by 37 (28.5%) of the participants is other information, such as terms of payment. 27 (20.8%) of the participants, on the other hand, thought that smallholder farmers tend to search for information on market demand for their produce. Eight (6%) of the participants mentioned that smallholder farmers access market information for buyers (agents) for their farm produce. Also, 4 (3%) of the participants mentioned that smallholder farmers tend to smallholder farmers normally search for market information on market opportunities.

Additionally, 2 (1.5%) of the participants claimed that farmers access no market information. However, 1 (1%) of the participants mentioned that smallholder farmers access to all information on the market.

4.8.1 The method used by smallholder farmers to access market information

The methods used by smallholder farmers to access market information in Brong Ahafo and Ashanti Regions of Ghana are summarised in table 31.

Crosstab										
Count										
How information is accessed by participants										Total
Extensio										
				Farmer	n		Market			
			Teleph	group	officers/M		agents/b		Farm	
		Post	one	meetings	OFA	Other	uyers	None	site	
Region in	Brong Ahafo	0	27	13	1	20	3	2	0	66
Ghana	Region									
	Asante	2	8	0	0	45	4	0	5	64
	Region									
Total		2	35	13	1	65	7	2	5	130

Table 31: Methods used by participants to access market information in Brong Ahafo and Ashanti Regions of Ghana

Table 31 shows that 65 (50%) of the participants interviewed use other methods, such as informal conversations among farmers and local gatherings to access information on markets. 45 out of the 65 responses came from Ashanti Region participants. The remaining 20 participants came from the Brong Ahafo Region. The second method the participants use to access market information is telephone (mobile phone). 35 of the participants mentioned that they use their mobile phone to contact buyers, their colleagues and other farmers in different locations for marketing information, such as prices for produce. Also, the 27 that responsed to the use of the telephone as a method of accessing market information came from farmers in the Brong Ahafo Region. The remaining 8 participants came from the Ashanti Region. Thus, Brong Ahafo Region's smallholder farmers use more mobile phones or telephone to access market information compared to farmers in the Ashanti Region.

Farmer group meetings were observed to be the third popular method used by participants to access information on the market. 13 of the participants mostly from the Brong Ahafo confirmed they use this method to access information marketing of their farm produce.

In addition, 7 of the participants mentioned that they use market women to access market information, such as current prices for their produce. Out of this number, 4 participants came from Ashanti Region and 3 came from Brong Ahafo Region.

However, 5 of the participants claimed they use farmgate (farm site) to access information on their produce. This shows that they discover market information from the interaction with buyers for their produce at farmgate.

Furthermore, 2 of the participants said that they access to market information via post. The participants mentioned that some of the transport (coaches) offer courier services and enable them to access market information on the market, especially from their customers in the capital (Accra). Only 1 participant mentioned that the extension officers (MOFA) are the medium for

accessing marketing information for the farmers produce.

				Cross	stab						
Count											
			Но	w information	on is accessed	by parti	icipants			Total	
								Market			
				Farmer	Extension		agents				
			Telephon	group	officers/MOF		/		Farm		
		Post	е	meetings	А	Other	buyers	None	site		
Participant	Asueyi	0	4	5	1	5	2	1	0	18	
S	Dabaa	0	1	0	0	5	4	0	1	11	
village/tow	Aworowa	0	6	5	0	1	0	0	0	12	
n	Tanoso	0	6	1	0	2	0	0	0	9	
	Tuobodo	0	10	2	0	7	1	0	0	20	
	m										
	Oforikuro	0	1	0	0	5	0	1	0	7	
	m										
	Akumada	1	0	0	0	11	0	0	0	12	
	n										
	Gyinase	0	3	0	0	10	0	0	0	13	
	Gyinase-	1	1	0	0	9	0	0	4	15	
	Karikari										
	farms										
	Kumasi-	0	3	0	0	10	0	0	0	13	
	Tanoso										
	(IPT)										
Total		2	35	13	1	65	7	2	5	130	

Table 33: Methods used by participants in towns/villages in Brong Ahafo and Ashanti Regions to access market information

Table 33 gives detail information on a specific number of responses from participants from different towns and villages in Brong Ahafo and Ashanti Regions on the methods or media use to access information on marketing. Out of 65 participants who selected others as means of accessing marketing information, the highest responses came from 11 participants from Akumadan. The second highest responses for other came from 10 participants from Gyinase and Kumasi-Tanoso (IPT) respectively. The third highest responses for 'other' came from participants Gyinase-Karikari farm. The fifth highest response to 'other' methods came from 7 participants from Tuobodum and it was followed by participants from participants from Asuyei and Dabaa, who had 5 responses each for 'other'. The seventh response came from 2 participants from Tanoso. The least response to 'other' methods of accessing market information came from 1 participant from Aworowa.

With regards to telephone, out of 35 responses, the highest responses came from 10 participants from Tuobodum a suburb of Techiman. The participants claimed, they use mobile phones (telephone) to contact their buyers from the capital of Ghana to discuss various issues on the marketing of their produce. The second highest responses on telephone or mobile phones as a medium of access to marketing information came from 6 participants each for Tanoso and Aworowa. The third highest response to the same question came from 4 participants from Asuyei. The fourth highest response for the telephone as a method for accessing marketing information came from 3 participants from Kumasi-Tanoso (IPT). The least responses on telephone usage as a means of accessing marketing information came from Dabaa, Oforikurom and Gyinase-Karikari farm with 1 response each. Akumadan recorded no response for the telephone as a means of accessing marketing information.

The highest response for participants who claimed that they use farmer group meeting as a medium to access marking information for their produce was 13 as mentioned earlier. Out of the above 13 who said that they access marketing information through a farmer group meeting, 5 of them each came from Asueyi and Aworowa respectively.

137

The second highest response for using farmer group meeting as a means of accessing market information came from 2 participants from Tuobodum. The least response came from 1 participant from Tanoso. The remaining participants did not respond to the use of farmer group meetings to access marketing information.

Furthermore, 4 of 7 participants who claimed they used a market agent (or traders) as a method of accessing marketing information came from Dabaa. The second highest response on the use of market agent came from 2 participants from Asueyi and the least response came from 1 participant from Tuobodum.

Additionally, out of the 5 participants who claimed they access marketing information at farmgate, 4 of them came from Gyinase-Karikari farm and the remaining 1 participant came from Daaba.

Again, 2 participants who mentioned that they use the post to access market information discussed earlier, 1 of the participants came from Akumadan and the remaining participant came from Gyinasi.

The 2 participants who responded to 'none' or no specific method for accessing market information came from Asueyi and Oforikurom. 1 respondent came from each town.

138

4.8.2 Existing markets for smallholder farmers

The participants were asked to select the type of market they are currently accessing with their farm produce. The responses given by the participants are shown in table 31.

		Crossta	ab			
Count						
			Type of mai	rket access		
		Export	Regional	Domestic	Subsistence	
		Market	market	market	/farmgate	Total
Participants	Asuyei	0	2	14	2	18
village/town	Dabaa	0	0	11	0	11
	Aworowa	1	0	11	0	12
	Tanoso	0	0	9	0	9
	Tuobodom	0	0	20	0	20
	Oforikurom	0	0	7	0	7
	Akumadan	0	0	12	0	12
	Gyinase	0	0	13	0	13
	Gyinase-Karikari	0	0	15	0	15
	farms					
	Kumasi-Tanoso (IPT)	0	0	13	0	13
Total		1	2	125	2	130

Table 34: Existing markets for smallholder farmers' produce in the Brong Ahafo and Asanti Regions in Ghana

Table 35 indicates that out of the 130 participants, 125 (96%) of them claimed that smallholder farmers access only domestic markets with their produce. Out of this number, 20 responses came from participants in Tuobodum; 15 responses came from Gyinase-Karikari farms; 14 responses came from Asueyi; 13 responses each came from participants in Gyinase and Kumasi-Tanoso (IPT); 12 responses came from participants in Akumadan; 11 responses each came from Dabaa and Aworowa; 9 responses came from participants in Tanoso and 7 responses came from participants in Oforikurom.

Both the regional market and farmgate had 2 responses each from participants in Asueyi. Besides, none of the remaining participants in the Brong Ahafo and Ashanti Regions discovered regional and farmgate as their existing markets.

Last, the export market received 1 response from a participant in Aworowa. None of the remaining 129 participants identified it as an existing for smallholder farmers. Many of the participants claimed they cannot meet the standards in the export or international markets.

The chi-square test for responses on the existing markets for participants in study areas (villages or towns) in both Brong Ahafo and Ashanti Regions is depicted in table 35.

Chi-Square Tests									
	Value	df	Asymptotic Significance (2-sided)						
Pearson Chi-Square	35.533 ^a	27	.126						
Likelihood Ratio	21.437	27	.765						
N of Valid Cases	130								
a. 30 cells (75.0%) have expected count less than 5. The minimum expected count is .05.									

Table 35: Chi-square test for existing market access for smallholder farmers

The outcome of the chi-square test (P=0.126) reveals that there is no statistical significance of the responses of participants on existing markets for smallholder farmers.

4.8.2.1 Reasons for the preferred markets

The participants were asked about their reasons for accessing the current or preferred markets. The participants' responses are depicted in table 36.

Crosstab										
Count										
		the preferred m	arket							
		Ready market	More money	Easy access	Other	Not sure	Total			
Region in Ghana	Brong Ahafo Region	19	37	8	1	1	66			
	Ashanti Region	19	24	15	6	0	64			
Total		38	61	23	7	1	130			

Table 36came: Reasons	for selecting preferred	markets at the regional level
-----------------------	-------------------------	-------------------------------

The table shows that 61 of the participants selected their preferred markets since they thought they will get more money from those markets. Out of 61 responses, 37 responses came from participants in the Brong Ahafo Region and 24 responses came from the Asanti Region. In like manner, 38 participants selected ready market as their reason for preferred markets of which 19 responses each came from both the Brong Ahafo and Ashanti Region. The third highest responses on reasons for smallholder farmers preferred markets is easy to access. It attracted 23 responses and out of these responses, 15 responses came from participants in the Brong Ahafo Region. Other reasons came up as the fourth highest response to smallholder farmers preferred markets with 7 responses. Out of this number, 6 responses came from participants in the Ashanti Region. In addition, a participant in the Brong Ahafo Region was not sure of the benefits associated with the preferred market.

The responses on reasons for the preferred market according to the participants' towns or villages are depicted in table 37.

		Cross	stab				
Count							
			Reasons for t	he preferred r	narket		
		Ready More Easy					Total
Participants	Asuyei	3	12	2	0	1	18
village/town	Dabaa	3	2	3	3	0	11
	Aworowa	8	4	0	0	0	12
	Tanoso	4	5	0	0	0	9
	Tuobodom	3	12	4	1	0	20
	Oforikurom	1	4	2	0	0	7
	Akumadan	3	7	1	1	0	12
	Gyinase	4	7	2	0	0	13
	Gyinase-Karikari farms	5	2	6	2	0	15
	Kumasi-Tanoso (IPT)	4	6	3	0	0	13
Total		38	61	23	7	1	130

Table 37: Reasons for accessing the current markets

4.8.2.2 The preferred market for smallholder farmers

The participants were to select their preferred markets from international, regional, domestic and other markets not listed on the questionnaire. The responses from the participants at regional and town/village levels are depicted in tables 38 and 40 respectively.

Table 38: Participants preferred markets access for their produce

Crosstab							
Count							
	Prefer_market						
		International	Regional	Domestic	Other	Total	
Region in Ghana	Brong Ahafo Region	26	17	18	5	66	
	Ashanti Region	9	33	21	1	64	
Total		35	50	39	6	130	

Most of the participants preferred the regional market to the rest of the markets. Out of the 50 (38%) of participants who selected regional markets, 33 of them came from Ashanti Region and the remaining 17 came from the Brong Ahafo Region. The domestic market had the second highest response with 39 responses of which 21 responses came from Ashanti Region and 18 responses came from participants in the Ashanti Region. The international market came up as the third highest response with 35 responses. Out of this number, 26 of the responses came from participants in the Brong Ahafo Region and 9 responses came from participants in the Asanti Region. The least responses for preferred markets was on other markets with 6 responses. Out of the 6 responses, 5 of the responses came from the participants in the Brong Ahafo Region and 1 response from a participant in the Asanti Region.

The chi-square for participants preferred markets is shown in table 39.

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square	16.248ª	3	.001			
Likelihood Ratio	16.939	3	.001			
N of Valid Cases	130					
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.95.						

Table 39: Chi-square test for preferred markets for participants

The chi-square test (P=0.001) indicates statistical significance of participants preferred markets at the regional level.

The specific responses from villages or towns represented by the participants are depicted in table 40.

Crosstab						
Count						
		Prefer_market				
	International Regional Domestic Other				Other	Total
Participants village/town	Asuyei	13	3	1	1	18
	Dabaa	1	8	2	0	11
	Aworowa	3	3	3	3	12
	Tanoso	6	2	1	0	9
	Tuobodom	3	8	8	1	20
	Oforikurom	1	1	5	0	7
	Akumadan	2	6	4	0	12
	Gyinase	5	3	4	1	13
	Gyinase-Karikari farms	0	9	6	0	15
	Kumasi-Tanoso (IPT)	1	7	5	0	13
Total		35	50	39	6	130

Table 40: Preferred markets for participants

The table shows that out of the 50 (38%) who chose regional markets as their favourite market for their produce, 9 responses came from Gyinase-Karikari farms; 8 responses each came from participants in Dabaa andTuobodum; 7 responses came from participants in Kumasi-Tanoso (IPT); 6 responses came from participants in Akumadan, 3 responses each came from participants in Asueyi, Aworowa, and Gyinase; 2 responses came from participants in Tanoso and 1 response came from a participant in Oforikurom.

Also, out of the 39 participants who claimed they preferred domestic markets, 8 of them came from Tuobodum; 6 of the participants came from Gyinase-Karikari farms; 5 participants each came from Oforikurom and Kumasi-Tanoso (IPT); 4 participants each came from Akumadan and Gyinase; 3 participants came from Aworowa; 2 participants came from Dabaa; 1 participant each came from Asueyi and Tanoso.

In addition, out of 35 who selected international markets as their preferred markets, the highest responses came from 13 participants in Asueyi; the second highest response came from participants from 6 participants in Tanoso; third highest response came from 5 participants in Gyinase; the fourth highest response came from 3 participants each from Aworowa and Tuobodum; fifth highest response came from 2 participants in Akumadan; the least response came from 1 participant each from Dabaa, Oforkurom and Kumasi-Tanoso (IPT). No response was received from participants in Gyinase-Karikari farms on this question. The fewest responses was on another market, according to both table 35 and 37. Out of the 6 participants who claimed they preferred other markets, 3 of them came from Aworowa and 1 participant each came from Asueyi, Tuobodum and Gyinase.

4.8.3 Channel of distribution for smallholder farmers

The participants were asked about the channel of distribution for their produce and their responses are depicted in table 41.

Participants	village/town * Ch	nannel of dis	stribution fo	or products	Crossta	bulatio	n
Count							
			Channel of dis	tribution for pro	oducts		
		Spot	Spot Contractual				
		market/farm	arrangement	Agents/midd			
		gate	S	lemen	Self	Other	Total
Participants village/town	Asuyei	0	3	7	5	3	18
	Dabaa	0	0	4	7	0	11
	Aworowa	0	0	9	3	0	12
	Tanoso	0	0	8	0	1	9
	Tuobodom	1	0	16	3	0	20
	Oforikurom	0	0	4	2	1	7
	Akumadan	1	0	9	2	0	12
	Gyinase	1	1	11	0	0	13
	Gyinase-Karikari	0	1	14	0	0	15
	farms						
	Kumasi-Tanoso	6	0	4	3	0	13
	(IPT)						
Total		9	5	86	25	5	130

Table 41: Marketing channels for smallholder farmers produce

.

Table 41 shows that 86 (66%) of the participants mentioned that market agents (market women) are the main chain of distribution for their produce. They claimed the agents or market women normally collect the products from the farmers directly or designated locations near the farmers. 16 of the responses came from participants from Tuobodum; 14 responses were received from participants at Gyinase-Karikari farm; 11 responses came from participants at Gyinase; 9 responses each came from participants in Akumadan and Aworowa respectively; 8 responses came from participants in Tanoso; 7 responses came from participants from Asueyi and 4 participants each came from participants in Dabaa, Oforikurom and Kumasi-Tanoso (IPT).
The second highest responses were on 'self' with 25 responses from the participants. Thus, participants take the products and look for potential buyers mostly from the local markets. Out of the 25 responses, 7 responses came from Dabaa;5 of the responses came from Asueyi; 3 responses each came from Aworowa, Tuobodum, and Kumasi-Tanoso (IPT);2 responses each came from Oforikurom and Akumadan participants. No response was recorded for Gyinase and Gyinase-Krilari regarding self as a channel of distribution.

The third highest channel of distribution of smallholder farmers is the spot market or farmgate with 9 participants' responses. Out of this number, 6 responses came from Kumasi-Tanoso (IPT) and 1 response participant each came from Tuobodum, Gyinase.

Also, contractual arrangement and other channels not listed on the questionnaire were the fourth highest responses. 5 participants each responded to the contractual arrangement and other. In case of a contractual arrangement, 3 responses came from participants in Asueyi. 1 response each came from participants in Gyinase and Gyinase Karikari farm.

Similarly, 3 responses came from a participant from Asueyi for other (channels); 1 response came from participants from Tanoso and the remaining 1 response came from 1 participant at Oforikurom.

The summary of channels of distribution according to the study Regions are summarised in table 42.

147

Table 42: Channels of distribution of smallholder farmers produce in Brong Ahafo and Asanti Regions

Brong Ah	afo and Ashanti	Regions in Cro	Ghana * Cl sstabulatio	hannel of di n	istributio	on for p	roducts
Count							
			Channel of dist	tribution for pro	ducts		
		Spot market/farm	Contractual arrangement	Agents/midd			
		gate	S	lemen	Self	Other	Total
Region in Ghana	Brong Ahafo Region	1	3	44	13	5	66
	Ashanti Region	8	2	42	12	0	64
Total		9	5	86	25	5	130

Table 42 indicates that out of the 86 participants who selected agents as the main channel of distribution, 44 of them came from the Brong Ahafo Region and 42 of the responses came from the Ashanti Region. 25 responses received for 'self' as a distribution channel, 13 of the responses came from Brong Ahafo Region and 12 responses came from Ashanti Region. Additionally, out of the 9 responses for the spot market (farmgate) as a channel of distribution, 8 responses came from Asanti Region and the remaining 1 response came from Brong Ahafo. Again, out of the 5 responses for contractual arrangement, 3 responses came from Brong Ahafo Region and the remaining two responses came from the Ashanti Region participants. Lastly, all the 5 responses for 'other' channel of distribution came from the Brong Ahafo Region. None of the participants identified other channel of distribution for smallholder farmers.

The chi-square test for distribution channels for smallholder farmers is shown in table 43.

Table 43: Chi-square test for channels of distribution for smallholder farmers

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	10.703ª	4	.030					
Likelihood Ratio	13.386	4	.010					
N of Valid Cases	130							

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is 2.46.

The outcome of the chi-square test (P=.030) means that there is a statistical significance between the responses from the participants in Brong Ahafo Region and those from Ashanti Region on channels of distribution for the smallholder farmers farm produce.

4.9 Smallholder farmers marketing problems

This section discusses smallholder farmers marketing problems identified by the participants from both Brong Ahafo and Asanti Region. These problems are depicted in table 42.

	Crosstab									
Count										
			Marketing problems encounter in farming							
				Low						
				prices/		lack of				
			High	price		market		All		
		Poor	transacti	fluctuat	Lack of	informatio		marketing		
roads on co				ions	transport	n	Other	problems		
Region in	Brong	8	3	37	4	1	11	2	66	
Ghana	Ahafo									
	Regio									
	n									
	Ashan	1	0	35	0	0	28	0	64	
	ti									
	Regio									
	n									
Total		9	3	72	4	1	39	2	130	

Table 42: Marketing problems encounter by smallholder farmers in Brong Ahafo and Asanti Regions

Table 42 reveals that 72 (55%) of the participants identified low (fluctuating) prices of produce or price fluctuations as a major problem affecting smallholder, which can be a source of transaction risk affecting smallholder farmers. The second major marketing problem affecting smallholder farmers discovered by 39 (30%) of the participants is other problems not listed on the questionnaire, such as commissioner ('lead boys') activities, lack of bargaining power and unfavourable treatment of market women (traders). Also, 9 (6.9%) of the participants chose poor road networks as a challenge

affecting smallholder farmers in the study areas in both Brong Ahafo and Ashanti regions of Ghana. Again, 4 (3%) of the participants identified lack of transport or absence of reliable transport system as a major marketing problem affecting smallholder farmers, especially on market access. In addition, 3 (2%) of the participants mentioned high transaction costs as a marketing problem affecting smallholder farmers marketing activities. However, 2 (1.5%) of the participants claimed that all marketing challenges mentioned in the questionnaire affect smallholders' farmers in their farming activities. The last marketing problem identified by 1 (0.8%) of the participants is the lack of market information. The participant mentioned that smallholder farmers do not have access to reliable information on prices of produce and buyers for their produce. Chi-square test for marketing problems is shown in table 44.

Table 44: Chi-square test for marketing problems for smallholder farmers in Brong Ahafo and Asanti Regions

Chi-Sq	uare	Tests
--------	------	-------

			Asymptotic Significance (2-
	Value	df	sided)
Pearson Chi-Square	22.885ª	6	.001
Likelihood Ratio	27.750	6	.000
N of Valid Cases	130		

a. 10 cells (71.4%) have expected count less than 5. The minimum expected count is .49.

The outcome of the chi-square test (P=.001) indicates statistical significance for the responses given by the smallholder farmers on marketing problems affecting them from both Brong Ahafo and Ashanti Regions. Participants identified high price fluctuation as their major marketing problems, although, there were variations in their

responses which could be the outcome of the chi-square test. For example, the poor road network was seen as a marketing problem in the Brong Ahafo Region with 8 responses but Ashanti Region participants did not see poor road network as a marketing problem, hence gave 1 response for it. Similarly, 3 participants identified high transaction costs as a marketing problem in the Brong Ahafo but no participant in the Ashanti Region saw high transaction costs as a marketing problem affecting them.

4.10 Transaction costs affecting smallholder farmers

The participants were interviewed about the impacts of high transaction costs on their farming activities, such as on profit margins, livelihoods, market participation and other areas.

The cross-tabulation for impacts of high transaction costs on smallholder farmers' activities in the Brong Ahafo and Ashanti Regions are depicted in table 45.

Crosstab								
Count								
Participants' view on high transaction								
		Awareness of high	Reduced profit	Affect	Lower trading/market			
	-	transaction	margins	livelihoods	participation	Other	Unsure	Total
Region in	Brong	1	40	21	3	1	0	66
Ghana	Ahafo Region							
	Ashanti Region	0	28	24	3	6	3	64
Total		1	68	45	6	7	3	130

Table 45: How high transaction costs affect participants

Participants were initially questioned about their awareness of the concept of the transaction costs. Only one of the participants claimed that he was aware of the transaction costs concept. However, after a detailed explanation of the meaning of transaction costs, most of the participants confirmed they are affected by high transactions costs in one way or other.

In respect of the impact of high transaction costs on smallholder farmers' activities as mentioned earlier, 68 out of the 130 participants believed high transaction costs reduce their profit margins of which 40 of them come from Brong Ahafo Region and the remaining 28 participants come from Ashanti Region. 45 participants (21 from Brong Ahafo Region and 24 from Ashanti Region) out of the 130 participants, however, discovered that high transaction costs affect their livelihoods. 6 of the participants (3 participants from Brong Ahafo and 3 participants from the <u>Ashanti</u> Region) claimed that high transaction costs affect their market participation. The remaining 11 participants had other areas high transaction costs affect them in their farming activities.

Also, the Chi-Square test indicated statistical insignificance (P=.079, see table 16). Thus, high transaction costs affect smallholder farming. who participated in the study of farming activities.

153

Table 46: Smallholder farmers from study villages/towns views on how high transaction costs affect them

			Cross	stab				
Count								
Participants' view on high transaction costs affect them								
Participants village/town	L	Awaren ess of transacti on costs	Reduced profit margins	Affect livelihoods	Lower trading/market participation	Other	unsure	Total
	Asuyei	1	8	8	1	0	0	18
	Dabaa	0	5	2	0	2	2	11
	Aworowa	0	9	2	1	0	0	12
	Tanoso	0	8	1	0	0	0	9
	Tuobodom	0	13	6	0	1	0	20
	Oforikurom	0	2	4	1	0	0	7
	Akumadan	0	6	5	1	0	0	12
	Gyinase	0	2	7	1	2	1	13
	Gyinase- Karikari farms	0	7	5	1	2	0	15
	Kumasi- Tanoso (IPT)	0	8	5	0	0	0	13
Total		1	68	45	6	7	3	130

Only one of the participants from the Brong Ahafo Region (Asueyi) claimed he is aware of transaction costs cost. In terms of responses to the effects of high transaction costs, the highest responses on how high transaction costs affect profit margin came from 13 participants in Tuobodom, a suburb of Techiman in Brong Ahafo Region noted for the high cultivation of tomatoes in Ghana.

The second highest response on how high transaction costs affect profit margins came from Aworowa, a town in Techiman under Brong Ahafo Region noted for the

high cultivation of vegetables especially pepper and tomatoes, including ¹Gari processing. The third highest responses on how transaction costs affect profit margins came from 8 participants from Asuyei, Tanoso (near Techiman) and Kumasi-Tanoso (IPT). The fourth response on how high transaction costs affect profit margins came from Gyinase-Karikari farms (a suburb of Kumasi) in the Ashanti Region.

The fifth highest response on how high transaction costs affect profit margins came from Akumadan in Ashanti Region. 2 participants from Oforikurom (a suburb of Techiman) and Gyinase (A suburb of Kumasi), respectively, gave the lowest response to how high transaction costs affect profit margins.

Participants were also asked how high transactions costs affect their livelihoods and their responses as follows: the highest responses on how high transaction costs affect livelihoods came from 8 participants from Asueyi. 7 farmers from Gyinase were second highest in the responses on how high transaction costs affect livelihoods. The third highest responses to the impact of high transaction costs came from 6 smallholder farmers in Tuobodum. The fourth highest responses of the impact of high transaction costs on livelihoods came from 5 participants from Akumadan, Gyinase-Karikari farm and Kumasi-Tanoso (IPT) respectively. Dabaa and Aworowa farmers

¹ "Gari is made from fresh cassava which is grated, and the excess liquid is then squeezed out. The remaining cassava is then fried with over an open fire, on a broad metal pan that has been greased with a little oil, could be palm oil or other vegetable fat." Ghanaweb (2018). See picture of Gari processing at appendix 3:8.7

had the fifth responses on the impact of high transaction livelihoods. The least response of impact of the high transaction on livelihoods came from a farmer from Tanoso.

Again, smallholder farmers were asked during the questionnaire interview on how high transaction costs affect their market participation or lower trading. The highest responses came from 1 participant each from Asueyi, Aworowa, Oforikurom, Akumadan, Gyinase and Gyinase-Karikari farm. The remaining participants did not respond to the question. Thus, the participants might not be aware of the impact of high transaction costs on their market participation.

Additionally, participants were asked if there are other ways high transaction costs affect them. 2 participants from Dabaa, Gyinase and Gyinase-Karikari farms respectively claimed high transaction costs affect them in other ways rather than a reduction in profit margin, livelihoods and market participant. The remaining participants, however, did not respond to the question.

With regard to the unsure question about the impact of high transaction costs on smallholder agriculture, 2 participants from Dabaa had the highest response to this question. The second highest response came from a farmer from Gyinase. m

156

Table 47: Chi-square test on how high transaction costs affect farmers

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	54.239 ^a	45	.163					
Likelihood Ratio	50.906	45	.252					
N of Valid Cases	130							

a. 49 cells (81.7%) have expected count less than 5. The minimum expected count is .05.

The outcome of the chi-square test (P=.163) of the data indicates that there is statistical insignificance of high transaction costs on smallholder farmers activities.

4.11 Institutional innovations to reduce high transaction costs and risks

The participants were asked during the questionnaire interviews to select possible institutional innovations likely to address high transaction costs and risks affecting smallholder farmers. The responses of the participants are depicted in table 48.

Table 48: Institutional innovations to reduce high transaction costs suggested by smallholder farmers at a regional level

Crosstab									
Count		-							_
	Institutional innovation to reduce transaction costs suggested								Total
		SmallholdSmallholdPublicSmallholdererGovernmPublicSmallholderfarmer'sGovernmandfarmerCo-participatientprivateempowermeoperativeon ininterventiContractpartnershi							
Region in Ghana	Brong Ahafo Region	9	16	5	14	9	7	6	66
	Asanti Region	9	14	6	8	23	2	2	64
Total		18	30	11	22	32	9	8	130

Table 48 revealed contracting (or contract farming) as the best institutional innovation smallholder farmers required to address high transaction. 32 (about 25%) of the participants identified as institutional innovation for them regarding market access for their produce. 23 out of the 32 responses came from Ashanti Region participants and remaining 9 participants came from the Brong Ahafo Region.

The second institutional innovation participants think it can reduce high transactions costs and risks are co-operative society. 30 (23%) of the participants responded to co-operative as the institutional innovation they believe can address high transaction costs and risks affecting their farming activities. 16 out of 30 responses came from

participants in the Brong Ahafo Region and the remaining 14 participants came from the Ashanti Region.

The third highest suggested institutional innovation by the participants likely to address their high transaction costs and risks is government intervention. 22 (about 17%) of the participants confirmed government intervention as the best institutional innovation for them with the potential to address high transaction costs and risks associated with their farming activities. 14 of the responses came from participants from the Brong Ahafo Region and the remaining 8 participants came from the Ashanti Region.

Furthermore, 18 (about 14%) of the participants discovered smallholder empowerment as an institutional innovation with the potential to address high transaction costs and risks. Both Brong Ahafo and Ashanti Regions have 9 responses each out of the total 18 responses.

Also, 11 (8%) of the participants identified smallholder participation in decision making on issues affecting them as the fourth institutional innovation. 6 of the responses came from participants in the Ashanti Region and the remaining 5 responses came from participants in the Brong Ahafo Region.

Similarly, 9 (about 7%) of the participants discovered public and private partnership as the institutional innovation likely to address high transaction costs and risks affecting smallholder farmers. 7 of the responses came from Brong Ahafo Region participants and remaining 2 participants came from the Ashanti Region participants.

However, 8 participants selected other innovations not listed on the questionnaire as best institutional innovations likely to address high transaction, such as price standardisation. 7 of the participants who opted for other institutional innovation came from Brong Ahafo Region and the remaining 2 participants came from the Ashanti Region.

The specific responses from participants from selected villages and towns in the Brong Ahafo and Ashanti Regions for the current study are shown in table 51.

Also, the chi-square test for institutional innovations to reduce high transaction costs at the regional level is shown in table 49.

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	60.004ª	54	.267					
Likelihood Ratio	77.863	54	.018					
N of Valid Cases	130							

Table 49:Chi square test for institutional innovation to reduce high transaction costs

a. 70 cells (100.0%) have expected count less than 5. The minimum expected count is .43.

The outcome of the chi-square test (P=.267) for responses from participants in various towns and villages in Brong Ahafo and Ashanti Regions on institutional innovations to address high transaction costs and risks indicates statistical insignificance

				Crosstab						
Count										
		Institutional in	nstitutional innovation to reduce transaction costs suggested							
							Public			
		Smallholder	Co-	Smallholder			and			
		farmer	operati	farmer's			private			
		empowerme	ve	participation	Government	Contracti	partnersh			
	1	nt	society	in decision	intervention	ng	ір	Other	Total	
Participants	Asuyei	3	0	3	5	2	3	2	18	
village/town	Dabaa	0	4	0	0	7	0	0	11	
	Aworowa	2	4	0	3	1	1	1	12	
	Tanoso	2	3	1	1	0	1	1	9	
	Tuobodo	1	7	1	5	3	1	2	20	
	m									
	Oforikuro	1	2	0	0	3	1	0	7	
	m									
	Akumad	1	0	1	4	5	1	0	12	
	an									
	Gyinase	2	4	2	1	3	0	1	13	
	Gyinase-	3	4	0	1	5	1	1	15	
	Karikari									
	farms									
	Kumasi-	3	2	3	2	3	0	0	13	
	Tanoso									
	(IPT)									
Total		18	30	11	22	32	9	8	130	

Table 50: institutional innovations to reduce transactions costs suggested by smallholders

As discovered earlier in table 50, contracting (contract farming) had the highest responses (32) regarding institutional innovation likely to address high transaction costs and risks. Out of the 32 participants who responded to contracting (or contract farming), 7 responses came from participants from Dabaa; second highest responses came from 5 participants from Akumadan and Gyinase-Karikari farm respectively; the third highest responses came from 3 participants each from Tuobodum, Oforikurom

and Kumas-Tanoso (IPT); 2 responses came from participants from Asueyi and 1 response a participant from Aworowa.

Co-operative had the second highest responses. out of the 30 responses for cooperative, 7 responses came from participants in Tuobodum; 4 responses each came from participants from Dabaa, Aworowa, Gyinase and Gyinase-Karikari farms; 3 responses came from participants in Tanoso; 2 responses each came from Oforikurom and Kumasi-Tanoso (IPT) and no response from Asueyi; 2 responses each came from Aworowa, Tanoso and Gyinase respectively.

Government intervention is discovered to be the third suggested institutional innovation with the potential to address high transaction costs and risks. Out of the 22 responses, 5 responses each came from participants in Asueyi and Tuobodum; 4 responses came from participants in Akumadan; 3 responses came from Aworowa participants'; 2 responses came from participants from Kumas-Tanoso (IPT); 1 response each came from participants in Tanoso, Gyinase and Gyinase-Karikari farms and 0 response from participants in Dabaa.

With reference to smallholder farmers' empowerment (fourth highest responses), out of 18 responses, 3 responses came from participants in Asueyi, Gyinasi-Karikari farms and Kumas-Tanoso (IPT); 2 responses each from participants in Tanoso and Gyinase; 1 response each from participants from Tuobodum, Oforikurom and Akumadan and 0 response from participants in Dabaa.

Out of the 11 respondents who selected smallholder farmers' participation in decision as an institutional innovation to address high transaction costs and risks, the highest response came from 3 respondents from Asueyi; second highest response came 2 participants from Gyinase; least responses came from 1 participant each from Tanoso, Tuobodum and Akumadan and no responses were recorded for Dabaa, Aworowa, Oforikurom and Gyinase-Karikari farms.

Out of 9 participants who selected public and private partnership as a possible institutional innovation, 3 responses came from participants from Asueyi; 1 response each for Aworowa, Tanoso, Tuobodum, Oforikurom, Akumadan and Gyinase-Karikari farms. No responses were received from participants in Dabaa, Gyinase and Kumasi-Tanoso (IPT).

Out of 8 respondents who selected other institutional innovations in the questionnaire, 2 of the came participants in Asueyi, 2 of the responses came of Tuobodum, 1 respondent each came from Aworowa, Tanoso, Gyinase and Gyinase Karikari farms. No respondent came from Dabaa, Oforikurom, Akumadan and Kumasi-Tanoso (IPT).

The chi-square test for the suggested institutional innovation to address high transaction costs and risks for smallholder farmers in Ghana at the town and village level can be seen in table 51.

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	12.736ª	6	.047					
Likelihood Ratio	13.223	6	.040					
N of Valid Cases	130							

Table 51: Chi-square test for suggested institutional innovation to reduce transaction costs.

a. 4 cells (28.6%) have expected count less than 5. The minimum expected count is 3.94.

The outcome of the chi-square test (P=0.047) shows statistical significance on the responses from participants in the Brong Ahafo and Asanti Region on the suggested institutional innovations to address high transactions costs and risks affecting smallholder farmers.

4.12 Participants view on smallholder farmers' participation in decision making

The participants were asked if smallholder farmers are permitted to take in decision making in the study areas and their responses are shown in table 52.

Crosstab								
Count								
		Do smallholder fa in decision	armers participant n making?					
		Yes	No	Total				
Region in Ghana	Brong Ahafo Region	41	25	66				
	Ashanti Region	24	40	64				
Total		65	65	130				

Table 52: Participants view whether smallholder farmers participate in decision making or not

The table shows that 65 (50%) of the participants responded yes to smallholder participation in decision making. Out of this number, 41(32%) of the participants' responses came from the Brong Ahafo Region and 24 responses came from the participants in the Ashanti Region. The remaining 65 (50%) of the participant responded no to smallholder participation in decisionmaking Out of this number, 40 (31%) of the participants' responses came from the Ashanti Region. The remaining 25 (19%) of the responses came from participants in the Brong Ahafo Region. The participants' responses to yes and no questions on smallholder farmers' participation in decisions according to their towns or villages are shown in table 53.

	Crosstab								
Count									
		Do smallholder fa	rmers participate						
		in decisior	n-making?						
		Yes No		Total					
Participants village/town	Asuyei	8	10	18					
	Dabaa	0	11	11					
	Aworowa	11	1	12					
	Tanoso	8	1	9					
	Tuobodom	13	7	20					
	Oforikurom	1	6	7					
	Akumadan	4	8	12					
	Gyinase	8	5	13					
	Gyinase-Karikari farms	8	7	15					
	Kumasi-Tanoso (IPT)	4	9	13					
Total		65	65	130					

Table 53: Participants responses to smallholder farmers' participation in decision-making

Out of 65 (50%) participants who responded yes to smallholders' participation in decision making; 13 of-of them came from Tuobodum; 11 of the participants came from Aworowa; 8 participants each came from Asueyi, Tanoso, Gyinase and Gyinase-Karikari farms; 4 responses each came from participants in Akumadan and Kumasi-Tanoso (IPT); 1 response came from a participant in Oforikurom and 0 response came from participants in Asueyi. Similarly, out of 65 (50%) participants who responded no to smallholder participation in decision making, 11 responses came from participants in Dabaa; 10 responses came from participants in Asueyi;9 responses came from participants in Kumasi-Tanoso (IPT); 8 responses came from participants in Asueyi;9 responses came from participants in Kumasi-Tanoso (IPT); 8 responses came from participants in Asueyi;9 responses came from participants in Kumasi-Tanoso (IPT); 8 responses came from participants in Asueyi;9 responses came from participants in Kumasi-Tanoso (IPT); 8 responses came from participants in Asueyi;9

farms; 6 responses came from participants in Oforikurom; 5 from participants in Gyinase; 1 response each came from participants in Aworowa and Tanoso.

4.13 Areas smallholder farmers can participate in decision making

The participants were asked on the specific areas smallholder farmers can participate in the decision making on farming, marketing activities and issues affecting them. Their responses are depicted in table 54.

	Crosstab								
Count									
		А	Areas smallholder farmers allow participation in decision						
								No	
								response	
								to	
								farmers'	
		Governmen			Farmer			participati	
		t	Stakeholder		association		None of	on in	
		intervention	participation	NGOs	meetings	Other	the above	decisions	
Region in	Brong	0	1	1	30	7	3	24	66
Ghana	Ahafo								
	Region								
	Ashanti	2	11	0	11	1	1	38	64
	Region								
Total		2	12	1	41	8	4	62	130

Table 54: Areas smallholder farmers can participate in decision making in both Brong Ahafo and Ashanti Regions

Table 54 shows that 62 of the participants claimed smallholder farmers do not have access to any form of meeting in both Brong Ahafo and Ashanti Regions. 12 of the participants 11 from Ashanti Region and 1 from Brong Ahafo Region, however, mentioned that smallholder farmers take part in stakeholder meetings; 8 of the participants 7 from the Brong Ahafo Region and 1 from the Ashanti Region mentioned

that smallholder farmers participate in other decisions not included in the questionnaire, such as informal meetings to agree on prices for market women. In addition, 4 participants (3 from the Brong Ahafo and 1 from Ashanti Region), however, did not respond to any of the questions; 2 participants from Asanti Region confirmed that smallholder farmers allowed to take part in the decision on government interventions, such as fertilizers for cocoa farmers in the Region. One participant from the Brong Ahafo Region mentioned that smallholder farmers take part in decisions organise by NGOs.

The specific responses from towns and villages represented by the participants in the Brong Ahafo and Ashanti Regions are depicted in table 55.

Crosstab									
Count									
		Areas	smallholde	r farmers	s are allowe	d to part	icipate in de	cision	Total
								No	
								response	
								for	
		Governm	Stakehold		Farmer			farmers'	
		ent	er		associatio			participati	
		interventi	participati		n		None of	on in	
		on	on	NGOs	meetings	Other	the above	decisions	
Participants	Asueyi	0	0	1	4	1	2	10	18
village/town	Dabaa	0	0	0	0	0	0	11	11
	Aworowa	0	0	0	11	0	0	1	12
	Tanoso	0	0	0	8	0	0	1	9
	Tuobodum	0	0	0	7	6	1	6	20
	Oforikurom	0	1	0	0	0	0	6	7
	Akumadan	0	3	0	0	1	0	8	12
	Gyinase	0	1	0	7	0	0	5	13
	Gyinase-	2	4	0	3	0	0	6	15
	Karikari farms								

Table 55: Areas smallholder farmers are permitted to take part in decision making

	Kumasi-Tanoso (IPT)	0	3	0	1	0	1	8	13
Total		2	12	1	41	8	4	62	130

Table 55 shows areas smallholder farmers currently allow to take part in decision making. Out of the 130 participants interviewed, 62 of them approximately 48% mentioned that smallholder farmers are hardly allowed to take part in decisions that affect them either from the government, other stakeholders, farmer associations, and NGOs. Out of this number, 11 responses came from participants in Dabaa; 10 responses came from participants in Asueyi; 8 responses each came from participants in Akumadan and Kumasi-Tanoso (IPT); 6 responses each came from participants in Tuobodum, Oforikurom and Gyinase-Karikari farm; 5 responses came from participants in Gyinase and 1 response came from participants in Aworowa and Tanoso. However, 41 (32%) of the participants who mentioned that smallholder farmers are only allowed to participate in decision organise by farmer associations,11 of them came from Aworowa; 8 of them came from Tanoso; 7 responses each came from Tuobodum and Gyinase respectively; 4 responses came from participants in Asuevi; 3 responses came from participants in Gyinase-Karikari farms; 1 response came from a participant in Kumasi-Tanoso and 0 response came from participants in Dabaa, Oforikurom and Akumadan. 12 of the participants' equivalent to 9% of the participants claimed that smallholder farmers are allowed to participate in other stakeholder meetings, such as community meetings and meetings with extension officers. Out of this number, 4 responses came from participants in Gyinase-Karikari farms; 3 responses each came from participants from Akumadan and Kumasi-Tanoso (IPT); 1 response each came from participants in Oforikurom and Gyinase. The

remaining participants from Asueyi, Dabaa, Aworowa, Tanoso and Tuobodum did not respond to the question.

Eight of the participant equivalents to 6% of the entire participants mentioned that smallholder farmers at times allow participation in other meetings not listed on the questionnaire, such as meeting with traders (market women) under the informal setting. The participants in Tuobodum responded more (6 responses) to this question compared to other participants. Also, 1 response each came from participants in Asueyi and Akumadan. None of the remaining participants from Dabaa, Aworowa, Tanoso, Oforikurom, Gyinase, Gyinase Karikari farms and Kumasi-Tanoso (IPT) responded to the question. Additionally, 4 of the participants equals 3% of the participants mentioned that no smallholder farmers are allowed to take part in meetings listed on the questionnaire. Out of the 4 responses, 2 of the respondents came from Asueyi and 1 response each came from participants in Tuobodum and Kumasi-Tanoso (IPT). The remaining 126 participants however did not a response to the question or refused to accept that smallholder farmers are denied in participatory decision making. In addition, 2 (2%) of the participants from Gyinase-Karikari farms mentioned that smallholder farmers take part in government decisions. The remaining 128(98%) of the participants disagreed that smallholder farmers are allowed to take part in decisions regarding government interventions. Finally, a participant from Asueyi mentioned that smallholder farmers can participate in decisions made by NGOs. The remaining 129 (99%) of the participants did not agree that smallholder farmers are allowed to participate in decision-making.

169

4.13.1 Impact of smallholder farmers' participation in decisions on transaction costs and market access

The participants in the Brong Ahafo and Ashanti Regions view on how smallholder farmers' participation in decision-making can promote market access. The responses are shown in table 56.

Crosstab									
Count									
Participant's view on how farmers' participation in the c promote market					n the deci	sion can			
				Reduce					
			Improve	their	Access				
		All needs	bargaining	transaction	market		All the		
		will be met	power	costs	information	Other	above	Total	
Region in Ghana	Brong Ahafo Region	23	27	1	2	6	7	66	
	Ashanti Region	39	6	4	6	7	2	64	
Total		62	33	5	8	13	9	130	

Table 56: Benefits of participation in the decision for smallholder farmers

Table 56 shows that majority (62) of the participant approximately 48% believed that all smallholder farmers needs will be met if, they are given chance to participate in a decision that affects their day-to-day activities. Out of this number, 23 of the responses came from the Brong Ahafo Region and the remaining 39 responses came from participants in the Ashanti Region. The second highest responses were on improvement in the bargaining power. Thirty-three (25%) of the participants, mentioned that their bargaining power in the local markets will be improved if, they are given an opportunity to take part in decisions on their activities. Out of this number, 27 responses came from participants in the Brong Ahafo Region and 6 responses came from participants in the Ashanti Region. The third highest responses on the benefit of smallholder farmers' participation in decision came from 13 participants on other benefits not listed on the questionnaire, such as access to credit facilities. Out of the 13 responses, 7 responses came from participants in the Ashanti Region and 6 responses came from participants in the Ashanti Region. Nine of the participants approximately 7% of the entire participants claimed that all the benefits listed on this questionnaire, such as access to the market, reduction transaction costs, other benefits, improved bargaining power are likely to be achieved through smallholder participation in decision-making. Out of the 9 responses came from the Ashanti Region. In addition, 8 (6%) of the participants rather thought participation in decision-making will facilitate their access to market information. Only 5 (4%) of the participants believed participation in the decision will lead to a reduction in high transaction costs.

			Crossta	b				
Count								
		Participar	nt's view on h	ow farmers'	participation	in the dec	ision can	
			promote market					
				Reduce	Access			
			Improve	their	market			
		All needs	bargaining	transactio	informatio		All the	
		will be met	power	n costs	n	Other	above	
Participants	Asuyei	9	7	0	1	1	0	18
village/town	Dabaa	10	1	0	0	0	0	11
	Aworowa	3	3	1	0	3	2	12
	Tanoso	2	1	0	1	0	5	9
	Tuobodom	6	12	0	0	2	0	20
	Oforikurom	3	4	0	0	0	0	7
	Akumadan	9	1	0	0	0	2	12
	Gyinase	4	1	2	2	4	0	13
	Gyinase-Karikari	9	2	1	2	1	0	15
	farms							
	Kumasi-Tanoso	7	1	1	2	2	0	13
	(IPT)							
Total		62	33	5	8	13	9	130

Table 57: Participants view on how smallholder farmers' participation

The table shows that out of the 62 responses from participants who believe that all the smallholder farmers needs will be met through participation in decision, 10 responses came from participants in Dabaa; 9 responses each came from participants in Asueyi and Gyinase-Karikari farms; 7 responses came from Kumasi-Tanoso (IPT); 6 responses came from the participants in Tuobodum; 4 responses came from participants in Gyinase; 3 responses each came from participants in Aworowa and Oforikurom and 2 responses came from participants in Tanoso. Besides, out of the 33 participants who claimed smallholder farmers participant can improve bargaining power, 12 responses came from participants in Tuobodum; 7 responses came from

participants in Asueyi; 4 responses came from participants in Oforikurom; 3 responses came from participants in Aworowa; 2 responses came from participants in Gyinase-Karikari farms and 1 response each came from participants in Dabaa, Tanoso, Akumadan, Gyinase and Kumasi-Tanoso (IPT). Moreover, out of the 13 participants who claimed smallholder farmers will get other benefits from the participatory decision, 4 responses came from Gyinase participants; 3 responses came from participants in Tuobodum; 2 responses each came from participants in Tuobodum and Kumas-Tanoso (IPT); 1 response each came from participants in Asueyi and Gyinase-Karikari farms. Zero response was received from participants in Dabaa, Tanoso, Oforikurom and Akumadan.

4.14 Findings from traders (agents)

The section looks at the views of 10 traders (market women) who took part in the questionnaire survey in the Brong Ahafo and Ashanti Regions of Ghana. Some of the questions used in the questionnaire were akin to that of smallholder farmers. This approach could help to understand traders' views on how high transactions costs affect their transactions with smallholder farmers, including possible institutional innovations to address those transactions. The section will initially look at the descriptive statistic of the participants. The second part will look at their views on smallholder farmers' challenges in relation to the marketing of their produce. The third part of this section will look at sources of high transaction costs and risks and its implications on smallholder farmers and traders. The final part will look at institutional innovations to address high transactions costs and risks, including the benefits of participatory decision for smallholder farmers.

4.14.1 Age of traders who participated in the study

The cross-tabulation of the age of traders or market women ("market queens") who participated in the questionnaire interviews in the Brong Ahafo Region and Ashanti Regions are shown in table 58.

Crosstab								
Count								
	Age	e of participa						
		20-29	40-49	50-59	Total			
Region in Ghana	Brong Ahafo	0	3	2	5			
	Ashanti Region	2	2	1	5			
Total		2	5	3	10			

Table 58: Cross tabulation for traders or market women in both the Brong Ahafo and Ashanti Regions

Table 59 shows that most of the traders (market women) who participated in the study were within ages 40-49. Five participants were within this age group. Out of this number, 3 participants came from the Brong Ahafo Regions. The second highest age range for the participants was ages 50-59 and 3 three respondents were within the above age group. Besides, 2 participants selected 20-29 as their age range and both participants came from the Ashanti Region. None of the respondents was within ages 60+. The specific locations (towns/villages) of traders in the Brong Ahafo and Ashanti Regions whose ages were discussed can be seen in table 59.

Table 59: Participants ages shown in towns/villages level

Crosstab							
Count							
		Ag	e of participa	nts			
		20-29	40-49	50-59	Total		
The actual location of the	Techiman market	0	3	2	5		
study	Gyinase-Karikari farms	1	2	0	3		
	Gyinase	1	0	1	2		

	Total	2	5	3	10
--	-------	---	---	---	----

The table shows that out of 5 participants whose ages fall within 40 to 49, 3 of them come from traders (market women) in the Techiman market. The remaining 2 traders came from Gyinase-Karikari farm. Also, out of 3 participants within ages 50 to 59 in the traders' interviews, 2 of them came from Techiman market women and remaining 1 participant came from Gyinase. In addition, ages 20 to 29 had 1 participant each from Gyinase and Gyinase Karikari farm.

The Chi-square test for the age of participants in both study regions is shown in table 60.

Table 60:	Chi-square	test for ages o	of traders in bo	oth the Brong	Ahafo and	Ashanti Regions
-----------	------------	-----------------	------------------	---------------	-----------	-----------------

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	2.533ª	2	.282					
Likelihood Ratio	3.314	2	.191					
Linear-by-Linear Association	2.064	1	.151					
N of Valid Cases	10							
a. 6 cells (100.0%) have expected count less than 5. The minimum expected count is 1.00.								

The chi-square test (P=0.282) indicates statistical insignificance of the responses given by traders in both Brong Ahafo and Ashanti Regions. The ages of the participants in both study areas regions are very similar, hence this could be the outcome of the chi-square test.

4.14.2 Sources of information for smallholder farmers and agents market

transactions

The traders were answered sources of information for their interactions with smallholder farmers and their responses are shown in table 61.

Table 61: Sources of market information for market interactions between smallholder farmers and traders

Crosstab								
Count								
		Sources of	f market infor	mation				
		Market						
		agents/buyers	Media	Other	Total			
Region in Ghana	Brong Ahafo	2	2	1	5			
	Asante Region	1	0	4	5			
Total		3	2	5	10			

Most of the traders (market women) 5 in total mentioned that they access information from other sources to enable them to interact with smallholder farmers, such as telephone calls. Out of this number, 4 of the responses came from the Ashanti Regions traders and 1 response came from a participant in the Brong Ahafo Region. The next highest response on sources of information for traders and smallholder farmers was agents or traders (market women) themselves. It had 3 responses in total and out of this, 2 responses came from traders (agents) in participants in the Brong Ahafo Region and 1 response came from a participant in the Ashanti Region. The least responses were received on media, such as local radio stations. Only 2 of the participants from the Brong Ahafo Region selected media as a source of information for smallholder farmers' market interactions with agents or traders (market women). No participant in the Ashanti Region responded to this question.

The specific locations of the traders who responded to sources of information for smallholder farmers and traders' interactions are shown in table 62.

Crosstab								
Count								
		Sources of	market inforn	nation				
		Market						
		agents/buyers	Media	Other	Total			
Towns/Villages	Techiman market	2	2	1	5			
	Gyinase-Karikari farms	0	0	3	3			
	Gyinase	1	0	1	2			
Total		3	2	5	10			

Table 62: Sources of information for smallholder farmers' interaction with traders at town/village levels

Out of the 5 respondents for other sources of information for market interactions between traders and smallholder farmers, 3 responses came from Gyinase-Karikari farms site. The traders were buying from the farmers at the time of the interview farmgate. One response came from a trader who was buying vegetables from Gyinase farmers at farmgate and the remaining response came from a trader in the Techiman market. The chi-square test for the respondents or traders at the regional level is shown in table 63.

Chi-Square Tests							
	Value	df	Asymptotic Significance (2-sided)				
Pearson Chi-Square	4.133ª	2	.127				
Likelihood Ratio	5.040	2	.080				
Linear-by-Linear Association	1.066	1	.302				
N of Valid Cases	10						

Table 63: Chi-square test for traders' view on sources of information for their interactions with smallholder farmers

a. 6 cells (100.0%) have expected count less than 5. The minimum expected count is 1.00.

The chi-square test (P=0.127) shows statistical insignificance on traders' responses for sources of information for smallholder farmers transactions with traders in rural markets in Ghana.

4.14.3 Traders responses on distribution channels for smallholder farmers

The traders were asked about the distribution channels for smallholder farmers produce in both the Brong Ahafo and Ashanti Regions and their responses are shown in table 64.

Crosstab										
Count										
			distributions	channels for pro	oducts					
		Spot market	Contractual	Agents/Middl	Self					
		/ farm-gate	arrangements	emen	(farmer)	Other	Total			
Region in	Brong Ahafo	1	1	1	2	0	5			
Ghana	Asante Region	2	0	0	0	3	5			
Total 3 1 1 2						3	10			

Table 64: Traders views on distribution channels for smallholder farmers

The highest responses from the traders were on spot markets (farmgate) and other distribution channels not listed on the questionnaire with 3 responses each. Some of the smallholder farmers in Akumadan and Tuobodum mentioned in the key informant interviews that many traders prepare to buy from farmgate to dictate the price for the smallholder farmers produce. Also, some of the traders claimed that they prefer to buy the produce at farmgate or spot market to other distribution channels to avoid commissioners' interference. With regards to other distribution, some of the traders mentioned that they like farmers to aggregate their produce to one location for bulk purchase in order to get the quantity of produce they are after at cheaper costs. Hence, higher responses for both the farmgate and other distribution methods. The second highest response for the channel of distribution for smallholder farmers according to the traders is farmers themselves with 2 responses from participants in the Brong

Ahafo Regions. Contractual arrangement and traders or middlemen received 1 respondent each. The responses of the traders are further shown in figure 17.



Figure 17: Traders view on distribution channels for smallholder farmers

The chi-square test for traders' responses on distribution channels for smallholder farmers is shown in table 66.

Table 66: Chi-square test for the channel of distribution for smallholder farmers

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	7.333 ^a	4	.119					
Likelihood Ratio	10.044	4	.040					
Linear-by-Linear Association	.301	1	.583					
N of Valid Cases	10							

a. 10 cells (100.0%) have expected count less than 5. The minimum expected count is .50.

The chi-square test (P=0.119) indicates statistical significance for the responses from traders on distribution channels for smallholder farmers produce. The result clearly fit

perfectly well with the responses from the traders on the smallholder farmers distributions channels in the cross tabulation. The responses from the traders in the Ashanti Region with regards to the distribution channels were different from the responses of the distribution channels in the Brong Ahafo Region. For example, the crosstabulations revealed that the traders in the Ashanti Region did not identify contract contractual arrangement, agents (market women) and self (farmers taking the produce to the local markets) as the distribution channels since they sell their produce mostly at the farmgate.

4.14.4 Market problems affecting smallholder farmers from traders' perspective

The market women (traders), who participated in the study identified challenges affecting smallholder farmers in their attempt to access the ready market for their produce. The specific marketing problems affecting smallholder farmers mentioned by the traders are shown in table 67:

Crosstab										
Count										
Market problems affecting farmers and agents										
	High Low									
			transaction	prices/fluctuat	Lack of					
	Poor roads costs ions transport 6									
Region in	Brong Ahafo	2	1	1	1	0	5			
Ghana	Asante	0	1	3	0	1	5			
	Region									
Total	Total 2 2 4 1 1									

Table 67: Traders' view on marketing problems affecting smallholder farmers

Table 68 shows that price fluctuation is the biggest marketing problem affecting smallholder farmers' market access. Four (40%) of the participants saw it as a

problem. The same problem came up as the biggest in the smallholder farmers interviews. The participants saw poor roads network and high transaction costs out as the second marketing problem affecting smallholder farmers. Both problems had 2 (20%) of the traders' responses respectively. Also, transport and other problems, such as commissioners' activities, were the third marketing problems affecting smallholder farmers' market access. Each of the above problems had 1 (10%) of the traders' responses.

The specific responses from participants according to their towns or villages in the Brong Ahafo and Ashanti Regions who took part in the study can be seen in table 68.

Crosstab									
Count									
Market problems affecting farmers and agents									
High Low prices									
		Poor	transaction	/fluctuation	Lack of				
		roads	costs	S	transport	Other	Total		
Actual location of	Techiman market	2	1	1	1	0	5		
the study	Gyinase-Karikari farms	0	1	2	0	0	3		
	Gyinase	0	0	1	0	1	2		
Total	2	2	4	1	1	10			

Table 68: Market problems identified by traders in villages/Towns in the Brong Ahafo and Ashanti

Out of 4 (40%) of the participants who identified prices fluctuations as a problem for the marketing of smallholder farmers produce, 2 (20%) responses came from traders

Gyinase-Karikari farms. High transaction costs received 2 (20%) of the responses Techiman market women and a trader from Gyinase Karikari farms responded see high Gyinase traders had 1 response each. The poor roads received two responses from Techiman market women; high transaction costs received 2 (20%) responses and 1 (10%) of the responses came from Techiman market women and Gyinase Karikari farms vegetable traders (buyers); 1 (10%) response came from a participant in Techiman market women for lack of transport and 1 (10%) response came from a participant in Gyinase for other marketing problem, such as lack of information.

4.14.4.1 Traders view on market the smallholder farmers desired most

The traders (market women) in both Brong Ahafo and Ashanti Regions were asked about the market currently, they or smallholder farmers access with their produce. All the traders who participated in the study selected domestic markets as the main markets. Thus, none of the traders and farmers interviewed access either regional or international markets with farm produce in the study areas in Ghana.

Consequently, they were asked from their personal point of views the best market smallholder farmers desired out of international, regional and domestic markets. The responses of the traders are shown in table 69.

Table 69: The market smallholder farmers like most

Crosstab								
Count								
Prefer market over the current market								
			Domestic					
	International	Regional	market	Total				
Region in Ghana	Brong Ahafo	2	1	2	5			
-----------------	----------------	---	---	---	----			
	Ashanti Region	0	1	4	5			
Total		2	2	6	10			

Six of the participants claimed that smallholder farmers prefer domestic markets to any other markets since they cannot meet the requirements in both international and regional markets. Out of this number, 4 of the responses came from participants in the Ashanti Region and 2 of the responses came from the Brong Ahafo Region. Two traders in the Brong Ahafo, however, mentioned that smallholder farmers prefer international markets to both domestic and regional markets. The regional market received 1 response from a participant in the Brong Ahafo and 1 response from a participant in the Ashanti Region. The responses are illustrated further in figure 19.



Figure 19: responses of participants on desired markets for smallholder farmers

The responses of the traders' according to their towns or villages are shown in table

70.

	Cros	sstab				
Count						
		Prefer market over the current market				
				Domestic		
	1	International	Regional	market		Total
	Techiman market	2	1		2	5
	Gyinase-Karikari farms	0	1		2	3
	Gyinase	0	0		2	2
Total		2	2		6	10

Table 70: Traders in views on the best markets for smallholder farmers at towns/villages level

The table shows that out of the 6 (60%) of the respondents who selected domestic markets as the best market smallholder farmers want, 2 (20%) of the respondents from Techiman market, Gyinase-Karikari farms and Gyinase respectively mentioned that smallholder farmers like domestic markets compared to the remaining market types. Two (20%) of the traders from Techiman market selected international markets as the desired market for smallholder farmers. One (10%) of the participants in the Techiman market and 1 (10%) of the participants in Gyinase-Karikari farms claimed that the regional market is the desired market for the participant.

The chi-square test for the responses of traders on the market smallholder farmers like the most is shown in table 71.

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square	2.667 ^a	2	.264			
Likelihood Ratio	3.452	2	.178			
Linear-by-Linear Association	2.250	1	.134			
N of Valid Cases	10					
a = 6 colls (100.0%) have expected	stad count los	s than 5 Th	minimum expected count is 1.00			

Table 71: Chi-square test for preferred market for smallholder farmers from traders' perspective

a. 6 cells (100.0%) have expected count less than 5. The minimum expected count is 1.00.

The chi-square test (P=0.264) shows statistical insignificance on the preferred market for smallholder farmers from the perspective of the traders (market women). In fact, the traders from both regions had different views on the market smallholder farmers like most. For example, the traders from Techiman (Brong Ahafo Region) thought smallholder farmers like international markets since, many of them are selling their cash crops, such as cocoa through the government of Ghana and other private cocoa buying companies into the international markets. However, the traders in Gyinase and Gyinase-Karikari farms (Ashanti Region) did not select the international market as the preferred market for smallholder farmers since many of them do not export cash crops through the government and some private cocoa buying companies.

4.14.5 Comparison of benefits for smallholder farmers in domestic, regional and international markets

The traders were asked whether smallholder farmers can benefit more from accessing both domestic and regional markets compared to the international markets. The responses from the participants are shown in table 72.

Table 72: Do smallholder farmers benefit more in regional and domestic markets than in the international markets?

Crosstab						
Count						
		Do local and regional markets offer more benefits				
		thai				
		Yes	No	Not sure	Total	
Region in Ghana	Brong Ahafo	2	3	0	5	
	Ashanti Region	4	0	1	5	
Total		6	3	1	10	

Six (60%) of the participants believed that smallholder farmers will benefit more in accessing both domestic and West Africa regional markets compared to the international markets. This is due to the demands in the international markets, such as high standards, year-round production and low level of most smallholder farmers' education. Out of the 6 responses, 4 responses came from Ashanti Region and the remaining 2 responses came from participants in the Brong Ahafo Region. Three of the respondents from the Brong Ahafo, however, disagreed that both regional and

domestic markets offer more benefits than international markets. They argued that smallholder farmers can benefit more in the international markets if most of them can access support from the government or NGOs. One participant from the Ashanti Region was not sure whether domestic and regional markets will benefit traders' more than international markets.

Also, the participants' responses from towns and villages on whether domestic and regional markets offer more benefits to the smallholder farmers than the international markets in towns and villages in both the Brong Ahafo and Ashanti Regions are shown in table 73.

Table 73: Traders responses on the comparison of for smallholder farmers to access domestic and regional markets instead of international markets.

Crosstab						
Count						
	_	Do local and regional markets offer more benefits than international markets				
		Yes	No	Not sure	Total	
Towns/villages	Techiman market	2	3	0	5	
	Gyinase-Karikari farms	3	0	0	3	
	Gyinase	1	0	1	2	
Total		6	3	1	10	

Out of the 6 respondents who claimed domestic and regional markets offer more benefit to smallholder farmers than international markets, 3 responses came from Gyinase Karikari farms, 2 responses came from participants in the Techiman market and 1 response came from a participant in Gyinase. Also, all 3 respondents who did not see more benefits in the domestic and regional compared to the international markets came from Techiman. The respondent who was not sure whether domestic and regional markets are preferred to the international market came from Gyinase.

The chi-square test for responses on whether domestic and regional markets are more beneficial to the international market is shown in table 74.

Table 74: Chi-square test for responses on whether domestic and regional markets are beneficial to smallholders than international markets

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square	8.167ª	4	.086			
Likelihood Ratio	8.456	4	.076			
Linear-by-Linear Association	.077	1	.781			
N of Valid Cases	10					
a. 9 cells (100.0%) have exped	cted count les	s than 5. The	e minimum expected count is .20.			

The chi-square test (P=0.086) indicates statistical significance on the responses given by traders in both Ashanti and the Brong Ahafo Regions. Majority of the participant believed smallholder farmers will benefit more from their local and regional markets as many of them are familiar with those markets. However, three of the traders in Techiman (Brong Ahafo Region) claimed that the international markets are more beneficial to both local and domestic in terms of financial rewards.

4.15 Do traders (market agents) and smallholder farmers received support on the market?

The market women were asked during the interviews in both Ashanti and Brong Ahafo on whether smallholder and traders have external support to enable them to access better markets. The responses from the traders are shown in table 75.

Crosstab							
Count							
		Do farmer	s or agent				
		receive s	upport for				
		market	access				
		No	Yes	Total			
Region in	Brong Ahafo	5	0		5		
Ghana	Ashanti	4	1		5		
	Region						
Total		9	1		10		

Table 75: Do traders and smallholder farmers receive support for market access

Nine (90%) of participants claimed that both traders (market agents) and smallholder farmers do not access support from anyone on market access in the study areas. Out of this number, 5 (50%) of the responses came from the Brong Ahafo Region and the remaining 4 (40%) of the participants came from the Ashanti Region. Only 1 participant from Ashanti Region claimed that traders and smallholder farmers have access to support on market access. The chi-square test for the responses on how whether traders and smallholder farmers' access support on market access or not is shown in table 76.

Chi-Square Tests								
			Asymptotic					
			Significance (2-	Exact Sig. (2-	Exact Sig. (1-			
	Value	df	sided)	sided)	sided)			
Pearson Chi-Square	1.111ª	1	.292					
Continuity Correction ^b	.000	1	1.000					
Likelihood Ratio	1.498	1	.221					
Fisher's Exact Test				1.000	.500			
Linear-by-Linear Association	1.000	1	.317					
N of Valid Cases	10							
a. 4 cells (100.0%) have expe	cted count le	ss than 5. Th	ie minimum expect	ed count is .50.				
b. Computed only for a 2x2 ta	ble		· · · ·					

Table 76: Chi-square test on whether traders and smallholder farmers receive support for market access

The chi-square test (P=0.292) indicates statistical insignificance about the responses from traders on whether traders and smallholder farmers access support on market access. The P value of the chi-square test might due to the similarities in the responses from the participants in both regions with regards to the support for market access. Ninety per cent of the participants claimed they do not access any form of support for market participation either from the government or NGOs.

The specific location of the participants who responded to the question of support for traders and smallholder farmers are shown in table 77.

Crosstab						
Count						
		Do farmers or agent receive support for market access				
		No	6	Total		
Towns/villages	Techiman market	5	0	5		
	Gyinase-Karikari farms	2	1	3		
	Gyinase	2	0	2		
Total		9	1	10		

Table 77: Do traders and smallholder farmers access support on market access?

The table shows that out of the 9 participants who mentioned that both traders and smallholder farmers have no support on market access, 5 of the responses came from Techiman; 2 responses came from participants in Gyinase-Karikari farms and 2 responses. With regards to yes response, only 1 participant from Gyinase-Karikari farms mentioned that smallholder farmers have access to support on market access. The overall responses show that smallholder farmers interviewed had no proper market access.

4.16 Awareness of high transaction costs affecting agents and smallholders

The traders were asked whether they are aware of how high transaction costs affect them and the smallholder farmers. The responses of the traders are shown in table 78.

Crosstab							
Count		T					
		Awareness of how hig	gh transaction costs				
		affect farmers					
	-	No	Yes	Total			
Region in Ghana	Brong Ahafo	2	3		5		
	Asante Region	3	2		5		
Total		5	5		10		

Table 78: Awareness of high transaction costs on market interactions between traders and farmers

Table 78 shows that 5 (5%) of the participants were not aware of the effects of high transaction costs on existing trade interaction between them and smallholder farmers. Out of the 5 responses, 3 responses came from traders in the Ashanti Region and the remaining 2 responses came from traders in the Brong Ahafo Region. However, 5 (5%) of the participants claimed they are aware of the impacts of high transaction costs on interactions between agents (traders) and smallholder farmers in rural markets of Ghana. The specific responses from participants according to their participating towns or villages in Ghana are shown in table 78.

Table 78: Awareness of high transaction costs effects at villages/towns

Crosstab						
Count						
		Awareness of how high transaction costs affect farmers and agents				
		No	Yes	Total		
The actual location of the	Techiman market	2	3	5		
study	Gyinase-Karikari farms	1	2	3		
	Gyinase	2	0	2		
Total		5	5	10		

Out of the 5 participants who mentioned that they are not aware of how high transaction costs affect them and the smallholder farmers, 2 of them came from Techiman and Gyinase respectively and the remaining 1 came from Gyinase-Karikari farms. Similarly, out of 5 participants who claimed that they are aware of how high transaction costs affect smallholder farmers, 3 of them came from Techiman; 2 of them came from Gyinase-Karikari farms and no response came from participants in Gyinase.

4.17 High transaction costs affecting marketing interaction between traders and smallholder farmers in rural markets of Ghana

The traders or market women were asked during the interview about the specific (or sources) of high transaction costs affecting their market transactions with smallholder farmers in the rural markets of Ghana. Their responses are given in table 79.

Crosstab							
Count							
Sources of transaction cost affecting own activities							
		Bargaining			No response on		
		costs	Contracting	Other	TC	Total	
Region in Ghana	Brong Ahafo	1	2	2	0	5	
	Ashanti Region	0	0	2	3	5	
Total		1	2	4	3	10	

Table 79: Sources of high transaction costs affecting traders' interaction with smallholder farmers

The table shows that 40% of the participants mentioned other transactions costs not widely discussed in the literature, such as commissioners' activities in the rural agricultural markets in Ghana. Out of this number, the Brong Ahafo and Ashanti Regions received 2 responses each. Three (30%) of the respondents from the Ashanti Region did not know anything about transactions costs. Hence, they were unable to comment on this question. Two (20%) of the participants from the Brong Ahafo Region mentioned that contracting or hiring people to assistant the interactions or transactions with smallholder farmers contribute to high transaction costs. Also, 1(10%) of the participants from Brong Ahafo Region claimed that bargaining costs are another source of high transaction cost in their market transactions between smallholder farmers, although most of the farmers interviewed mentioned that traders have got more bargaining power compared to the traders.

The responses from participants in relation to their villages or towns within the 5 Ashanti and Brong Ahafo Regions are shown in table 80.

Table 80: Sources of high transaction costs identified by participants at villages/towns level

Crosstab	
Count	

	Type of tra					
		Bargaining			No response	
	-	costs	Contracting	Other	on TC	Total
Actual location of the	Techiman market	1	2	2	0	5
study	Gyinase-Karikari	0	0	2	1	3
	farms					
	Gyinase	0	0	0	2	2
Total		1	2	4	3	10

Out of the 4 participants who selected other sources of high transaction costs, 2 of them came from Techiman and the remaining 2 participants came from Gyinase-Karikari farms. Also, out of 3 participants who did not respond to the question on sources of transaction costs, 2 of them came from Gyinase and remaining 1 participant came from Gyinase-Karikari farms. The 2 participants who claimed contracting is the source of high transaction costs for traders and smallholder farmers came from Techiman market. The 1 participant who selected bargaining costs as a source of high transaction costs came Techiman market.

4.18 The implication of high transaction costs in the market transactions between traders and smallholder.

The traders were asked about the implication of high transaction costs in their transactions with smallholder farmers and their responses are shown in table 81.

Crosstab								
Count								
		What are impli	What are implications on high transaction costs					
			Affects					
		Reduce profit	livelihoods	Other	Total			
Region in Ghana	Brong Ahafo	3	1	1	5			
	Ashanti Region	2	1	2	5			

Table 81: Traders view on how high transaction costs affect their interactions with smallholder farmers

	Total	5	2	3	10
--	-------	---	---	---	----

The table clearly shows that 5(50% of the participants identified high transaction costs as a problem likely to the reduction of profit in the marketing transaction between traders and smallholder farmers. In other words, if traders encounter high transaction costs in their transactions with smallholder farmers both parties profit margins will be affected. Three of the responses came from the participants in the Brong Ahafo Region and the remaining; 2 responses came from participants in the Ashanti Region. Three (30%) of the participants thought high transactions costs between them and farmers can result in other challenges, such as loss of business. Out of this number, 2 responses came from the Ashanti Region and the remaining 1 response came from a participant in the Brong Ahafo Region. Two (20%) of the participant claimed that high transaction costs can affect the livelihoods of both traders and smallholder farmers and 1 response came from a participant in the Brong Ahafo Region.

The responses on implications of the high transaction costs on the market interactions between traders (agents) and smallholder farmers according to participants' towns or villages are shown in table 82.

Crosstab							
Count							
		What are imp	plications on hig	h transaction			
			Affects				
		Reduce profit	livelihoods	Other	Total		
Towns/villages	Techiman market	3	1	1	5		
	Gyinase-Karikari farms	2	0	1	3		
	Gyinase	0	1	1	2		
Total		5	2	3	10		

Table 82: Implication of high transaction costs on marketing interactions between traders and farmers at the village/town level

As discovered earlier, 5 participants claimed high transactions costs affect the profit margins of both traders and farmers in the market interactions. Out of this number, 3 responses came from participants in Techiman and the remaining two respondents came from Gyinase-Karikari farms. Also, out of 3 participants who selected other implications for higher transaction costs, 1 participant responded from Techiman markets, Gyinase-Karikari farms and Gyinase respectively. Out of the 2 participants who mentioned that transaction costs affect livelihoods, 1 participant came from Techiman Techiman market and the remaining participant came from Gyinase.

4.19 Institutional innovations to address high transaction costs and risks

The participants (market women) were asked to select possible means of addressing the high transaction costs and risks affecting their trade interactions with farmers, and their responses are shown in table 83.

Table 83: Best institutional innovation to address high transaction costs and risks

Crosstab								
Count								
	Best institutional innovations to reduce Transaction costs and risks							
				Smallholder				
		Smallholder		farmer				
		farmer	Co-	participation				
		empowerme	operative	in decision	Contractin		Not	
	-	nt	society	making	g	Other	sure	Total
Region in	Brong Ahafo	0	0	1	1	2	1	5
Ghana	Ashanti	2	2	0	0	1	0	5
	Region						,	,
Total		2	2	1	1	3	1	10

Out of the total 10 (100%) traders (agents) who took part in the study, 3 (30%) of them claimed other institutional innovations not listed on the questionnaire were needed to address high transaction costs and risks, such as participatory decision making and removal of commissioners from the market by policymakers. Out of this number, 2 respondents came from Techiman market and 1 respondent came from Ashanti Region. Two respondents from the Ashanti Region, however, mentioned that traders and smallholder farmer empowerment are the best institutional innovation needed to address high transaction costs and risks affecting their transactions with traders. Also, 2 participants in the Ashanti Region identified co-operative society as the best institutional innovations to address high transaction costs and risks. One response was given by a participant in the Brong Ahafo for contracting (contract farming). Lastly, 1 participant was not sure of any of the given institutional innovations on the

questionnaire and could not think of other institutional innovations not listed on the questionnaire as best for smallholder farmers. The responses are further shown in figure 19.

Figure 20: Best Institutional Innovations to reduce high transaction costs between agents and farmers transactions

4.20 Traders view on smallholder participation in decision-making



The traders were asked whether smallholder farmers have an opportunity to participate in the decision-making on issues affecting them, such as market access and their responses are shown in table 84.

Crosstab							
Count							
		Do smallholder	farmers allow to				
		participate in major decisions					
		Yes	No	Total			
Region in Ghana	Brong Ahafo	4	1	5			
	Ashanti Region	1	4	5			
Total		5	5	10			

Table 84: Traders' view on whether smallholder farmers allow to take part in decision-making or not

The table shows that 5 (50%) of the respondents responded (Yes) for smallholder farmers participation in decision-making and 5 (50%) of the participants responded "No" to smallholder farmers participation in decision-making on issues affecting them. Out of the 5 participants who responded yes to smallholder participation in decision-making, 4 of the responses came from the Brong Ahafo Region and the remaining response came from a participant (trader) in the Ashanti Region. With regards to "No" response, 4 of the participants came from the Brong Ahafo Region and the remaining response came from a participant in the Brong Ahafo Region.

The participants' responses, according to their towns or villages, on whether smallholder farmers are allowed to participate in decision-making, are shown in table 85.

Crosstab							
Count							
		Do smallholder participate in n	farmers allow to najor decisions				
		Yes	No	Total			
The actual location of the	Techiman market	4	1	5			
study	Gyinase-Karikari farms	0	3	3			
	Gyinase	1	1	2			

Table 85: Traders response on whether smallholder farmers participate in decision-making or not at villages/towns level.

	Total	5	5	10
--	-------	---	---	----

With regards to the "Yes" response, out of the 5 responses for smallholder participation in decision-making, 4 responses came from Techiman market women and remaining 1 response came from Gyinase women. Also, out of the 5 responses received for the traders, 3 responses came from Gyinase-Karikari farms; 1 response came from Techiman market women and the remaining response came from a participant from Gyinase.

4.20.1 Areas smallholder farmers are allowed participation in decision-making

Crosstab							
Count							
		Areas smallh	older farmers a	allow particip	ants from yes r	esponses	
						Lack of	
			Farmer			participati	
		Stakeholders	association		None of the	on in	
		meetings	meetings	Other	above	decisions	Total
Region in	Brong Ahafo	2	1	0	1	1	5
Ghana	Ashanti	0	0	1	0	4	5
	Region						
Total		2	1	1	1	5	10

Table 86: Traders view on areas smallholder farmers allowed participation in decision-making

The table reveals that the highest response was on lack of participation in decisionmaking with a total of 5 (50%). Out of this number, 4 (40%) responses came from the participants in the Ashanti Region and 1 (10%) response came from the Brong Ahafo Region. The second highest response came from 2 participants in the Brong Ahafo Region, who believed that smallholder farmers can take part in stakeholder decisions. One response came from a participant in the Brong Ahafo Region on farmer association meetings. One response was received for other decisions, such as informal meeting with other farmers on latest prices for produce, and the remaining 1 response came from a participant in the Brong Ahafo Region, who was unsure about specific areas smallholder farmers are given opportunity to participate in decisionmaking.

Further information on specific towns or villages where participants responded can be seen in table 87.

Crosstab							
Count							
Areas smallholder farmers allowed participation in decision- making					decision-	Total	
	Stakeholder	Farmer association		None of the	Not allowed in decision-		
		s meetings	meetings	Other	above	making	
Actual location of the	Techiman market	2	1	0	1	1	5
study	Gyinase-Karikari farms	0	0	0	0	3	3
	Gyinase	0	0	1	0	1	2
Total		2	1	1	1	5	10

Table 87: Areas where smallholder farmers can take part in the decision-making

The table shows that the highest responses on areas smallholder farmers allowed to participate in the decisions on issues affecting them came from 5 participants who claimed smallholders are not allowed to take part in the decision-making in their farming activities. Three of the responses came from 3 participants in Gyinase-Karikari farms; 1 response came from a participant in Techiman and another 1 response came from a participant in Gyinase. However, 2 participants from Techiman Market Women Association mentioned that smallholder farmers have the chance to take part in the

decision-making at stakeholder meetings. The chi-square test for the responses is shown in table 88.

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	4.800ª	2	.091					
Likelihood Ratio	6.086	2	.048					
Linear-by-Linear Association	2.815	1	.093					
N of Valid Cases	10							

Table 88: Chi-square test on areas smallholder farmers allowed participation in decision-making

a. 6 cells (100.0%) have expected count less than 5. The minimum expected count is 1.00.

The chi-square test (P=0.091) shows statistical insignificance on the traders' view on areas smallholder farmers allowed to take part in the decision making on issues affecting them.

4.20.2 Why smallholder farmers are denied participation in decision-making

The traders were further asked for reasons behind little or no participation in decisionmaking, and their responses are shown in table 89.

Crosstab									
Count									
		Reasons for e	exclusion of sm	allholder farme	rs in major	decisions			
		low educational							
		level	incompetent	Bureaucracy	Other	Not sure	Total		
Region in	Brong Ahafo	0	0	1	1	3	5		
Ghana	Ashanti Region	2	2	1	0	0	5		
Total	•	2	2	2	1	3	10		

Table 89: Reasons for excluding smallholder farmers from participatory decision making

The table shows that the highest response came from 3 participants in the Brong Ahafo Region who were not sure about the reasons for excluding smallholder farmers from participatory decision-making. Two participants from the Ashanti Region believed that smallholder farmers are not allowed to participate in decision-making based on the low level of their education; 2 participants from the same Ashanti Region claimed smallholder farmers are not allowed to participate in decision-making due to low level of education; 2 participants identified bureaucracy as a reason for excluding smallholder farmers from decision-making, of which 1 came from the Brong Ahafo and the other from the Ashanti Region. One participant in the Brong Ahafo Region selected other reasons for excluding smallholder farmers from decision-making, such as poverty.

4.21 Findings from key informants' data interviews

This section discusses the data generated from key informants' interviews in both study areas (Techiman Municipal and Kumasi Metropolitan Assemblies), using both descriptive statistics and principal components analysis (PCA). It will initially look at the descriptive statistics on the response to transaction costs and possible institutional innovations required for smallholder farmers. It will further look at the various loadings of the PCA on axis 1 and 2, including the biplots. The final part of the PCA analysis focuses on the cluster analysis of the participants and the correlations (probability values) between some of the responses.

4.21.1 Ages of participants for key informants' interviews

The key informants who participated in the key informants' interviews in both the Ashanti and the Brong Ahafo Regions are shown in table 90.

Table 90: Ages of the key informants' interviews participants

Crosstab
Count

			Age					
		20-29	30-39	40-49	50-59	60+	Total	
Region	Brong Ahafo Region	2	6	3	5	2	18	
-	Ashanti Region	0	3	7	6	1	17	
Total		2	9	10	11	3	35	

The participants within ages 50 to 59 were the highest participating age group, with 11 participants. Out of this number, 6 of the participants came from the Ashanti Region and 5 participants came from the Brong Ahafo Region. Ages 40 to 49 was the second highest participated in the age group in the study with 10 participants. Out of this number, 7 participants came from the Ashanti Region and 3 participants came from the Ashanti Region and 3 participants came from the Brong Ahafo Region. The third highest participated age group in the study came from 30 to 39 with 9 participants. Six of the participants came from Brong Ahafo Region and 3 participants came from Ashanti Region. The participants within ages 6+ were the fourth highest participated group in the study with 3 participants. Out of this number, 2 participants came from the Brong Ahafo Region. The least participated age group is 20 to 29 with 2 participants from the Ashanti Region. The ages of the participants are shown further in figure 21.



Figure 21: Ages of participants in the key informants' interviews

The ages of the key informants according to their towns and villages in both study areas (Brong Ahafo and Ashanti Regions) are shown in table 91.

	Crosstab									
Count	Count									
				Age						
	20-29 30-39 40-49 50-59 60+						Total			
Town	Techiman	2	3	1	0	0	6			
	Asueyi	0	1	1	2	1	5			
	Tuobodum	0	0	1	1	1	3			
	Oforikurom	0	2	0	0	0	2			

Table 91: Age range for key informants who participated in the study at towns/villages level

	Akumadan	0	0	0	2	0	2
	Gyinase	0	0	2	1	0	3
	Gyinase-Karikari farms	0	0	2	1	1	4
	Kumasi-Tanoso (IPT)	0	0	1	1	0	2
	Dabaa	0	3	2	3	0	8
Total		2	9	10	11	3	35

Eleven participants were within the ages 50 to 59 and out of this number, 3 participants came from Dabaa; 2 participants came from Asueyi; 2 participants came from Akumasi; 1 response each for participants in Tuobodum, Gyinase, Gyinase-Karikari farms and Kumasi-Tanoso (IPT). Again, out of 10 participants for ages 40 to 49, 2 response each came from Gyinase; Gyinase-Karikari farms and Dabaa. One response each came from Techiman, Asueyi, Tuobodum and Kumasi-IPT. No participant came from Oforikurom and Akumadan. Out of 9 participants for ages 30-39, 3 participants came from Techiman and Dabaa; 2 participants came from Oforikurom and 1 participant came from Asueyi.

The chi-square test for the ages of the participants in both Brong Ahafo and Ashanti Regions of Ghana are shown in table 92.

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square	5.000ª	4	.287			
Likelihood Ratio	5.840	4	.211			
Linear-by-Linear Association	.919	1	.338			
N of Valid Cases	35					
a_1 7 colls (70.0%) have expected count loss than 5. The minimum expected count is 07						

Table 92: Chi-square test for participant ages

La. / cells (70.0%) have expected count less than 5. The minimum expected count is .97.

The chi-square test (P=0.287) shows statistical insignificance on the ages of the key informants in both study areas. Also, the cross-tabulation revealed that there are not much any differences between the age range of participants in the Brong Ahafo and Ashanti Regions.

4.21.2 The gender of the participants

The gender for the key informants' interviews particularly for both the Ashanti and Brong Ahafo Regions is shown in table 93.

Table 93: Gender of the key informants

Crosstab								
Count	Count							
		Gen	der					
		Male	Female	Total				
Region	Brong Ahafo Region	16	2	18				
	Ashanti Region	15	2	17				
Total		31	4	35				

Thirty-one (89%) of the participants were male. Out of this number, 16 of the participants came from the Brong Ahafo Region and 15 of the participants came from the Ashanti Region. Only 4 (11%) of the entire participants were female. Two of the female participants each came from both the Ashanti Region and the Brong Ahafo Region. The low female participation of females in the study shows that females may be under-represented in major decision making.

The specific towns or villages where key informants participated in the study are shown in table 94.

Table 94:	: Gender of the participants	s
-----------	------------------------------	---

Crosstab						
Count						
		Ge	ender			
		Male	Female	Total		
Town	Techiman	4	2		6	

	Asueyi	5	0	5
	Tuobodum	3	0	3
	Oforikurom	2	0	2
	Akumadan	2	0	2
	Gyinase	3	0	3
	Gyinase-Karikari farms	4	0	4
	Kumasi-Tanoso (IPT)	2	0	2
	Dabaa	6	2	8
Total		31	4	35

Out of the total 31 males who participated in the study,6 of them came from Dabaa; 5 of them came from Asueyi; 4 participants each came from Techiman and Gyinse-Karikari farms; 3 participants each came from Tuobodum and Gyinase; 2 participants each came from Oforikurom, Akumadan and Gyinase. With regards to the female participants, out of the 4 participated who took part in the study, 2 of them came from Techiman and remaining 2 came from Dabaa.

The chi-square test for the gender of the participants in both study areas (Brong Ahafo and Ashanti Regions are shown in table 95.

Chi-Square Tests								
			Asymptotic					
			Significance (2-	Exact Sig. (2-	Exact Sig. (1-			
	Value	df	sided)	sided)	sided)			
Pearson Chi-Square	.004ª	1	.952					
Continuity Correction ^b	.000	1	1.000					
Likelihood Ratio	.004	1	.952					
Fisher's Exact Test				1.000	.677			
N of Valid Cases	N of Valid Cases 35							
a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.94.								
b. Computed only for a 2x2 table								

The chi-square test (P=0.952) shows statistical insignificance for the gender of participants who participated in the study from the Brong Ahafo and Ashanti Regions. However, the cross tabulation shows that 89% of the participants were male compared to the 11% female.

4.22 The educational levels of the key informants

The educational levels of key informants who took part in the study are shown in table 96 according to their Regions.

		C	Crosstab					
Count								
	Educational level							
				Vocational/techn				
		Primary	Secondary	ical	Degree	Total		
Region	Brong Ahafo Region	4	3	7	4	18		
	Ashanti Region	3	4	2	8	17		
Total		7	7	9	12	35		

Table 96: Educational levels of key informants according to their Regions

The key informants with degree qualifications were the highest with 12 participants. Most of them work at management levels at the Ministry of Food and Agriculture (MOFA), NGOs and other civil services in the study areas. Out of the 12 participants with degrees, 8 of them came from the Ashanti Region and remaining four of them came from the Brong Ahafo Region. Nine key informants held technical and vocational qualifications, such as Higher National Diploma (HND) from polytechnics and agriculture colleges. Most of them were working as Agriculture Extension Officers at the time of the interviews. Out of the 9 technical and vocational qualifications holders, 7 of them came from the Brong Ahafo Region and 2 of them came from the Ashanti Region. Seven of key informants were holders of secondary school certificates and most of them were farmers. Out of this number, 3 of them came from the Brong Ahafo Region and the remaining 4 came from the Ashanti Region. Similarly, 7 key informants were primary school certificate holders and most of them were farmers. Out of this number, 4 of them came from the Brong Ahafo Region and 3 of them came from the Ashanti Region. The qualifications are further displayed in figure 22.



Figure 22: The educational levels of the key informants

The specific locations (Towns or villages) of the key informants in both the Brong Ahafo and Ashanti Regions are shown in table 97.

		C	rosstab			
Count						
			Educa	tional level		
				Vocational/techn		
		Primary	Secondary	ical	Degree	Total
Town/	Techiman	0	0	2	4	6
village	Asueyi	1	1	3	0	5
	Tuobodum	0	2	1	0	3
	Oforikurom	2	0	0	0	2
	Akumadan	1	0	1	0	2
	Gyinase	2	1	0	0	3
	Gyinase-Karikari farms	1	1	0	2	4
	Kumasi-Tanoso (IPT)	0	0	1	1	2
	Dabaa	0	2	1	5	8
Total		7	7	9	12	35

Table 97: Cross tabulation for the education of participant

The table shows that out of the 12 key informants degree holders, 5 of them came from Dabaa, 4 of them came from Techiman; 2 of them came from Gyinase-Karikari farms and 1 of them came from Kumasi-Tanoso (IPT). Additionally, out of 9 vocational (technical) certificate holders, 3 of them came from Asueyi; 2 of them came from Techiman; 1 each came from Tuobodum, Akumadan, Kumasi-Tanoso (IPT) and Dabaa. None of them came from Gyinase and Gyinase-Karikari farms. Out of the 7 secondary school certificate holders, 2 key informants each came from Tuobodum and Dabaa; 1 key informant each came from Asueyi, Gyinase, Gyinase-Karikari farms and no secondary certificate key informant was found in Techiman, Oforikurom, Akumadan and Kumasi-Tanoso (IPT). Finally, out of 7 key informants with primary education, 2 key informants each came from Oforikurom and Gyinase; 1 key informant each came from Oforikurom and Gyinase; 1 key informant each came from Oforikurom and Gyinase; 1 key informant each came from Oforikurom and Gyinase; 1 key informant each came from Oforikurom and Gyinase; 1 key informant each came from Oforikurom and Gyinase; 1 key informant each came from Oforikurom and Gyinase; 1 key informant each came

from Asueyi, Akumadan and Gyinase-Karikari farms. No primary school certificate holder was found in Techiman, Tuobodum, Kumasi-Tanoso (IPT) and Dabaa.

4.22.1 The professions or occupations of the key informants

The occupation (profession) of the key informants are shown in table 98

Crossta	ab						
Count							
			Pro	fessions of I	key informants		
					Farming and		
					another	Financial	
		Farmer	MOFA	NGO	profession	sector	Total
Region	Brong Ahafo Region	9	5	1	3	0	18
	Ashanti Region	7	5	1	3	1	17
Total		16	10	2	6	1	35

Table 98: Occupation (profession) of the key informants

The table shows that out of 35 of the key informants who took part in the study, 16 (46%) of them were farmers and out of this number, 9 of them came from the Brong Ahafo Region and the remaining 7 farmers came from the Ashanti Region. Ten of the participants worked for MOFA and they were made up of a director, administrator and extension officers. Out of this number, 5 of them came from the Brong Ahafo Region and the remaining 5 came from the Ashanti Region. Six of the key informants were farming but had other professions, such as an electrician. Out of this number, 3 of them came from the Brong Ahafo Region. Two key informants worked for NGOs. Out of this number, 1 key informant each practised both in the Brong Ahafo Region and the Ashanti Region.

The locations (towns and villages) of key informants took part in the study in the Brong

Ahafo and Ashanti Regions.

			Cros	stab			
Count							
			Prof	essions of l	key informants		
					Farming and		
					another	Financial	
	-	Farmer	MOFA	NGO	profession	sector	Total
Town	Techiman	0	5	1	0	0	6
	Asueyi	3	0	0	2	0	5
	Tuobodum	3	0	0	0	0	3
	Oforikurom	2	0	0	0	0	2
	Akumadan	1	0	0	1	0	2
	Gyinase	2	1	0	0	0	3
	Gyinase-Karikari farms	2	2	0	0	0	4
	Kumasi-Tanoso (IPT)	0	1	0	1	0	2
	Dabaa	3	1	1	2	1	8
Total		16	10	2	6	1	35

Table 99: Crosstabulation for professions of the participants at towns and villages levels

As discussed earlier, 16 of the participants were farmers and most of them held positions in the farmers' associations or have many years of experience. Out of this number, 3 of the farmers each came from Asueyi, Tuobodum and Dabaa; 2 farmers each came from Oforikurom, Gyinase and Gyinase-Karikari farms. One farmer came from Akumadan. With regards to MOFA, out of the 10 participants, 5 of them came from Techiman (a director, office staff and extension officers); 2 of them came from Gyinase-Karikari farms; 1 participant each came from Gyinase and Dabaa. Also, out of the 6 Key informants who were farmers but have other professions, 2 of them each came from Asuyei and Dabaa. The only key informant from the financial sector came from Dabaa.

The chi-square test for the professions of the key informants is shown in table 100.

Chi-Square Tests							
Value df Asymptotic Significance (2-sided)							
Pearson Chi-Square	32.867 ^a	32	.424				
Likelihood Ratio	38.873	32	.188				
Linear-by-Linear Association	.566	1	.452				
N of Valid Cases 35							
a_{45} cells (100.0%) have exp	$a_{\rm c}$ 45 colls (100.0%) have expected equations than 5. The minimum expected equation 06						

Table 100: Chi-square test for professions of key informants.

a. 45 cells (100.0%) have expected count less than 5. The minimum expected count is .06.

The chi-square test (P=0.424) shows that the participants' professions are statistical insignificance.

4.23 Marketing problems affecting smallholder farmers

The current section initially discusses smallholder farmers marketing problems identified by the key informants interviewed. It will further look at the reasons for smallholder farmers accessing local (domestic) markets instead of other markets, such as international or export markets.

4.23.1 Marketing problems encountered by smallholder farmers

The participants were asked during the key informants' interviews about the major marketing problems encountered by the smallholder farmers and their responses are shown in table 101.

Table	101: Marketing	problems affectin	g smallholder farmers
	0	•	0

Crosstab						
Count						
Marketing problems for smallholders	Total					

			Low				Lack		
			prices/Price	Lack of		High	of	Multiples	
		Poor	fluctuations	market		transport	ready	marketing	
		roads	for produce	information	Other	cost	market	problems	
Region	Brong Ahafo	2	5	0	3	1	1	6	18
	Region								
	Ashanti	1	7	1	1	0	0	7	17
	Region								
Total		3	12	1	4	1	1	13	35

Thirteen of the key informants claimed that smallholder farmers have many (multiple) marketing problems affecting them, including all the problems listed on the questionnaires. Out of this number, 7 responses came from key informants in the Ashanti Region and 6 responses came from the Brong Ahafo Region. The price fluctuation or low prices for smallholder farmers produce came up as the second major marketing problem faced by smallholder farmers in both the Brong Ahafo and Ashanti Regions. In total, 12 key informants identified price fluctuations or low prices for produce. Out of this number, 7 responses came from the key informants in the Ashanti Region and 5 responses came from key informants in the Brong Ahafo Region. The third marketing problems faced by smallholder farmers were identified as others, such as commissioners and lack of storage facilities to store produce until prices are high. Out of the 4 responses for other problems, 3 of the responses came from key informants in Techiman and 1 response came from a key informant in the Ashanti Region. Poor road network came up as the fourth highest marketing problem affecting smallholder farmers market access with 3 responses. Out of the 3 responses, 2 responses came from participants in the Brong Ahafo Region and 1 response a participant in the Ashanti Region. Lack of market information (a sources of high transaction) received1 response from a participant in the Ashanti Region; high

transport costs (a source of high transaction) was identified as marketing problem by a key informant in the Brong Ahafo Region and lack of ready market was identified a marketing problem affecting smallholder farmers from a key informant in the Brong Ahafo Region.

The responses of the key informants according to their towns or villages on marketing problems affecting smallholder farmers are shown in table 102.

Crosstab										
Count										
			Ν	Marketing prol	olems for	smallholders				
			Low							
			prices/Price	Lack of		High	Lack of	Multiples		
		Poor	fluctuations	market		transport	ready	marketing		
		roads	for produce	information	Other	cost	market	problems	Total	
Tow	Techiman	0	2	0	0	1	0	3	6	
n	Asueyi	1	1	0	0	0	0	3	5	
	Tuobodum	0	2	0	1	0	0	0	3	
	Oforikurom	0	0	0	1	0	1	0	2	
	Akumadan	1	0	0	1	0	0	0	2	
	Gyinase	0	2	0	1	0	0	0	3	
	Gyinase-Karikari	1	1	0	0	0	0	2	4	
	farms									
	Kumasi-Tanoso	0	1	1	0	0	0	0	2	
	(IPT)									
	Dabaa	0	3	0	0	0	0	5	8	
Total		3	12	1	4	1	1	13	35	

Table 102: Key informants' responses to marketing problems faced by smallholders at Towns or villages levels

Out of the 13 key informants who believed smallholder farmers have multiples marketing problems, 5 of them came from Dabaa; 3 responses each came from Techiman and Asueyi and 2 responses came from key informants in Gyinase-Karikari farms. With regards to price fluctuations or low prices out of 12 responses from key informants, 3 responses came from key informants in Dabaa; 2 responses each came from Techiman, Tuobodum and Gyinase; 1

response each came participants in Asueyi, Gyinase-Karikari farms and Kumasi-Tanoso (IPT); 0 response came from key informants in both Oforikurom and Akumadan. Out of 4 key informants who mentioned other marketing problems, 1 key informant each came from Tuobodum, Oforikurom, Akumadan and Gyinase. Also, out of 3 responses for poor road network as a marketing problem, 1 response each came from key informants from Asueyi, Akumadan and Gyinase-Karikari farms. No response came from key informants in Techiman, Tuobodum, Oforikurom, Gyinase, Kumasi-Tanoso (IPT) and Dabaa. Lack of market information was identified by a key informant in Kumasi-Tanoso (IPT) as a marketing problem affecting smallholder farmers; high transport costs were identified as a marketing problem faced by smallholder farmers by a key informant in Techiman. Lastly, the lack of a ready market was identified as a marketing problem by a key informant as a problem.

4.23.2 Existing markets for smallholder farmers

The key informants were asked about the existing or current markets for smallholder farmers and their responses are shown in table 103.

		Cr	osstab			
Count						
		Curi	ent markets a	access by smallhol	ders	
		Export/internatio		Domestic	Domestic and	
		nal market	Regional	market	regional markets	Total
Region	Brong Ahafo Region	1	1	13	3	18
	Ashanti Region	0	0	13	4	17
Total		1	1	26	7	35

Table 103: Existing markets for smallholder farmers identified b	y ke	y informants
--	------	--------------

The domestic market was discovered to be the main existing market for smallholder farmers with 26 (74%) responses from the key informants. Out of this number, 13

responses each came from participants in the both Brong Ahafo and Ashanti Regions. Seven of the key informants however selected domestic and regional markets as the current markets access by smallholder farmers. Out of this number, 4 of the key informants or responses came from the Ashanti Region and 3 remaining 3 responses came from the Brong Ahafo. One respondent each from the Brong Ahafo Region identified export (international) and regional markets as the existing markets for smallholder farmers.

		Cro	sstab								
Count											
	Current markets access by smallholders										
		Export/international	ort/international Domestic Domestic and								
		market	market Regional market regional markets								
Town	Techiman	1	0	4	1	6					
	Asueyi	0	0	4	1	5					
	Tuobodum	0	1	1	1	3					
	Oforikurom	0	0	2	0	2					
	Akumadan	0	0	2	0	2					
	Gyinase	0	0	3	0	3					
	Gyinase-Karikari	0	0	4	0	4					
	farms										
	Kumasi-Tanoso (IPT)	0	0	2	0	2					
	Dabaa	0	0	4	4	8					
Total		1	1	26	7	35					

Table 104: Existing markets for smallholder farmers identified by key informants at the town and village levels

The table shows that out of 26 participants or key informants who selected domestic markets as the existing markets for smallholder farmers, 4 key informants each from Techiman, Asueyi, Gyinase-Karikari farms and Dabaa; 3 key informants came from Gyinase; 2 key informants each came fromOforikurom, Akumadan and Kumasi-Tanoso (IPT) and 1 key informant came from Tuobodum. Additionally, out of the 7 key informants who selected domestic and regional
markets as the existing markets for smallholder farmers, 4 of them came from Dabaa; 1 key informant each came from Techiman, Asueyi and Tuobodum and no response came from key informants in Oforikurom, Akumadan, Gyinase, Gyinase-Karikari farms and Kumasi-Tanoso (IPT). One key informant from Techiman mentioned export or international market as the existing market for smallholder farmers and another key informant from Tuododum claimed the regional market is the existing market for smallholder farmers produce.

The chi-square test for existing markets for smallholder farmers identified by the key informants both the Brong Ahafo and Ashanti Regions are shown in table 105.

Chi-Square Tests									
	Value	df	Asymptotic Significance (2-sided)						
Pearson Chi-Square	24.538ª	24	.431						
Likelihood Ratio	19.114	24	.746						
Linear-by-Linear Association	1.261	1	.261						
N of Valid Cases	35								

Table 105: Chi-square test for key informants view on existing markets for smallholder farmers

a. 35 cells (97.2%) have expected count less than 5. The minimum expected count is .06.

The chi-square test (P=0.431) indicates statistical insignificance between responses of key informants in the Brong Ahafo and Ashanti Regions responses on existing markets for smallholder farmers. Thus, the key informants from both study regions gave similar responses to the question of existing markets for smallholder farmers. It was discovered from the participants that smallholder farmers tend to access domestic market with their produce compared to the other markets since, they cannot meet the standards of the international markets and lacked infrastructures, such as storage facilities, irrigation and good road network to carry out year-round production.

4.23.3 High transaction costs affecting smallholder interaction with traders

Initially, most of the participants in the key informants' interviewed did not know the concept of the transaction until it was clearly explained to them. They were finally asked about the main transaction costs affecting smallholder farmers in their market interactions with traders in rural markets. Their responses are shown in table 106.

	Crosstab											
Count												
			Transaction costs affecting smallholder farmers									
						No						
						response						
		Buyers	Marketing			for						
		searching	informatio	Negotiati	Bargaini	transacti	Contra	Spoilage				
		costs	n costs	on costs	ng costs	on costs	cting	costs	Other	Total		
Regi	Brong	1	5	2	4	3	0	3	0	18		
on	Ahafo											
	Region											
	Ashanti	0	2	2	0	8	1	3	1	17		
	Region											
Total		1	7	4	4	11	1	6	1	35		

Table 106: High transaction costs affecting smallholder farmers

Table 106 shows that 11 key informants (31%) which the highest response on high transaction costs claimed that, they did not know anything about the high transaction costs (risks) and their effects on smallholder farmers' market transactions with traders in rural markets in Ghana. Out of this number, 8 responses came from the Ashanti Region key informants and 3 responses came from the Brong Ahafo Region. Thus,

key informants in the Brong Ahafo were less informed about the transaction costs than their counterparts in the Ashanti Region. Seven (20%) of the participants mentioned that market information search is the common transaction costs affecting smallholder farmers' transactions with traders. Six (17%) of the participants rather thought spoilage is a source of high transaction costs affecting smallholder farmers' interactions with traders (agents) and their markets access in rural markets in Ghana. Out of this number, 3 responses came from the participants in the Brong Ahafo Region and 3 responses came from participants in the Ashanti Region. Also, bargaining costs and negotiation costs were the fourth highest transactions costs affecting smallholder farmers' market interactions with traders with 4 (11%) responses each from the participants. With regards to Bargaining power, all the 4 responses came from key informants in the Brong Ahafo Region. This shows that bargaining power is a major problem affecting smallholder farmers in the Brong Ahafo Region. For example, the executives of the 'The Brong Ahafo and Ashanti Region Vegetable Growers' claimed during MARISCO analysis (focus) in Tuobodum that due to lack of bargaining power, the market women from Accra determine the prices of vegetables and use large boxes to purchase their tomatoes and one of their boxes is equivalent to two of the local farmers boxes. However, out of the 4 responses for negotiation costs, 2 responses came from the key informants in the Brong Ahafo Region and the remaining 2 responses came from the key informants in the Ashanti Region. One response was received from a participant in the Brong Ahafo for buying searching costs; 1 response was received from a participant in the Ashanti Region on contracting and 1 response came from a participant in the Ashanti Region on other high transaction costs, such as commissioners' activities.

The specific towns and villages in the Brong Ahafo and Ashanti Regions where the responses came from the key informants as shown in table 107.

	Crosstab												
Count	Count												
			Tra	insaction co	sts affecting	g smallholde	er farmers			Total			
						No							
			Marketin			response							
		Buyers	g			for							
		searching	informati	Negotiati	Bargainin	transactio	Contrac	Spoilage					
	1	costs	on costs	on costs	g costs	n costs	ting	costs	Other				
Town	Techiman	1	2	0	1	1	0	1	0	6			
	Asueyi	0	1	2	1	1	0	0	0	5			
	Tuobodum	0	2	0	1	0	0	0	0	3			
	Oforikurom	0	0	0	0	0	0	2	0	2			
	Akumadan	0	0	0	1	1	0	0	0	2			
	Gyinase	0	0	0	0	1	0	2	0	3			
	Gyinase-	0	1	1	0	0	1	0	1	4			
	Karikari farms												
	Kumasi-	0	0	0	0	2	0	0	0	2			
	Tanoso (IPT)												
	Dabaa	0	1	1	0	5	0	1	0	8			
Total		1	7	4	4	11	1	6	1	35			

Table 107: Key informant responses on high transactions costs affecting smallholder farmers at town/village levels

The table shows that out of the 11 respondents who selected no for high transaction costs, 5 of them came from Dabaa; 2 responses came from participants in Kumasi-Tanoso (IPT); 1 response each came from participants in Techiman, Asueyi, Akumadan and Gyinase. Again, out of the 7 responses on marketing information costs, 2 responses each came from participants in Techiman and Tuobodum; 1 response each came from participants in Asueyi and Dabaa and 0 responses came from participants in Oforikurom, Akumadan, Gyinase and Kumasi-Tanoso (IPT). Spoilage costs received the third highest responses from the key informants with 6 responses

in total. Out of this number, 2 responses each came from Oforikurom and Gyinase key informants. In fact, farmers in both Gyinase and Gyinase-Karikari farms are vegetable growers and lack proper storage facilities for their produce, hence storage costs are obviously a transaction costs affecting their market access. 1 response each came from key informants in Techiman and Dabaa. It seems most of the farmers in both Techiman and Dabaa are subsistence farmers, hence, they do not have much problem with storage. Out of 4 responses on negotiation costs, 2 responses came from Asueyi; 1 response each came from participants in Gyinase-Karikari farms and Dabaa and no response came from key informants in the remaining towns and villages. Out of 4 responses for bargaining costs, 1 response each came from participants in Techiman, Asueyi, Tuobodum and Akumdan. All the towns with 1 response to each complaint that costs associated with lack of bargaining tend to affect the profit margins of the farmers. Finally, buying searching costs had 1 response from a key informant inTechiman and another form of high transaction costs, such as commissioners' activities received 1 response from a participant in Gyinase-Karikari farms.

Chi-Square Tests									
	Value	df	Asymptotic Significance (2-sided)						
Pearson Chi-Square	63.260ª	56	.236						
Likelihood Ratio	54.468	56	.533						
Linear-by-Linear Association	4.373	1	.037						
N of Valid Cases	35								

Table 108: Chi-square test on high transaction costs affecting smallholder farmers from key informants' perspective

a. 72 cells (100.0%) have expected count less than 5. The minimum expected count is .06.

The chi-square test (P=0.236) shows statistical insignificance about the high transaction cost affecting smallholder farmers interactions with traders and market access. For example, a clear majority of the key informants were not aware of the

concept of transaction costs prior to the study. This could impact on their responses on the exact transaction costs affecting smallholder farmers.

4.23.3.1 The implications of high transaction cost on smallholder farmers

The key informants were further asked about the implications of high transaction costs and risks for smallholder farmers in the study areas. The responses of the key informants on the above question are shown in table 109.

Crosstab										
Count										
		Th	e impacts o	of high trans	action cost	s on smallh	older farmers		Total	
			Affects	Close	High					
Affects margins/f down prices for Prevents										
		livelihood s	arming activities	farming business	produce/f ood	market access	No response	other		
Regions	Brong Ahafo Region	2	5	4	1	4	2	0	18	
	Ashanti Region	1	7	2	4	1	1	1	17	
Total		3	12	6	5	5	3	1	35	

Table 109: The implications for high transaction costs for smallholder farmers.

The highest responses on the impacts or implications of high transaction costs for smallholder farmers came from Twelve (35%) of the key informants pointed out that a high transaction costs affects their profit margins. Out of this number, 7 of the respondents came from the Ashanti Region key informants and remaining 5 came

from the Brong Ahafo Region. Six of the participants, however, mentioned that high transaction costs could lead to close down of the farming business. Out of this number, 4 of the respondents or key informants came from the Brong Ahafo Region and remaining 2 key informants came from the Ashanti Region. Five participants claimed that high transaction costs could result in high prices in the farmers produce or food. Thus, the demand for farmers produce will be low if they operate under high transaction costs. Out of this number, 4 responses came from key informants in the Ashanti Region and 1 response came from a key informant in the Brong Ahafo Region. Also, the key informants in the Ashanti Region saw this as a major problem compared to the participants in the Brong Ahafo Region as the price of food tend to be high in the Ashanti Region than in the Brong Ahafo Region, it is more urbanised than the Brong Ahafo Region. Also, 5 key informants claimed that high transaction costs could prevent markets access. Out of this number, 4 responses came from the key informants in the Ashanti Region and 1 response came from a key informant in the Ashanti Region. The key informants in the Brong Ahafo Region complained a lot about market access on behalf of the smaller farmers. Many of them claimed, the farmers do not access information needed to promote market access due to the poor enabling environment. For example, an extension officer mentioned during the interview that he is not receiving his allowances to buy fuel to visit farmers and assist them in market access. However, the participants in the Ashanti Region at Gyinase confirmed that they are always receiving support from their extension officers. Three respondents, however, did not give a response on how high transaction costs affect smallholder farmers. Out of this number, 2 responses came from the Brong Ahafo Region and 1 response was received from a participant in the Ashanti Region. One participant,

however, identified other implication of high transactions costs, such as the inability for smallholder farmers to pay off their debts.

The specific responses from the key informants according to their towns or villages are shown in table 110.

			C	rosstab							
Count											
		Impacts of high transaction costs on smallholder farmers									
		Affects livelihood	Affects profit margins/f arming	Close down farming	High prices for produce/f	Prevents market	No respons	Other	Total		
Towns/	Techiman	0	0	0	1	4	1	0	6		
villages	Asuevi	1	2	2	0	0	0	0	5		
	Tuobodum	0	2	1	0	0	0	0	3		
	Oforikurom	0	0	1	0	0	1	0	2		
	Akumadan	1	1	0	0	0	0	0	2		
	Gyinase	1	1	1	0	0	0	0	3		
	Gyinase- Karikari farms	0	3	1	0	0	0	0	4		
	Kumasi- Tanoso (IPT)	0	1	0	1	0	0	0	2		
	Dabaa	0	2	0	3	1	1	1	8		
Total		3	12	6	5	5	3	1	35		

Table 110: The implication of high transactions costs on smallholder farmers at towns and village levels

Г

The table shows that out of the 12 participants who claimed high transaction costs affect profit margins, 3 responses came from participants in Gyinase; 2 responses each came from key informants in Asueyi, Tuobodum and Dabaa; 1 response each came from key informants in Akumadan, Gyinase and Kumasi-Tanoso (IPT) and 0 response came from participants in Techiman and Oforikurom. Out of the 6 key informants who mentioned that high transaction costs could lead to close down of the farming business, 2 of them came from Asueyi; 1 response each came from participants in Tuobodum, Oforikurom, Gyinase and Gyinase Karikari farms and 0 response came from participants in Techiman, Akumadan, Kumasi-Tanoso and Dabaa. Out of the 5 key informants who mentioned that high transaction costs could result in prices of produce (food), 3 of them came from Dabaa; 1 respondent each came from Techiman and Kumasi-IPT and the remaining key informants did not select. Also, 5 key informants who claimed high transaction costs could prevent market access, 4 of the respondents came from Techiman and 1 response came from a participant in Dabaa. Out of the 3 key informants who select no response or unsure about the implication of high transaction costs on smallholder farmers, 1 response each came from key informants in Techiman, Oforikurom and Dabaa. Lastly, the 1 participant who selected other implication came from Dabaa.

The chi-square test for the implication of high transaction costs on smallholder farmers market access from key informants' perspective is shown in table 111.

Table 111: Chi-square test for the implication of high transaction costs on smallholder farmers

Chi-Square Tests									
	Value	df	Asymptotic Significance (2-sided)						
Pearson Chi-Square	53.813ª	48	.262						
Likelihood Ratio	54.269	48	.248						
Linear-by-Linear Association	.080	1	.778						
N of Valid Cases	35								

a. 63 cells (100.0%) have expected count less than 5. The minimum expected count is .06.

The chi-square test (P=0262) shows statistical insignificance of the responses given by key informants in the study areas. This result could be attributed to poor responses associated with lack of awareness about the implication of high transaction costs on smallholder farmers.

4.23.4 Institutional innovations to address high transaction costs and risks

involved in smallholder farmers transactions with traders

The key informants' were asked to suggest the possible institutional innovations likely to address high transaction costs and risks associated with smallholder farmers' interactions with traders in rural markets. Their responses are shown in tables 112.

	Crosstab										
Count	Count										
			Institutional innovations								
		smallholder				Public	Smallhold				
		farmers				and	er				
		involvement				private	farmers				
		in decision-	Co-	Government	Contract	partnershi	empower				
		making	operatives	intervention	farming	р	ment	Other	Total		
Regions in	Brong	3	3	2	5	3	1	1	18		
Ghana	Ahafo										
	Region										
	Ashanti	4	2	3	3	1	0	4	17		
	Region										
Total		7	5	5	8	4	1	5	35		

Table 112: Institutional innovations to address high transaction costs and risks

Contract farming emerged as the institutional innovations with the highest responses from the key informant. Out of the 8 responses, 5 responses came from participants in the Brong Ahafo Region. Some key informants mentioned during the interviews that contract farming can help smallholder farmers in the Brong Ahafo Region to address price fluctuations and other marketing challenges. The remaining 3 responses came from key informants in the Ashanti Region. Smallholder farmers' participation in the decision-making had the second highest response as the institutional innovation likely to address high transaction costs and risks with 7 responses. Out of this number, 4 responses came from participants in the Ashanti Region and the remaining 3 responses came from participants in the Brong Ahafo Region. Again, 5 responses each was received from the key informants on co-operatives, government interventions and other institutional innovations not listed on the questionnaire. The 5 key informants who selected co-operative another institutional innovation with the potential to address high transaction costs and risks, 3 of them came from the Brong Ahafo Region and remaining 2 key informants came from the Ashanti Region. Also, 5 key informants who selected government intervention as the best institutional innovation, 3 of them came from the Ashanti Region and the remaining 2 came from the Brong Ahafo Region. All the 5 participants believed that government intervention can help the smallholder farmers overcome high transactions costs and other challenges facing the smallholder farmers, such as favourable land tenure arrangement. For example, a key informant (a farmer) at Gyinase mentioned that the smallholder farmers need government intervention to enable them to address land tenure problems at their farm sites. He mentioned that their farmlands belong to 'Kwame Nkrumah University of Science and Technology' and the management always threatens to stop them from farming on the university property, but farmers do not have alternative farmlands for farming. Additionally, the 5 key informants who selected cooperative as their preferred institutional innovations to other institutions listed on the guestionnaires believed that it can enable smallholder farmers to have bargaining powers with regards to transactions with the market women from the capital (Accra), they claimed that prices for the farmers produce and even payment arrangement are dictated by the market women (market queens) and the outcome of this affect smallholder farmers livelihoods. Out of the 5 responses, 3 responses came from key informants in the Brong Ahafo and 2 responses came from key informants in

the Ashanti Region. Five key informants, however, selected other institutional innovations, such as creating of warehouses for smallholder farmers produce to address high spoilage rate. Out of this number, 4 responses came from key informants in the Ashanti Region and 1 response came from a key informant in the Brong Ahafo Region. Four responses came from the Ashanti Region key informants and 1 response came from Brong Ahafo Region key informants. many responses came from the key informants in the Ashanti Region on another form of institutions to enable them to reduce high spoilage rate. Furthermore, they were planning to export their refresh vegetables to the international markets at the time of the interviews.

The specific responses according to the key informants' towns and villages in both Brong Ahafo and Ashanti Regions are shown in table 113.

	Crosstab												
Count	Count												
			Institutional innovations										
		amallhaldar		Covernm		Public	Smallhaldar						
		farmers	Co-	ent		private	farmers						
		involvement in	operative	interventi	Contract	partners	empowerm						
		decision-making	S	on	farming	hip	ent	Other	Total				
Towns/	Techiman	2	2	0	0	1	1	0	6				
villages	Asueyi	1	0	1	2	1	0	0	5				
	Tuobodum	0	0	1	1	0	0	1	3				
	Oforikuro m	0	0	0	1	1	0	0	2				
	Akumadan	0	1	0	1	0	0	0	2				
	Gyinase	0	0	0	2	0	0	1	3				

Table 113: Institutional innovations to address high transaction costs and risks

	Gyinase-	2	1	1	0	0	0	0	4
	Karikari								
	farms								
	Kumasi-	0	0	1	1	0	0	0	2
	Tanoso								
	(IPT)								
	Dabaa	2	1	1	0	1	0	3	8
Total		7	5	5	8	4	1	5	35

The table shows that out of the 8 key informants who chose contract farming as the institutional innovation likely to address smallholder farmers high transaction costs and risks in their interactions with market women and market access, 2 responses each came from the participants in Asueyi and Gyinase;1response each came from participants in Tuobodum, Oforikurom, Akumadan and Kumasi-Tanoso (IPT). No response was received from key informants in Techiman, Gyinase-Karikari farms and Dabaa. In addition, out of the 7 keys informants who selected smallholder participation in decision-making as desired institutional innovation, 2 responses each came from participants in Techiman; Gyinase-Karikari farms and Dabaa and 1 response came from a participant in Asueyi. Out of the 5 key informants who selected co-operatives as an institutional innovation, the response came from 2 key informants in Techiman; 1 response each came from participants Akumadan, Gyinase-Karikari farms and Dabaa. Five key informants who mentioned government intervention as a recommended institutional innovation to address smallholder farmers high transaction costs and risks. Out of this number, 1 response each came from participants in Asueyi, Tuobodum, Gyinase-Karikari farms, Kumasi-Tanoso (IPT) and Dabaa. No response was received from key informants in Techiman, Oforikurom, Akumadan and Gyinase.

Out of the 5 key informants who selected other institutional innovation not listed on the questionnaire, 3 responses came from key informants in Dabaa, 1 respondent each came from key informants from Tuobodum and Gyinase. Lastly, 1 response was received for smallholder empowerment from a participant in Asueyi and no response was received from key informants in Tuobodum, Oforikurom, Akumadan, Gyinase and Kumasi-Tanoso (IPT).

The chi-square test for key informants' responses for institutional innovations to address high transaction costs and risks affecting smallholder farmers transactions with traders and overall market access is shown in table 114.

Table 114: Chi-square test for institutional innovations for smallholder farmers market access

Chi-Square Tests								
	Value	df	Asymptotic Significance (2-sided)					
Pearson Chi-Square	4.818ª	6	.567					
Likelihood Ratio	5.383	6	.496					
Linear-by-Linear Association	.048	1	.827					
N of Valid Cases 35								
a. 14 cells (100.0%) have expected count less than 5. The minimum expected count is .49.								

The chi-square test (P=0.567) shows statistical insignificance about the key informants' responses from both the Brong Ahafo and Ashanti Regions. There were little variations in the responses of key informants on the possible institutional innovations for smallholder farmers to address high transaction costs and risks, hence this could impact on the chi-square test.

4.23.5 Smallholder participation in decision-making

Smallholder farmers' participation in decision-making was discovered to be the second best institutional innovation in the previous section. The key informants were asked whether smallholder farmers currently allowed to take part in certain decision making in the stud areas and their responses are shown in table 115.

Crosstab										
Count										
		Participatory de	cision-making							
		Yes	No	Total						
Regions in Ghana	Brong Ahafo Region	4	14	18						
	Ashanti Region	5	12	17						
Total		9	26	35						

Table 115: Do smallholder farmers participate in decision-making?

Twenty-six (74%) of the key informants selected 'No' response to the questions on whether smallholder farmers participate in the decision-making or not. Fourteen of the responses came from participants in the Brong Ahafo Region and the remaining 12 responses came from the key informants in the Ashanti Region. The 'No' participation in the decision-making was more in the Brong Ahafo Region compared to the responses in the Ashanti Region. This is due to the poor enabling environment for smallholders in the Brong Ahafo Region. Furthermore, one of the extension officers in Techiman confessed that he is unable to visit the farmers very often as she is not getting money (allowances for those visits). Furthermore, he claimed that he has not

received money to licence his motorbike since it was given to him more than a year ago. As a result, he finds it difficult to visit farmers. However, few key informants claimed smallholder farmers who cultivate cash groups like cocoa could take part in certain decision-making, such as spraying their cocoa farms. Some of the key informants in the Ashanti Region (farmers and extension officers) confirmed that smallholder farmers have a chance to take part in certain decisions especially on their farming activities with their extension officers and other stakeholders. For example, some farmers at Gyinase claimed that farmers in the area have been given a tutorial on good farming practices by some lecturers from the University of Science and Technology since they are not far from the University. In addition, an executive member of the farmers' association at Gyinase mentioned that the smallholder farmers have received a tutorial from an American NGO on farming practice. Furthermore, few farmers in Dabaa (part of Ashanti Region) claimed mentioned that have a chance to participate in decision-making. They claimed they meet their extension but not very often compared to farmers at Gyinase and Gyinase-Karikari farms, who are very close to Kumasi (the capital city of Ashanti Region) and a university. Also, out of the 9 key informants who selected 'Yes' for smallholder participation in decision making, 5 of them came from Ashanti Region and the remaining 4 key informants came from the Brong Ahafo Region. Therefore, smallholder farmers in the Ashanti Region have more opportunities to participate in decision-making in relation to their farming activities than their counterparts in the Brong Ahafo Region.

The responses of the key informants on participation in decision-making according to their towns and villages are shown in table 116.

Table 116: Key informants' responses on farmers participate in decision-making at towns/villages levels

		Crosstab		
Count				
		Participate in dec		
		Yes	No	Total
Town_or_villages	Techiman	0	6	6
	Asueyi	1	4	5
	Tuobodum	2	1	3
	Oforikurom	1	1	2
	Akumadan	0	2	2
	Gyinase	0	3	3
	Gyinase-Karikari farms	1	3	4
	Kumasi-Tanoso (IPT)	0	2	2
	Dabaa	4	4	8
Total		9	26	35

Out of the 26 'No' responses from the key informants for smallholder farmers participation in decision-making, 6 of the responses came from Techiman; 4 responses each were received from the key informants in Asueyi and Dabaa; 3 responses each came from participants in Gyinase and Gyinase-Karikari farms; 2 response each came from participants in Akumadan and Kumasi-Tanoso (IPT) and 1 response each came from participants in Tuobodum and Oforikurom. Also, out of the 9 key informants who responded 'Yes' for smallholder farmers participation in decision, 4 responses came from Dabaa key informants; 2 responses came from key informants in Tuobodum;1 response each came from key informants in Asueyi, Oforikurom;

Gyinase-Karikari farms and 0 response came from key informants in Techiman, Akumadan and Kumasi-Tanoso (IPT).

4.24 The importance of smallholder farmers participation in decision-making

The key informants were asked about the benefits or importance of smallholder farmers participation in decision-making and their responses are shown in table 117.

Crosstab											
Count											
		Benefits of participatory decision-making									
		Address									
		all		Reducti				Improve			
		marketin	Improve	on in			Prevent	ment in			
		g	ment in	high		Promote	s price	bargaini	No		
		problem	livelihoo	transacti		s market	fluctuati	ng	respons		
		S	ds	on costs	4.00	access	ons	power	е		
Regions in	Brong	0	2	4	2	2	1	7	0	18	
Ghana	Ahafo										
	Region										
	Ashanti	6	1	2	0	3	0	4	1	17	
	Region										
Total		6	3	6	2	5	1	11	1	35	

Table 117: Benefits for smallholder farmers participation in decision-making

The eleven key informants who claimed smallholder farmers participating in the decision-making can lead to an improvement in bargaining power, 7 of them came from the Brong Ahafo Region and the remaining 4 key informants came from the Ashanti Region. Also, all 6 key informants who claimed that smallholder farmers participation in decision-making can address all marketing problems faced by the smallholder farmers came from. Also, out of the 6 key informants who thought

smallholder farmers participation in decision-making can lead to a reduction of in high transaction costs, 4 of them came from the Brong Ahafo Region and the remaining 2 key informants came from the Ashanti Region. Five participants, you mentioned that smallholder farmers participation can promote market access, 3 of them came from the Ashanti Region and 2 of them came from the Brong Ahafo Region. Out of the 3 key informants who mentioned that smallholder farmers participation in decision-making can to improvement in the livelihoods, 2 of them came from the Brong Ahafo Region. One key informant who identified smallholder farmers participation in decision-making as a means of preventing price fluctuations came from the Brong Ahafo Region. One participant who selected no response for smallholder farmers participation in decision-making came from the Ashanti Region.

Crosstab											
Count											
Benefits of participatory decision-making										Total	
		Address									
		all		Reducti				Improve			
		marketin	Improve	on in			Prevent	ment in			
		g	ment in	high		Promote	s price	bargaini	No		
		problem	livelihoo	transacti	Una	s market	fluctuati	ng	respons		
		s	ds	on costs	ware	access	ons	power	е		
Town_or_	Techiman	0	0	1	2	1	0	2	0	6	
villages	Asueyi	0	0	2	0	0	0	3	0	5	
	Tuobodum	0	0	1	0	0	0	2	0	3	
	Oforikurom	0	0	0	0	1	1	0	0	2	
	Akumadan	0	2	0	0	0	0	0	0	2	
	Gyinase	2	0	1	0	0	0	0	0	3	

Table 118: Benefits for smallholder farmers participation in decision-making

	Gyinase- Karikari farms	2	1	0	0	0	0	1	0	4
	Kumasi- Tanoso (IPT)	1	0	0	0	0	0	1	0	2
	Dabaa	1	0	1	0	3	0	2	1	8
Total		6	3	6	2	5	1	11	1	35

Eleven (31%) of the key informants realised that participatory decision has a potential to promote bargaining power for smallholder farmers. Some of the key informants mentioned that the improvement in the smallholder farmers bargaining power will enable them to overcome bargaining costs discovered to be high transaction costs. Three responses out of the 11 responses from key informants came from Asueyi; 2 responses each came from the key informants in Techiman, Tuobodum and Dabaa; 1 response each came from participants Gyinase-Karikari farms and Kumasi-Tanoso (IPT). Six key informants mentioned that smallholder farmer's participation in decisionmaking could help to address all marketing problems. Out of this number, 2 responses each came from key informants in Gyinase and Gyinase-Karikari farms; 1 response each came from participants in Kumasi-Tanoso (IPT) and Dabaa. Similarly, 6 key informants, on the other hand, believed that participation in decision-making can help to address high transaction costs. Out of this number, 2 responses came from key informants in Asueyi; 1 response each came from key informants in Techiman, Tuobodum, Gyinase and Dabaa and 0 response was received from participants Oforikurom and Dabaa. Five of the key informants mentioned that participatory decision-making can promote market access for the smallholder. Out of this number, 3 responses came from key informants1 response each came from Techiman and Oforikurom. The remaining participants did not key informants did not respond to this question. Three key informants identified improvement in the livelihoods of smallholder

farmers as the benefit for participation in decision-making. Out of this number, 2 responses came from key informants in Akumadan and 1 response came from a key informant in Gyinase-Karikari farms. Again, 2 participants from Techiman claimed they are unsure about the benefit associated with smallholder participation in decision-making. A participant from Oforikurom mentioned that smallholder farmers' participation in decision-making can help to address price fluctuation. Lastly, a participant in Dabaa decided not to respond to any of the benefits listed on the questionnaire as a benefit for smallholder farmers' participation in decision-making.

The chi-square test for the key informants' responses for benefits of smallholder farmers' participation in decision-making is shown in table 119.

Chi-Square Tests									
	Value	df	Asymptotic Significance (2-sided)						
Pearson Chi-Square	80.915ª	56	.016						
Likelihood Ratio	59.566	56	.347						
Linear-by-Linear Association	1.141	1	.285						
N of Valid Cases 35									
a 72 cells (100.0%) have expected count less than 5. The minimum expected count is .06									

Table 119: Chi-square test for benefits of smallholder farmers participation in decision-making

The chi-square test (P=0.16) shows the statistical significance of the responses of the key informants. There were variations in the responses from the key informants in both Ashanti Region and Brong Ahafo Region on the benefits of participatory decision for smallholder farmers. For example, key informants in the Brong Ahafo Regions claimed participation in decision-making can help to address all market problems but none of the key informants in the Ashanti Region thought smallholder participation can address all their marketing problems.

4.25 PCA analysis for smallholder farmers

This section discussed PCA analysis for the responses from participants in the study areas. It will initially look at the loadings on axis 1 as it always shows the highest degrees of variability. The analysis will further look at the loading on axis 2 and axis 3. In addition, Biplot will be analysed to support the analysis of the loadings of axis 1, 2 and 3. The final part of this section will look at the correlation between some of the variables.

4.25.1 The PCA loadings for smallholder farmers' responses

The PCA loading on axis 1 (Figure 23) for smallholder farmers' responses in both Brong Ahafo and Asante Regions. The loading on axis 1 shows that smallholder farmers in Tanoso (village 3) and Tuobodom (village 4) had the highest response on questions relating to the types of crops grown and percentage sell for money compared to the other villages. Both villages come under Brong Ahafo Region. Also, participants from Akumadan (village 6) and Gyinase (village 7) had the highest response to questions on access to information and knowledge on high transaction costs. Both villages come under Ashanti Region of Ghana. The participants' responses can be seen in figure 23 (axis 1 loading

241



Figure 23: PCA loading on axis 1

The high bar for village implies village 3 and 4 correspond directly with crops but inversely with villages 6 and7; high values for information access and high values for transaction costs. This can be interpreted as the responses from smallholder farmers from Tanoso (village 3) and Tuobodum (village 4) 'negatively' correlated with the responses of participants from Akumadan (village 6) and Gyinase (village 7) (see figure 24). Thus, smallholder farmers from village 3 and 4 were not very interested in questions on transaction costs compared to those in village 6 and 7. In the same way, smallholder farmers in village 6 and 7 were not very interested in questions related to crops grown. Consequently, figure 24 and 25 depicts negative correlations between participants in village 3 and 4 to those in village 6 and 7



Figure 24:PCA loading for axis 2

The loading indicates that villages 3 and 4 negatively correlates with villages 6 and 7. This is further displayed in figure 24.



The important questions discovered from the Biplot (figure 26) for the smallholder farmers responses include information access (under section D on the questionnaire); whether smallholder farmers are allowed to participate in the decision or not (question 7 under institutional innovations), type of crops cultivated by the smallholder farmers (question 8 under section C) and how participate in decision-making could better smallholder farmers (question 2 under institutional innovations-section G). Also, the first two questions negatively correlate the last question.

Also, all four questions are important to the current study as they relate to the study aim and objectives. For example, information access is a source of high transaction costs and risks. Also, smallholder farmers' participation in decision-making is identified in the current study as a possible institutional innovation through the crosstabulations from the key informants and smallholder farmers interviews.



Figure 26: Biplot for smallholder farmers responses to the questionnaire interviews

4.26 PCA analysis for key informants

The current section discusses the PCA analysis for key informants' response for both Brong Ahafo and Ashanti Regions participants. It will initially look at the loadings on axes. It will further look at the Biplot and the final focus on the cluster analysis using Ward's method.

4.26.1 The PCA loadings on axis 1 for key informants

The loadings on axis 1 of the PCA (figure 27) indicate that key informants at Kumasi-Tanoso (IPT) responded more to question 6 but less to question 5,7, 8, 10 and 22. Similarly, participants at Gyinase responded more to answered question 9 and 6 but responded less to question 5, 7, 8, 10 and 22. Alternatively, key informants in Kumasi, Akumadan and Techiman responded more to questions 7, 8, 10 and 22.



Figure 27: for axis 1 (key informants' interviews)

The key informants gave the second highest response to question 10 (figure 27). They claimed that smallholder farmers have a lot of marketing challenges and most of the challenges can be addressed through participatory decision-making approach for the smallholder. Hence, they gave higher responses to question 22. However, key

informants at Kumasi-Tanoso or IPT (University of Winneba, Kumasi campus) and Gyinase did not see a lack of participation in decision-making as a problem.

Similarly, key informants at Gyinase and Gyinase-Karikari farms did not see marketing challenges as a major problem for most smallholder farmers at Gyinase and Gyinase Karikari farms since, they have well-established farmer association (Vegetable Growers Associations). The farmers at Gyinase and Gyinase Karikari farms normally get buyers at farmgate. Many market women come and buy the produce to the local Kumasi open market and other national markets. The farmers at this study location practice organic farming and due to lower levels of chemical usage, they tend to get more buyers (traders) at farmgate. In addition, the key informants claimed that their strong farmer association gave them bargaining power compared to other smallholder farmers in the Ashanti and the Brong Ahafo Regions who participated in the study.

Again, question 2 was designed to find out reasons for key informants' involvement in farming, to discover alternative livelihoods for smallholder farmers in rural parts of Ghana. Similarly, question 7 was about the type of farming undertaken by smallholder farmers, whether they practice commercial farming or subsistence farming. This question is equally important as participants' response can be used to recommend alternative livelihood for smallholder farmers in rural areas of Ghana who may find it difficult to access better marketing questions. Some of the Key informants in both Brong Ahafo and Ashanti Regions gave high responses to this question.

Additionally, participants from the Brong Ahafo Region gave a positive response to question 12 compared to their counterparts in the Brong Ahafo Region. This question was about their current market access for their farm produce. It was discovered to be

important to many to them since they are looking for better marketing condition for their produce. For example, farmers in the Ashanti Region were very confident about the quality of their produce and intensively looking for storage facilities at the time of the interview to enable them to produce all year round to enable them to regional and international markets with their farm produce. Furthermore, question 9 was another important question displayed in axis 1, axis 2 and in the biplot (figure 27, 28 and 29). In view of this, the participants from Gyinase and Gyinase-Karikari farms in the Ashanti gave a high response to question 9. This question was meant to verify whether smallholder farmers in the study areas rear animals alongside the cultivation of crops in order to discover the possible alternative livelihoods for smallholder farmers in the Ashanti Region. It was revealed that some farmers at Gyinase and Gyinase Karikari farms cultivate leafy vegetable in large scale and rear animals (Plate 4) as a source of extra income. This seems to be the outcome of their high number of responses to question 9. However, key informants in the Brong Ahafo Region gave low responses to question 9. Some of them mentioned during the interviews that they only rear animal on the subsistence basis. Thus, they rear animals just to feed their family, but not as another source of income. Pictures depict the kind of farming practices undertake by some smallholder farmers at Gyinase and Karikari farm can be seen in plate 4.

4.26.1.1 Loading on axis 2





Figure 28:PCA loading for axis 2



Plate 5: Animals kept alongside vegetable crops by Gyinase, Karikari farms

Plate 5 shows the pictures of animals (pigs and poultry) rear by smallholders' farmers at Gyinase Karikari farms alongside vegetable crops they cultivate

intensively as their main source of income. The farmers use the manure from the animals to fertilise their farmlands for vegetable cultivation.

4.26.1.2 PCA biplots for key informants

The biplot for key informants' responses from both study areas (Brong Ahafo and Ashanti Regions) are shown in figure 29.

Also, the loading shows a negative relationship between question 22 and question 8. Thus, the reason behind this type of farming (subsistence or commercial) does not influence participation in decision making.
The current section discusses the PCA analysis for key informants' response for both Brong Ahafo and Ashanti Regions participants. It will initially look at the loadings on axes. It will further look at the Biplot and the final focus on the cluster analysis using Ward's method.



Figure 29:PCA biplot plot for key informants' interviews in the Ashanti and Brong Ahafo Regions

The loadings for the PCA on axis 1 (figure 29) for key informants responses indicates that following questions are important: job or profession of the participants (question

1); type of infrastructure smallholder farmers have access (question 5); types of crops cultivated by smallholder farmers in the study area (question 6); classification of smallholders (question 7); smallholder farmers rear animal alongside crop farming (question 9); what marketing problems faced by smallholder farmers (question 10) and can smallholder farmers participation in decision-making promote market access (question 22). Also, questions 5 and 22 directly correspond directly with questions 1, 8, 7 and 10. It corresponds indirectly to question 6 and 9. This information is further displayed in figure 30.

4.26.1.3 Cluster analysis Ward's method



Figure 30: provide more detailed legendCluster analysis

The current section looks at cluster analysis of the respondents in the key informants when asked questions relating to loadings 1 and 2. The cluster analysis shows that some key informants responses were very similar to the questions used in their interviews. The participants are cluster into three groups. The cluster on the left of figure 31 represents those participants that responded in a similar way to questions relating to question 1 to question 5. Question 1 to question 5 were on the participants' demographic information. Thus, they gave similar responses to questions, such as the

type of occupation. The second cluster was on marketing information, such as smallholder marketing challenges. The cluster shows that Gyinase farmers and MOFA (extension officers) in Techiman give similar responses to smallholder farmers marketing challenges. The last cluster shows that many MOFA staff in Techiman and key informants were farmers gave similar answers to the questions on institutional innovations need for farmers, such as participation in decision-making.

4.26.1.4 Correlations between the questions based on the responses from the cluster ward's method

The cluster analysis Ward's method reveals corrections between certain questions. Some of them are discussed in this section. For example, question 9, which is intended to verify whether smallholder farmers rear animals alongside crop farming correlates (p=0.0068103) with question 6, the type of crops do smallholder farmers normally grow in the area. Thus, not all crop cultivation may allow rearing of animals alongside.

Also, in question 5, the type of infrastructure smallholder that farmers have access to correlates (p=0.0022054) with question 11, a person or organisation that farmers contact to discuss their marketing problems. This correlation confirms reason why smallholder farmers in Ashanti Region especially at Gyinase with access to good transport network, good road network, and internet, get access to MOFA for advisory services compared to counterparts in KMA without good access to the good transport network, the internet, irrigation facilities and good road network struggle to get support from MOFA.

Similarly, question 22, which was used to assess how smallholder farmers participation in the decision can improve their market access correlates (p=0.02726) with question 12, smallholder farmers market access.

4.27 MARISCO vulnerability analysis (Concrete application and MARISCO results)

The current section reports on the gap analysis carried out as part of vulnerability (MARISCO) analysis from both the Brong Ahafo and Ashanti Regions. It will initially explain cause-effect web (rankings of threats, criticality, manageability, and knowledge). It will further look at the results chain of the situational analysis. The final part of this section focuses on new strategies likely to address threats without the existing strategies. Ranking of threats, criticality, manageability, and knowledge.

4.27.1.1 Cause-effect web

According to Ibisch and Hobson (2014:115), "Unlike conventional 'Systematic Conservation Planning', adaptive management does not rely entirely on a qualified body of knowledge to structure its strategies." In view of this, they go on to say, "It is important, then, to try and harvest as much knowledge as possible while at the same time embracing unknowns and non-knowledge."

Consequently, the participants (knowledge group) in the vulnerability (MARISCO) analysis carried conceptual model based on threats, stresses and their contributory factors on a spreadsheet attached to the last page of this thesis.

In addition, the participants were given the opportunity to identify existing strategies and new strategies to address smallholder farmers' challenges. The sources for the identification of strategies include government policies, literature and participants own knowledge. This process is termed gap analysis in MARISCO (See Ibisch and Hobson, 2014). A diagram showing MARISCO process is shown in table 122.

The participants further classified the threats, stresses, contributory factors and associated strategies according to criticality, knowledge and manageability. Also, the levels of criticality, knowledge and manageability are distinguished from each other

based on colour coding. The detailed description of the above is shown below:

Slightly critical = 1	Moderately critical = 2	Critical = 3	Very critical = 4
The stress/threat/factor does not play a very important role in generating the overall vulnerability of the conservation objects in the area of analysis.	The stress/threat/factor plays a fairly important role in generating the overall vulnerability of the conserva- tion objects in the area of analysis.	The stress/threat/factor plays an im- portant role in generating the overall vulnerability of the conservation objects in the area of analysis. It is an important driver of negative change in the analysed system.	The stress/threat/factor plays an extremely important role in genera- ting the overall vulnerability of the conservation objects in the area of analysis. It is a major and persistent driver of negative change in the analysed system.

Figure 33: Rating categories for current criticality, Source: Ibisch and Hobson, 2014

Well known = 1 Somewhat known = 2		Not known, but theoretically knowable = 3	Not knowable = 4		
The level of knowledge about the factor/threat/stress is very high; the planning team has a precise idea of the element's characteristics, relevan-		The level of knowledge about the factor/threat/stress is poor, the planning team does not have a good idea of the element's characteristics,	It is impossible to obtain a level of good knowledge about the factor/ threat/stress, the planning team can only formulate assumptions about the element's characteristics relevan-		
Very manageable = 1	Somewhat manageable = 2	Poorly manageable = 3	Not manageable = 4		
The element can be easily and directly influenced by strategies and project activities, usually these refer to mainly local elements.	The element is likely to be directly influenced by strategies and project activities to a certain extent, espe- cially if more resources are made available than at present.	The element is not very likely to be directly manageable. It can be influ- enced instead in a meta-systemic and indirect way.	The element is not manageable at all; it is extremely unlikely that local ma- nagement would effect any change, either directly or indirectly.		

Figure 32:Rating of categories for manageability, Source: Ibisch and Hobson, 2014

The rating criticality, knowledge and manageability emerged from the gap analysis and conceptual model can be seen in Table 120. They are arranged according to their impacts on smallholder farmers. The highest threats and contributing factors with little knowledge and poorly manageable or not manageable are the top of cause-effect web table. The least severe ones are at the bottom. Thus, the threats and contributing factors to the of the cause-effect web required immediate urgent attention to improve the livelihoods of the smallholder farmers.

Table 120: Cause-effect web	С
-----------------------------	---

Threats	Criticality	Manageability	Knowledge
Price fluctuations	4	3	1
Urbanisation	4	4	1
Spoilage	4	3	1
Extreme weather	4	4	2
pattern			
"Lead boys"	4	2	4
(commissioners)			
Environmental	4	4	2
degradation			
Erosion	4	2	1
Bushfire	2	3	1
Illegal logging	3	2	
Contributing factors			
Corruption	4	3	1
Lack of market	4	3	4
information			
Lack of enforcement	4	2	2
Lack of participation	4	2	2
in decisions			
Lack of credit	4	3	3
facilities			
Poor road network	4	3	4
Lack of irrigation	4	3	4
facilities			
Climate change	4	2	2

4.27.1.2 Result Chain

²The current session discusses the resulting chain from MARISCO situational analysis. It shows the ranking of criticality, manageability, and knowledge on threats and associated contributory factors affecting smallholder farmers are exposed to, including the existing strategies put in place by policymakers to address them.

Result chain for MARISCO analysis

The current table summarises the outcome of the ranking of criticality, knowledge, and manageability of stresses, threats and contributing factors for MARISCO analysis carried out in the current study. Numbers and colour coding are used to determine the strategic importance of the threats and their associated contributing factors, including their criticality, knowledge, and manageability (Ibisch and Hobson, 2014).

Existing strategies	Threats	Contributory factors	Criticality (Cc)	Manageability (M)Manageability (M)	Knowledge (K)
Development of high- yielding, disease, and pest-resistant varieties and certified planting	Spoilage	Lack of post-harvest storage facilities	4	3	1

Table 121: Results	chain	for M	ARISCO	analysis
--------------------	-------	-------	--------	----------

² How threats are prioritised:

High critical threats + manageable (2 or 3) is given top priority followed by those of high critical threats

+ not so manageable (3 > 4), so forth

Existing strategies	Threats	Contributory factors	Criticality (Cc)	Manageability (M)Manageability (M)	Knowledge (K)
materials (MoFA, 2007)					
Introduction of national buffer stocks and minimum guaranteed prices for farmers (FAO, 2015)	Price fluctuation	Lack of enforcement	4	3	1
DFID has an anti- corruption strategy for Ghana (DFID, 2013); creation of Office of Special Persecutor by Ghana's president (Nana Akuffo-Addo)	Corruption	Lack of enforcement	4	3	1
The signing of the Ghana-EU voluntary partnership agreement in 2009 (Hoare, 2014)	Illegal logging/deforestation	Lack of law enforcement Enforcement	3	2	4
Climate change adaption and disaster risk reduction are incorporated into national development.	Extreme weather patterns	Climate change	4	4	2

4.27.2 Proposed strategies to address threats and contributing factors

The chain analysis revealed certain threats without existing strategies, yet they are manageable. These threats include commissioners (lead boys), price fluctuation and

spoilage. The strategies associated activities and indicators to measure the success

of those strategies are shown in table 122.

Threats	Strategies	Activities	Indicators to show improvement in the threats
Price fluctuations	Introduction of Warehouse receipts systems in rural areas	Government and NGOs can take the costs involved in the warehouse's systems. Also, they should train people to manage them.	Standardised price for food produces in the local markets in Ghana.
	Contract farming	Creating enable environments to facilitate contract farming (Anseeuw, 2009).	A ready market for contract farmers' farm produce in rural markets.
	Introduction of market information systems (MIS)	Focus group discussions with the heads of a government department, NGOs, banks and farmer associations	Availability and accessibility of market information, such as pricing for small
'Lead boys' (commissioners)	Law enforcement to remove intermediaries or commissioners between smallholder farmers and market women. Contract farming to remove 'lead boys' (commissioners) terminate activities.	Encouraging participatory decision-making involving smallholder farmers, traders, security agencies, such as the police and local authorities to remove commissioners from rural markets.	Removal of intermediaries between traders and smallholder farmers
	Create a more effective integrated enabling environment	Focus group discussions with heads of government departments, NGOs, banks and farmer associations	The presence of participatory decision- making.
Spoilage	Develop a good policy environment that encourages investment from the private sector.	Attract financial support from government and the private sector.	Presence of storage facilities

Tabla	400. NL	المنابية	اممئر ماريم مستعر		1	~~~ .	م ما 4	a viation a	
rable		ewivi	rormulated	strateoles	TO THE	dabs in	Ine	existina	strateoles
1 abio	1	•••••	onnaiatoa	onatogioo		gape in		o, ao ang	onalogioo

The major threat revealed by the chain analysis is price fluctuation. In view of the above, proposed strategies likely to address this threat include the introduction of warehouse receipts systems in rural areas, contract farming and the introduction of the market information system.

The above strategies can be achieved through a set of recommended activities as shown in table 26, such as government and NGOs taking the costs involved in the warehouse systems. In addition, they should train people to manage them. Also, creating an effective enabling environment can help to successfully create contract farming to further address price fluctuations affecting smallholder farmers in rural markets of Ghana.

Spoilage was discovered from the chain analysis as another biggest challenge or a threat affecting smallholder farmers. The proposed strategy to address this problem is the development of a good policy environment that encourages investment from the private sector. The following chart shows how new strategies (table 26) were developed from MARISCO vulnerability gap analysis shown in the poster attached to the dissertation.

265

4.28 Conclusion for data analysis

This chapter has presented the responses of the participants who took part in the Brong Ahafo and Ashanti Regions of Ghana in relation to the possible institutions likely to reduce high transaction cost and risks between smallholder farmers and traders, including the potential for small-scale rural farmers in Ghana to access the national and West Africa markets with their produce. Besides, other factors that contribute to the high transaction costs and risks associated with smallholder farmers' market transactions with traders in rural markets in Ghana were presented.

The findings revealed that that smallholder farmer who participated in the study from different villages or towns have variations in their needs and exhibited different characteristics. For example, farmers from Brong Ahafo have larger farm sizes, less support from MOFA and informal farmer co-operative societies.

Also, smallholder farmers are affected by high transaction costs and risks in their interaction with traders (market women), however, their awareness about transaction cost concept is weak. In addition, high transaction costs associated with their marketing participation is linked with different factors, which vary among different farming communities or villages, even within the same country. Again, the findings revealed that high transaction costs can be addressed through institutional innovations, such as smallholder farmers' participation in decision making. Additionally, all the data collections methods revealed similar findings. The detailed findings from a questionnaire survey, key informants, and MARISCO situational analysis are as follows.

266

5 Discussion

The chapter discusses the main findings from quantitative (smallholder farmers' and traders' questionnaires interviews) and qualitative data (key informants' interviews and MARISCO vulnerability analysis) data sources employed in the study. The discussion will initially look at the sources of the data generated and apply the findings to some of the existing literature. The second part of this chapter will look at the new contributions of the study to the knowledge gap. The third part of this chapter will look at recommendations emerged from the study. It will finally look at the limitations of the study and future research, including the summary of the key findings and contributions of the literature and conclusions.

5.1 Source data for the discussion

The data generated from the current study came from the following sources: smallholder farmers, traders, key informants from both Brong Ahafo and Ashanti Regions and MARISCO Vulnerability analysis. The total participants for smallholder farmers' interviews was 130. Out of this number 64 came from the Brong Ahafo Region and remaining 64 came from Ashanti Region. The specific villages or towns participants came from and their numbers can be seen in table 8. The key informants' participants were 35 in total. Eighteen of the participants came from the Brong Ahafo Region and the remaining 17 participants came from. Also, out of the 10 traders who participated in the study, 5 of them came from the Brong Ahafo Region and the remaining 5 participants came from the Ashanti Region. The participants for MARISCO vulnerability analysis came from a range of stakeholders, such as executives from farmers Brong Ahafo and Ashanti Regions Vegetable Growers

Association, MOFA extension officers, Yam Growers Association, market women and smallholder farmers.

5.2 Demographic information of the smallholder farmers

The smallholder farmers from both the Brong Ahafo and Ashanti Regions did not show a lot of differences on their demographic information. The detailed discussion of some of the demographic factors of the smallholder farmers are discussed below:

5.2.1 Gender of the participants

First, the findings from the smallholder farmers' interviews revealed that majority of the farmers (115 or 88%) were males and only a few of them are females (15 or 12%). Twelve of the females came from the Brong Ahafo Region and the remaining 3 females came from the Ashanti Region. Thus, the Brong Ahafo Region had more females' farmers than their counterparts in the Ashanti Region. Many of the participants pointed out that women (females) involvement in agriculture is restricted by the existing culture of the local people. In fact, this is not new in the much of the academic literature on gender participation in Agriculture in Ghana and Africa as a whole (Anaglo, et al., 2014; Send-Ghana, 2014); Lambrecht, et al., 2017). Hence, this finding is a confirmation of what is known already. For example, Send-Ghana (2014:6) found out that "One of the most significant gender-based constraints [in Ghana] that women farmers face is access to, ownership and control of agricultural land." In view of this, it was not surprising to discover that there were more male smallholder farmers than female smallholder farmers in the current study. Furthermore, during smallholder farmers' interviews, some women were working with their husband but did not bother to participate in the questionnaire interviews and allowed only their husband to answer all the questions, which testified that the existing culture of the participants does not favour women compared the men. Also, it was discovered in the interviews that male farmers were carrying out transactions with the traders who visited the farmgate for smallholder farmers produce (vegetables) at Gyinase and Gyinase Karikari farms. This finding could be interpreted as gender inequalities in smallholder agriculture in the study areas in Ghana. Hence, it affirms Lambrecht, et al., (2017) findings on gender inequalities in agriculture in Ghana.

5.2.2 Farm sizes of smallholder farmers

The study revealed that the average farm size of the smallholder farmers from both study Regions was found to be 1.9692 hectares (standard deviation \pm 1.58451). With reference to the individual region, the average farm size for smallholder farmers in the Brong Ahafo Region was found to be 2.1364 hectares (standard deviation of \pm 1.52806), while the average farm size of the smallholder farmers in the Ashanti Region was found to be 1.7969 (standard deviation of \pm 1.63474). The farm sizes of the smallholder farmers fit perfectly into much the existing literature (World Bank, 2003; Singh, et al., 2002; Thapa, 2009; Torero, 2011) definition of smallholder farmers based on farm size. For example, the World Bank (2003) defines smallholders as farmers with limited assets base and operating on less than 2 hectares of cropland. Consequently, the finding on the smallholder farmers farm sizes.

Also, smallholder farmers in the Brong Ahafo Region compared to those from the Ashanti Region had fewer restrictions on landholdings, hence, they had average bigger farm sizes than their counterparts in the Ashanti Region. Many of them were operating on inherited or family farmlands and they have more opportunity to expand their farm size. However, many of them chose not to expand their farms since they lacked resources to expand their farm sizes. Furthermore, some of them did not see farming as a business venture and as a result did not apply some business principles to their farming activities, such as recording on expenses and profits.

Farmers in the Ashanti Region unlike those in the Brong Ahafo had some restrictions, which could not permit them to expand their farms. First, many of them hire the land, which belongs to private individuals and organisations. For example, farmers interviewed at Gyinase and Kumasi-Tanoso (IPT) were farming on University of KNUST and University of Wenneba, Kumasi campus property respectively. Also, some farmers interviewed at Gyinase-Karikari farms farmlands belonged to individuals (building plots), and some of them were about to start their building projects on part of their farmlands. Some farmers claimed many of their previous farmlands were taken for building houses due to urbanisation. As a result, some of the farmers in the Ashanti Region mentioned that suitable land tenure arrangements were one of their priorities.

5.2.3 **The educational level of the participants**

The study discovered that formal educational levels of the smallholder farmers can impact on their farming activities. The data analysis revealed that 18 (14%) of the entire participants in the smallholder farmers' questionnaire interviews had no education; 70 (53%) of the smallholder farmers had primary or basic formal education; 6 (5%) of them had technical education and 1 participant from the Brong Ahafo Region (Aworowa) had a degree in agriculture. Out of the 130 farmers interviewed in both study regions, none of them has ever received an award for good farming practices

except the farmer with a degree. He had one of the national best farmers' awards in 2013. Also, he was cultivating a range of crops in large scales at the time of the interview, such as cash crop (cocoa), tomatoes, pepper, garden eggs and many more (See appendix 8.8). He promised to take more awards in future from his farming activities from the government in the annual farmers' day celebration in Ghana. This finding supports the existing studies (Eric, et al., 2014; Muburu, et al., 2014; Weir, 1999) that concluded that education is crucial for smallholder performance in Agriculture. In view of this, Eric, et al., (2014:6) was right argued from their findings that "Formal education tends to promote the formation of cognitive skills and abstract reasoning ability as well as changes in attitudes." While "Non-formal education most often serves to transmit specific information needed for a particular task or type of work. Informal education may serve mainly to shape attitudes, beliefs and habits."

Furthermore, the chi-square test (P=0.007) shows statistical significant on levels of education and smallholder farmers performance in the study areas.

With regards to the comparison between the participants levels of education, it was discovered that 44 out of the 130 of the participants from the Ashanti Region had primary education but 26 of the participants in the Brong Ahafo Region had primary education; 7 participants from the Ashanti Region had secondary school education (GCSE equivalent) but 18 of the participants in the Brong Ahafo had secondary school education; 4 participants from Ashanti Region had technical education but 2 of the participants from the Brong Ahafo had technical education but 2 of the participants from the Brong Ahafo had technical education and, as mentioned above, 1 participant from Brong Ahafo (Aworowa) had a degree, but no participant from Ashanti Region had a degree. Hence, on the average smallholder

farmers in the Ashanti Region had more basic education compared to farmers in the Brong Ahafo Region. However, smallholder farmers in the Brong Ahafo Region have a more secondary education than farmers in the Ashanti Region, but farmers in the Ashanti Region had more vocational or technical related qualification than them. While the farmer with degree came from the Brong Ahafo Region.

Even though formal education has a positive impact on smallholder farmers' productivity as discussed earlier, it was revealed in the study that smallholder farmers in the Ashanti Region were generally doing better than their counterparts in the Brong Ahafo Region, while the majority of them had primary education. Their successes partly due to support and informal training from extension officers (MOFA) and other stakeholders. For example, farmers at Gyinase confirmed that they access training from lecturers from KNUST and NGOs from time to time. However, smallholder farmers in the Brong Ahafo Region do not normally get informal training from extension officers and other stakeholders as discovered from both smallholder farmers and key informants' interviews. As a result, education (both formal and informal) and enabling environment are needed to help smallholder farmers to increase their productivity, however, farmers' smallholder commercialisation and innovation can be facilitated through a higher level of formal education.

5.3 Sources of market information

The participants were asked about sources of information for market access since information access costs contribute to high transactions costs (Osebeyo and Aye, 2014). According to 78 (60%) of the participants interviewed (table 30), smallholder farmers access marketing from the traders (market women), such as the latest prices

for farm produce. This is one of the reasons why smallholder farmers interviewed lack bargaining power. Furthermore, smallholder farmers interviewed in Akumadan in Ashanti Regions mentioned that the traders or market women normally meet in a local park in the town to decide the amount they are willing to offer for a box of tomatoes from them and other smallholders in Techiman. However, 31 (23.8%) of the participants mentioned during the interviews that farmers use other informal sources, such as a conversation with other farmers, local farmers' meetings and mobile phone communications to access market information.

Additionally, 5 out of 10 traders interviewed (table 61) mentioned that smallholder farmers use other sources, such telephone calls and FM radio to access market information. This shows that smallholder farmers do not have standardised sources of market information and could contribute to price fluctuations

In terms of the costs associated with sources of market information, smallholder farmers are using, none of the farmers in both study areas (Brong Ahafo and Ashanti Regions) was able to give the exact cost involved in using the information sources. All the participants confirmed that they do not record costs associated with the sources of the information. However, sources of information and flows defer between districts and villages (Nyambo and Ligate, 2013). As a result, sources of information smallholder farmers are using may have costs associated with their usage and may vary from different regions or villages in Ghana.

Consequently, proper accounting and records keeping are crucial for smallholder in order to determine the costs and reliable sources of market information. This will help them to determine their transaction costs.

273

Also, government intervention is needed to ensure standardised market information sources for smallholder farmers in Ghana. In view of this, Nyambo and Ligate (2013) were right to argue that "Policy change and additional resources are required for improvement of existing information systems."

5.4 Channel of distribution and market access problems for the smallholder farmers

First, the study discovered that out of the 130 participants, only 1 participant from Aworowa (the best farmer in 2013) could confidently say he was accessing an international market with his farm produce. One hundred and twenty-five (96%) of the smallholder farmers were accessing domestic markets. Four of the participants were accessing regional markets with their farm produce.

In view of the above, most of the farmers' access domestic markets. For example, 86 (66%) of the participants sell their farm produce through traders (market women) especially vegetable crops in the domestic markets.

Many farmers interviewed mentioned that using market women (agents) is not the best option as they encounter a lot of problems working with them. For example, they used over-size boxes to purchase their tomatoes (see appendix). This means that they give away two boxes of tomatoes for a price of one. Similarly, the executives of Brong Ahafo and Ashanti Regions Vegetable Growers Association mentioned during interviews at Tuobodum, a suburb of Techiman that they have seen instances market women from Accra took smallholder farmers tomatoes away without paying them any money. Market women after loading their trucks told them they will pay them in future

without any formal agreement and ran away with their produce. This shows that there is a lot of risks associated with smallholder farmers' transaction with traders.

Nevertheless, smallholder farmers use market women as their main channel of distribution as many of them do not have alternative means of selling off their harvested produce. Moreover, market women at times offer smallholder farmers transport to convey their produce to them. This saves the farmers' challenges associated with the transport of farm produce.

Twenty-five of the smallholder farmers interviewed claimed they always have to take their produce themselves to the local markets. However, if they do not get buyers, they tend to lose all their produce to spoilage. In view of this, this channel of distribution equally has a high risk in the same way as selling through market women.

According to Ranjan (2017:386), "In addition to these risks, farmers face significant institutional and infrastructure-related hurdles in their pursuit of attractive prices for perishable farm produce." He goes on to say "Transportation and storage infrastructures are often lacking or costly in poorer regions, preventing farmers from taking their produce to distant markets that may offer better prices." In fact

Nine participants confirmed that they sell their produce at farmgate. Many residents buy food at farmgate from smallholder farmers. However, only a few quantities of produce can be sold at farmgate. Moreover, much of the literature on smallholder market participation points out that selling at farmgate affect smallholder farmers profit margins compare to selling in distance markets (Fafchamps and Hill, 2005; Abu et al., 2017).

275

Also, Abu et al., (2017:2) claim that "There are two basic decisions that are open to smallholders in their quest to be market participants: selling at farmgate or selling at a designated market centre." The authors further explained that selling at farmgate attract low prices compared to travelling to a market centre where higher prices are offered while incurring some transaction costs.

A typical picture of smallholder farmers' channels of distribution is shown unidentified in figure 35.



Figure 35:Nature of market smallholder farmers access in rural Ghana, Source: Author

This shows that many of the farmers' food production was not up to international standards. Also, the chi-square test (P=0.126) shows statistically insignificance about the responses of the participants in relation to market access. The outcome of the chi-square could be as a result of dependence on domestic markets for the majority of the smallholder farmers.

Most of the farmers' inability to access international and regional markets were attributed to marketing challenges, such as price fluctuations and commissioners' activities. Price fluctuations were identified as the major marketing problem affecting smallholder farmers. Price fluctuations (or low prices) was identified by 72 (55%) of the smallholder farmers in the smallholder farmers interviews; 12 key informants identified price fluctuations or low prices for smallholder farmers produce as a major marketing problem; 4 (40%) of the traders (market women) saw price fluctuations, as well as a major problem affecting smallholder farmers in Ghana and it, was ranked as the second highest problem affecting traders in the MARISCO vulnerability chain analysis (see table 117). This problem is already known in the literature (Fafchamps (2000; Huka, et al., 2014), hence the current finding is a confirmation of the existing findings on the impact of price fluctuations on smallholder farmers market access. Also, it was discovered to be a marketing risk for all the participants interviewed in the current study. This is because smallholder farmers are unable to predict prices before their crops are harvested. Moreover, the participants' complaint a lot about the absence of storage facilities for their farm produce. Thus, they are unable to keep harvested crops to meet high prices. In view of this, the finding on high price fluctuation supports Fafchamps (2000:1) who argued that "Farmers all over the world face dramatic fluctuations in the price of the crops they produce." However, it does not agree on part of his argument that stated that "They have all devised ways of coping with the resulting market risk." Since most farmers interviewed are faced a lot of challenges, such as spoilage for their produce due to high price fluctuations. Some farmers' executive in Tuobodum, a suburb of Techiman gave instances tomoatoes growers ended their lives in the Town due to their inability to pay back the loan for farming activities. Furthermore, one lady mentioned in Oforikurom (plate 2) how she destroyed her produce in the local market due to lowest price offered for her harvested

produce by commissioners or lead boys in Techiman market on behalf of market women.

Similarly, Poole (2017:6) confirms that "High levels of price [fluctuations] and production risk and uncertainty and limited access to tools to manage them deter investment in more productive new technologies that would enable smallholders to produce surpluses for sale in markets." In view of this, many smallholder farmers in Ghana have no coping strategies to withstand problems associated with price fluctuations.

Also, commissioners (lead boys) activities emerged as a problem affecting not only smallholder farmers profit margins in the local markets but traders as well. Hence, it was discovered as a source of high transaction costs and risks affecting smallholder farmers' interactions with traders (agents). For example, smallholder farmers saw identified it as next to high price fluctuations with 39 (30%) responses; 2 (20%) of the traders discovered as a major problem and ranked as a third major problem under the MARSICO vulnerability analysis (table 26). However, it seems little is known in the literature about the commissioners' activities as a source of high transaction costs and risks, hence, it is a new finding in the current study. For example, a participant in Oforikurom mentioned that she had to destroy her farm produce a few years ago in a market as one of the commissioners wanted to take all her profit from yam sales in the Techiman. Also, one of the executives of the market queen gave an example during the MARISCO vulnerability analysis how a market woman was killed by one of the commissioners after she left the market and she was heading home.

279

Additionally, other marketing problems were identified from all the interviews which affect smallholder farmers. For example, poor roads network was a major problem in the Brong Ahafo Region compared to the Ashanti Region. Eight participants in the Brong Ahafo selected poor roads as their major problem since they live far away from the local market. One participant in the Ashanti Region selected poor road network as a marketing problem. Most farmers in the Ashanti Region have access to properly road networks and they live close to the local markets. Moreover, the Ashanti Region is more urbanised than the Brong Ahafo Region, hence the Region has better motorways. Also, 4 participants in the Brong Ahafo Regions identified lack of transport for their produce but none of the participants in the Ashanti Region saw it as a problem. All the other problems associated with marketing may be sources of high transaction costs from the literature review and the discussion on the transaction costs in this thesis. In view of this, 3 participants in the Brong Ahafo Region identified high transaction costs as a marketing problem for them but none of the participants saw the high transaction as the marketing problem.

Finally, the chi-square test (P=0.001) for marketing problems affecting smallholder shows statistical significance. Thus, the marketing problems identified in the current study did not occur by chance but linked with all the farmers' activities.

5.4.1.1 Application of the existing conceptual model (framework for linking smallholder to markets) to smallholder farmers in Ghana

The current section looks at how Torero's (2011) 'Framework for Linking Small Farmers to Markets' can be applied to the findings, which is the conceptual model adopted for the current study. As discussed earlier in the literature review section, it is based on the notion that smallholder farmers, due to the small volume of their production leftovers, are prone to more risk and transaction costs. Also, Torero thinks smallholder farmers are not the same in relation to market access, and hence classified them according to "rural world 1, rural world 2 and rural world 3".

The smallholder farmers with the ability to compete in the international market come under rural world 1, those capable of accessing local and national markets come under rural world 2. The final group known as rural world 3 are those seen as marginalised from their local economy, in other words, unable to access local, national and international markets. This classification can be seen in figure 36.



Figure 36:Small farmers Heterogeneity, Source: Torero, (2011)

In fact, all the above Torero's classifications of smallholder farmers into rural worlds were discovered in the study from the smallholder farmers. The farmers exhibited variations in relation to market access. For example, in Aworowa (Brong Ahafo Region), a farmer who received the best farmer's award in 2013 (see appendix 8.8) is the only farmer among the entire participants who claimed that he is currently accessing international market with his produce (table 99). Moreover, some farmers in Aworowa are already accessing international markets with their 'gari' (processed cassava) but not with fresh farm produce (see appendix 8.7). In view of this, the best farmer can be classified under rural world 1. Also, farmers in Aworowa who export gari can be classified under rural world 1. However, with regards to fresh vegetables and other crops they cultivate alongside the gari, they can be classified under rural world 3. Similarly, some smallholder farmers in Asueyi produce cash crops (cocoa and cashew nut), and they access international markets through the Ghana Cocoa Marketing Board (CMB) and other private cash crops buying companies. Notwithstanding, many of them find it difficult to access local agricultural or food market in Techiman. Hence, with government intervention, none of them will be able to access international markets with their cash crops. Even when they were as about their preferred market (table 37) out of the 35 participants who selected international markets, 13 of them came from Asueyi. Consequently, many farmers in Asueyi can as well be classified under rural world 3.

The farmers who may be classified under rural world 2 include participants from Gyinase, Gyinase-Karikari (Vegetable Growers Association) and oforikurom Yam Growers Association. Gyinase and Gyinase-Karikari farms have joint farmers' co-operative. The above farmer association were able to sell their products to other parts of the country themselves without relying on the market women (market queens) or government. As a result, they could be classified under rural world 2. In fact, the farmers were able to access national markets based on some benefits associated with

the co-operatives, such as bargaining power, access to market information and access to cheap transport costs. In addition, some of the farmers from both Gyinase and Gyinase-Karikari farms claimed that they tend training from time to time from KNUST and an NGO with headquarters in the US to sell their organic vegetables in international markets. In addition, the farmers were having meetings on storage facilities during the field visit or the face-to-face interviews. This supported their claims regarding their ability to access competitive markets at international levels. In fact, such evidence demonstrated how very well organised their cooperative society was. This was an innovation compared to other smallholder farmers interviewed in other villages, who had no farmer association. In view of this, farmers at Gyinase can be classified under rural world 1.

Furthermore, except for Gyinase, Gyinase-Karikari and Oforikurom Yam Growers Association, all the remaining farmers from the Brong Ahafo and Ashanti Regions, such as Tuobodum, Akumadan, Tanoso, Kumasi-Tanoso (IPT) and farmers outside farmers' co-operative association in Gyinase, Gyinase-Karikari farm and Aworowa can be classified under rural world 3. Hence, farmers can belong to different rural words based on the type of crops produced. Also, it is a deviation in relation to Torero's classification of rural farmers.

Farmers in IPT (University of Winneba Kumasi-campus) mentioned during questionnaire interviews that they access only local markets with their produce - mostly the traders buy from the farm site. Moreover, many of farmers interviewed mentioned during the interviews that they had second jobs in the university. Therefore,

they used farming as a source of extra income. As a result, they can be classified under rural world 3.

Similarly, most farmers from Daaba interviewed clearly mentioned that they lacked technical support from MOFA on the cultivation of crops. Moreover, they lack financial support to transport their produce to local markets and as a result, they operate on subsistence. This as well revealed that they belonged to rural world 3.

In view of the above, the Torero's classification is fit for purpose as it can enable decision makers to devise strategies to improve smallholder farmers' livelihoods.

5.5 High transaction costs and its implications on smallholder farmers market access

The study revealed that majority of the participants (smallholders, traders and key informants) knew little about the concept of transaction costs in the Brong Ahafo and Ashanti Regions of Ghana. For example, 11 of the key informants did not answer the questions on the high transaction costs due to lack of prior knowledge about high transaction costs. Similarly, none of the traders who took part in the study knew about the transaction costs before the study. Only 1 smallholder farmer from Asueyi claimed that he is aware of the concept of transactions costs.

Also, the chi-square test (P=0.163) for smallholder farmers' awareness of high transactions costs awareness shows statistical insignificance. In view of this, the concept of transaction costs and the impacts of high transaction costs were explained to the participants to enable them to answer the questions. The participants were able to give examples specific high transaction costs affecting smallholder farmers

transactions with traders in the local and national markets of Ghana after the explanation on high transaction costs, such as marketing information search costs, bargaining costs, negotiations costs, costs associated with contracting, spoilage costs and other costs like the costs associated with commissioners interaction with both the smallholder farmers and traders in the local markets.

In fact, all the high transaction costs identified by the participants were popular in much of the existing literature (Allen, 1999; Singh, 2008; Van Tilburg, et al., 2012) on high transaction costs in agricultural markets access except costs associated with commissioners. Thus, the only new finding on high transaction costs affecting smallholder farmers' interaction with traders is the commissioners' costs.

5.5.1 Impacts of high transaction costs on smallholder farmers and traders' interactions

The high transaction was costs was discovered to be a barrier to market participation. Yet, due to poor awareness as mentioned earlier, most of the participants tend to overlook the impacts associated with high transaction costs on their farm activities. Consequently, it was a hidden barrier to market participation at local, national, regional and even international levels among smallholder farmers in Ghana. For example, many farmers interviewed disqualified themselves from certain markets due to the costs involved in accessing those markets. This finding is already known in the literature (de Silva, et al., 2010; Van Tilburg, et al., 2012). For example, Key et al., (2000) found that costs associated with market transactions can explain the reason why some households (or smallholder farmers) have different relationships to the market. Also, 68 (52%) of the smallholder farmers who participated in the study claimed that high transaction costs cause a reduction in their profit margins; 45 (35) of them mentioned that high transaction costs could affect their livelihoods and 6 (5) of them mentioned that it will deter them from market participation. Similarly, 5 (50%) of the traders claimed that high transaction costs could affect their interaction with smallholder farmers by reducing their profit margins.

5.5.2 Application of framework of analysis to the smallholder farmers' high transaction costs

The current findings of the smallholder farmers confirm that Van Tilburg, et al., (2012) are right on their argument that there are structural constraints affecting smallholder farmers in many developing countries, which are embodied in high transaction costs for information, contract negotiation or contract enforcement resulting in barriers to market access (Van Tilburg, et al., 2012). Thus, smallholder farmers in the Brong Ahafo and Ashanti Region are unable to access better markets for their farm produce.

at it can affect their livelihoods.

5.5.3 Nature of high transaction costs affecting smallholder farmers in Brong Ahafo Region

Additionally, it was observed from the study that smallholder farmers encounter different transactions costs, yet the severity of impacts of the high transaction costs varies within the same districts or region in Ghana, which appear to have a link to the type of crop grown. For example, farmers at Tuobodum (Vegetable Growers Association) in TMA complained about high bargain costs in their interactions with market women and a high rate of spoilage of their produce. They claimed that market women, mostly from Accra (capital of Ghana), purchase their tomatoes on each cropping season. According to the farmers who participated in the study, traders always tell them the amount they are willing to pay for a box of tomatoes and farmers hardly challenge them since they lack buyers or alternative channel of distributions. Moreover, their produce is highly perishable, and they lack storage facilities. In addition, the traders use bigger tomatoes boxes (see appendix 2) and one of the traders' boxes is equivalent to two of smallholder farmers' boxes.

However, farmers in Aforikurom (Yam Growers Association) complained about high transport costs and the costs incur from "lead boys" (commissioners) activities in the open market in Techiman (local market). The yam has high demand in local, national and even in international markets but most of the farmers cannot afford the costs involved in transporting the produce to different markets other than the local markets. Yet they have a major challenge in getting the right price for their produce and profit due to "lead boys" (commissioners), who act as an intermediary between traders and farmers.

The so-called lead boys' or commissioners' activities are not formal. Hence, they are not known by the policymakers, they tend to charge both market women and smallholder farmers before they allow traders to interact directly with smallholder farmers. Furthermore, one of the farmers mentioned during MARISCO situational analysis that, she has destroyed all produce twice due to an unfair price offered by the "lead boys". In fact, they are not seen as a threat to only smallholder farmers but both traders and smallholder farmers suffer from their activities. Hence, the traders complained bitterly about the "lead boys" during questionnaire interviews and MARISCO situational analysis (focus group discussions). Consequently, market women who participated in MARISCO situational analysis blamed the "lead boys" for most of the market problems smallholder farmers and traders are facing in rural markets in Ghana. However, little appears to be known in the academic literature about their influence on market access in Ghana.

Again, farmers in Aworowa and Tanoso, who mostly practice mixed cropping and tend to sell their produce at the farm-gate, identified information search costs as the biggest high transaction costs smallholder farmer. Most of the farmers want to know the prices of produce from different local and national markets on the daily and weekly basis, in order price their produce especially for market women who buy from farm-gate in the district.

The farmers at Asueyi, a suburb of Techiman town, who tend to grow cash crops like cocoa, cashew nuts and other vegetables on small scale, could not give specific transaction costs affecting them since government and other cash crop buyers tend to buy their produce at the farmgate. Moreover, they normally enjoy more support services from MOFA and the government.

5.5.3.1 Nature of transaction costs affecting smallholder farmers in the Ashanti Region

The study discovered that smallholder farmers are faced by different types of high transaction costs in their market interactions with traders. For example, Akumadan (Ashanti Region) smallholder farmers grow a lot of tomatoes on large scale like farmers in Tuobodum farmers discussed earlier. These farmers as well complained about high bargaining costs due to lack of bargaining power in their market transactions with market women from Accra. Also, the bigger tomatoes boxes market women use to measure a box of tomatoes whenever they come to the smallholder farmers purchase tomatoes.

These farmers like those in Tuobodum also have no alternative marketing channel and are faced with high perishability of their farm produce. In view of the above, both farmer groups (Tuobodum and Akumadan) have formed a farmer association known as 'Vegetable Growers Association'.

Also, during face-to-face questionnaire interviews in Akumadan, many of the farmers interviewed mentioned that the market women (traders) normally stop their trucks on the local school park and agree on the price they are willing to pay for a box of tomatoes from the farmers in Akumadan and Tuobodum. The traders will tend to communicate their price to all the smallholder farmers in both towns and surrounding villages. Consequently, the formation of the 'Brong Ahafo and Asante Region Vegetable Growers Association' was aimed at devising strategies likely to give them bargaining powers in their interaction with market women (traders) from Accra.

Also, farmers at Gyinase, who have specialisation in growing leafy vegetables like cabbage, spinach, and lettuce, and their neighbours at Gyinase Karikari farm discovered spoilage and contracting (hiring labour) as the main high transaction costs facing smallholder farmers. Unlike other smallholder farmers, they have more bargaining power in their transactions with market women as they have more value proposition for their produce. Also, the farmers interviewed realised that farmers in the community spend a lot on contracting or hiring labour to assist in their farming activities farming. The farmers claimed high labour costs affect their profit margins.

Similarly, some farmers mentioned during the questionnaire interviews that, they avoid local markets due to commissioners' activities in Kumasi open market. Hence, it was obvious that commissioners' activities are hidden high transactions costs in many open markets in Ghana. Notwithstanding, spoilage was rated as the highest transaction costs in smallholder interactions with traders in this study area and next to it is the contracting costs.

Furthermore, the farmers from IPT (University of Winneba, Kumasi campus), who grow leafy vegetables also saw spoilage as biggest high transaction costs prevent farmers from accessing markets at local, national and international levels. The farmers saw high transport costs and bargaining costs other transaction costs affecting them.

The farmers at Dabaa (Ashanti Region) near Kumasi city, however, claimed that they experience high transaction costs, such as high bargaining costs, high transport costs, information search and infrastructure access costs. These farmers associated their high transaction costs to lack of support services or an effective enabling environment in the study area. Participants further claimed the above is the reason why most of them do not farm for more income, but on a subsistence, basis to support their family food needs.

Eventually, it can be argued that in the case of Ghana the transaction costs are not specific to each seller as identified previously by Maltsoglou and Tanyeri-Abur (2005). Rather, it is linked to the type of crops grown. Hence farmers growing the same crops within a geographical location may require same strategies to address high transactions costs as in the case of Tuobodum and Akumadan farmers, in order to access to markets for their farm produce. However, if farmers growing same crops

290
have unequal access to support services or an effective enabling environment then different strategy could be adopted by smallholder farmers.

5.6 Transaction risks in the market interactions between smallholder farmers and traders (market women)

Geyer (1984) defines transaction risk as to the risk of not receiving the goods or the money for which one traded. This definition clearly shows that smallholder farmers' and traders' transactions do not only give rise to the high transaction costs discussed earlier but transaction risks as well.

All the participants' responses (in the questionnaire interviews with smallholder farmers and traders, key informants' interview and MARISCO situational analysis) show that smallholder farmers in the Brong Ahafo and Ashanti Regions encounter high transactions risks in their existing transactions between them and the traders in rural markets in Ghana. A typical example of transaction risks discovered in the current study is the high price fluctuations and commissioners' activities discussed earlier in the marketing problems section. Also, other sources of high transaction risks include reliance on rainfall instead of both rainfall and irrigation. All the farmers interviewed especially the vegetable growers' complaint about the impact of lack of irrigation on their farming activities. Furthermore, farmers in Gyinase, Gyinase-Karikari farms, Tuobodum and Akumdan mentioned during interviews that lack of irrigation prevent them from year-round cultivation, hence their inability to participate in the international markets. In addition, lack of ready market, storage facilities and transports (see table 97) were discovered to be sources of high transaction risks.

Also, all the four categories of transaction risks (risks of natural shocks, price risks, economic coordination risks and risks of opportunism) identified by Dorward et al., (2004) were present in the study. For example, smallholder farmers have a thin market and their investment is based on complementary actions from the market women and

government for policies. The farmers want to know their produce will be purchased by traders, government policies will lead to a reduction in farm inputs and agrochemicals, in order to invest more of their limited resources on farming activities. The above is a typical example of economic coordination risk (See Dorward and Kydd, 2004).

Additionally, farmers have high price risk due to price fluctuations, which came out as a common problem across revealed by findings from smallholder farmers, traders, and MARISCO situational analysis. This finding is confirmed by Geyer's (1984) argument that price risk is the common transaction risk that farmers are exposed to, and it is very often associated with the sale of farm products. In fact, this risk was discovered in the current study as one of the main causes of spoilage and complete market failure in rural markets in Ghana. For example, some of the farmers interviewed in Tuobodum claimed that they were unable to pay their bank loans for farming business due to price fluctuations.

Similarly, the study identified risks of natural shocks through the vulnerability analysis or MARISCO situational analysis. Climate change was discovered to be a source of risks of natural shocks and ranked as highly critical and less manageable. Hence, it can affect food production and market participation by smallholder farmers.

The risks of opportunism were as well seen in the interaction between smallholder farmers and traders (market women). These risks tend to occur due to this market and the presence of weak institutions, which allow an actor to exercise a monopoly over another actor. In the current study, the findings on smallholder farmers' market transactions with traders, especially vegetable growers in Akumadan and Tuobodum, show that market women exercise monopoly, which enables them to capture an undue share of the revenue in the supply chain (See Dorward and Kydd, 2004).

The high transaction risks may be the reason why many of the farmers interviewed had financial problems. It has kept smallholder farmers in both the Brong Ahafo and Ashanti Regions in a low level of Equilibrium trap (see figure 2). This occurs where smallholder farmers encountered high transaction costs and high transaction risks with no proper institutional arrangement to improve smallholder farmers' livelihoods (Dorward et al, 2003). This problem can only be addressed through improvements in access to assets, information, services and remunerative markets. In other words, by overcoming their high transaction costs (Van Tilburg, et al., 2012) and risks through appropriate institutional innovations.

5.7 Analysis of the innovative public and private institutions role in address high transaction costs and risks

This section looks at the potential of innovative public and private institutions to reduce high transaction costs and risks smallholder affecting smallholder farmers and traders in rural markets of Ghana. It will look at possible institutional innovations applicable to both private and public-sector institutions in Ghana, such as contract farming and participatory decision making.

5.7.1 Contract farming

Contract farming is the first institutional innovation identified in the current study as having the potential to address both high transactions costs and risks associated with smallholder farmers and traders' transactions. Also, it can help to minimise price fluctuations identified from all the participants in MARISCO situational analysis, key informants, and smallholder farmers' questionnaire interviews as a major marketing problem affecting smallholder farmers' market access.

In addition, 24% of the participants in the smallholder farmers' questionnaire interviews, which was the highest of the participants' responses, identified it as one of the institutional innovations needed for them (See table 5). They claimed that it is the best institutional innovation to reduce high transaction costs and risks in their interactions with traders in the rural markets in Ghana. Moreover, 20% of the participants in the informants' interviews identified it as one of the institutional innovations for smallholder farmers to address high price fluctuations associated with smallholder farmers produce. Similarly, contract farming emerged as a strategy to help smallholder farmers to overcome threats from the same price fluctuation and commissioners (lead boys) activities in local markets in Ghana.

Again, this finding is not new as some of the existing literature (Oluoch-Kosura, 2010; Minot, 2011, Torero, 2011) have already identified it as one of the best ways of addressing high transaction costs and other market problems affecting smallholder farmers market participation. For example, it was discussed earlier in the literature review that it has enabled many smallholder farmers of Mozambique to be integrated into commercial agriculture (Oluoch-Kosura).

Consequently, it can guarantee a ready market for many smallholder farmers in rural areas in Ghana. This is possible since in contract farming, unlike the traditional farming, the buyers, who may come from national or international levels, such as supermarkets, tend to offer support to farmers in the form of inputs, credit, technical advice, and market services. The support from the buyers entitled them to be sole buyers of the farmers' produce (Adjognon, 2012).

Notwithstanding the potential of contract farming as an institutional innovation for smallholder farmers in rural areas in Ghana to address high transaction costs and risks, there are some challenges that need to be addressed by policymakers to enable it to work for smallholder farmers. Some of them are discussed below.

First, Adjognon (2012) observes that "One of the main requirements for eligibility into contract farming schemes is land ownership." Thus, farmers need to have appropriate land ownership in place as a basic requirement to enable them to access contract farming. However, land ownership was observed as a threat or a challenge to many smallholder farmers interviewed in Ghana, especially those at Gyinase and Karikari farms in KMA. Most of the farmers in these areas operate on Kwame Nkrumah University of Science and Technology (KNUST) lands. Some of the smallholder farmers confirmed that they are using the University land on a temporary basis. The authorities of the University are constantly threatening to move them from the area. In view of this, some farmers mentioned that they need government intervention to address this issue.

Second, much of the academic literature (Adjognon, 2012; Torrero, 2011; Key and Runsten, 1999) on contract farming mention that many contractors in contract farming prefer large-scale farmers to smallholder farmers, order to obtain economies of scale, year-round production and avoid excessive high transaction costs involved in dealing with spatially dispersed smallholder farmers. Many smallholder farmers are unable to meet year-round production compared to large scale. Moreover, the volume of

smallholder farmers' production denies buyers the economies of scale compared to large-scale farmers. Additionally, smallholder farmers tend to be scattered and operating under a lot of high transaction costs, such as transport costs, in gathering the produce from one farm to another.

Furthermore, the unequal power relationship between smallholder farmers and contractors in contract farming is another challenge associated with contract farming (ActionAid, 2015). Smallholder farmers normally lack the ability to negotiate terms in contract farming compared to the contractors. The outcome of this can worsen the challenges facing these farmers. For example, a study carried out by ActionAid (2015) reported: "Farmers often provide both the land and cheap labour, and at the same time carry most of the risk."

Consequently, Adjognon (2012) argues that "innovative contractual design and operational modalities can be instrumental in overcoming legal and regulatory constraints." This means that an enabling environment must be created by different stakeholders, such as government and NGOs to obtain an innovative contractual design likely to minimise challenges associated with contract farming for smallholder farmers. For example, the government of Ghana can develop regulations that will give equal power to both buyers and farmers in contract farming.

Also, smallholder farmers can work in partnerships to guarantee large production volumes to offer economies of scale to buyers (contractors) and minimise high transaction associated with spatially disperse farms and year-round production.

5.7.2 Smallholder farmers' participation (involvement) in decision making

Baas (1987) thinks that "The term "Participation" is used to describe direct involvement in decision-making." He goes on to say, "It means the actual involvement of each member of a group or organisation in the identification formulation and implementation of group activities." If this definition is right then, smallholder farmers in rural parts of Ghana are not participating in decision making on issues affecting them.

The findings from the smallholder farmers' questionnaires interviews, key informants' interviews and vulnerability analysis (MARISCO situational analysis) have all confirmed that smallholder farmers lack participation in decision making. 20% of the participants in the key informants' interviews (see table 15) confirmed that participation in the decision is needed to reduce high transaction costs and risks in their market access, including price fixing and lack of bargaining power. Similarly, 11% of the participants in the questionnaire interviews identified participatory decision as an institutional innovation they required to facilitate their market access. Moreover, their involvement in the MARISCO situational analysis revealed that they have information decision makers needed to hear, in order to develop strategies likely to address their marketing problems, such as high transaction costs.

Consequently, it can be argued that smallholder farmers' participation or involvement in decision making is one of the institutional innovations required to address high transaction costs and risks in their market transactions with traders (market women) in rural and national markets in Ghana. For example, both traders and smallholder farmers in interviewed in the Brong Ahao Region mentioned that the policymakers knew nothing about the problems in the open markets in Ghana, such as commissioners' activities, that are eroding profits from both farmers and traders in the local market in Techiman. In addition, the leader of Yaw Traders Association mentioned that they are always careful to not to challenge 'lead boys' (commissioners) as they can physically attack them physically and nobody will come to their defence if that happens due to lack of participation in decisions. In view of this, market women interviewed claimed that they are not responsible for smallholder farmers marketing problems but the policymakers both at local and national levels.

Also, smallholder farmers' participation in decision making can help government, NGOs and charities, such as Oxfam, to discover alternative livelihoods for some of the farmers, especially those at rural world 3 (subsistence farmers), who lack the urge to move into rural world 2 in Torero (2011) classification of smallholder farmers. Thus, using a bottom-up approach instead of a top-down approach can help bring about rural development in Ghana.

In addition, an interview with a key informant, who is a director of a local NGO supporting smallholder farmers financially on their market access in the study areas, was very revealing. It confirmed that farmers are not involved in decision making. According to him, even a budget for the money already allocated in the previous year from the NGO's head office for smallholder farmers' budget is yet to be received from the local authority due to bureaucracy and corruption.

Furthermore, Baas (1997) discovers that there is "Lack of beneficiary participation: too little attention has been given to strengthening the negotiation capacities of the rural populations." In view of this, he explains that "Programmes were often designed in a top-down approach within which beneficiaries were not given any authority for decision making or program execution."

Again, while smallholder farmers' participation in decision making is very crucial to address marketing problems and issues affecting their livelihoods, very little is known in the literature (Baas, 1997) on how participation in decision making can help to address smallholder farmers' problems, such as high transactions costs and risks.

5.7.3 Government intervention smallholder agriculture

Government is another institutional innovation participant discovered that it can help to address high transaction costs and risks affecting smallholder farmers market participation. Twenty-two of the participants in smallholder farmers' interviews identified government intervention in smallholder agriculture as the best institutional innovation likely to address smallholder farmers' challenges such as large price fluctuations, lack of bargaining power, high transaction costs and risks associated with smallholder farmers market participation (Table 48). Moreover, the participants mentioned that government intervention can help them to get ready markets for their produce to improve their livelihoods.

Similarly, 5 of the key informants interviewed (table112) mentioned that government intervention is institutional innovation not only to address high transaction costs in the smallholder farmers market participation but to improve enabling an environment for smallholder agriculture. For example, one extension officer who took part in the study in Techiman said that his motorbike is not registered since he received it for almost year and as a result, the police keep worrying him. He further claimed that he is not receiving money to buy fuel to follow up farmers under his care regular. Hence, he sees government invention in smallholder farmers' activities as institutional innovation.

In addition, most of the strategies emerged from MARISCO vulnerability (table 122), such as the introduction of warehouse receipts systems in rural areas to address high price fluctuations; creating enabling environment for contract farming; law enforcement to remove commissioners from the local market and so on can be achieved through government intervention.

However, Poole (2017:95) argues that "Of all the reasons why a government might want to intervene in the economy, the provision of some form of insurance is probably the least controversial one." He goes on to say, "With reference to prices, one accepted conclusion should be that price stabilization per se is not a desirable policy objective." Since, "an attempt to stabilize prices without an understanding of the fundamental cause for price instability may reduce the natural hedge, resulting in increased risk and a shift of instability from one sector of the economy to another." In view of this argument, it is advisable to understand the causes of price fluctuations in order to devise strategies to address this problem. Hence, stakeholders' participation to discover causes of price fluctuations in smallholder agriculture in Ghana can be the way forward.

Nevertheless, Poole (2017: 96) mentions that "direct price stabilisation policies and other forms of government intervention in agricultural and food markets are still very common." Hence, government intervention in smallholder rural agriculture in Ghana can take a form of direct price stabilisation policies and other form of intervention, such as extending of GCAP to rural smallholder farmers, offering of production contracts,

financial and data services as in the case of Grow activities in Ghana, which was discussed earlier in the introduction.

5.8 Alternative sources of livelihoods to benefit smallholder farmers.

The findings in the current study show that smallholder farmers' have alternative sources of livelihoods besides farming activities. These livelihood sources vary from one farming community to the other. For example, most farmers in TMA, especially in Aworowa and Asueyi, are experts in processing cassava into gari, a common food for many people in Ghana (see appendix 8.7 or plate 13).

This gari has a high demand in local, regional and international levels. In terms of local and national markets in Ghana, many students in secondary and tertiary institutions like universities eat gari every day as it is easy to prepare in different forms. Moreover, the public uses it a lot, and hence it is sold in open markets and supermarkets across the country.

Also, at regional and international levels, it is a common food in Nigeria. Hence it can be exported to Nigeria by the smallholder farmers. Also, there are no restrictions on sending produce to Nigeria from Ghana and traders from Nigeria visit Ghana on a weekly basis. Similarly, it is a common food in Cote d'Ivoire, where it is used to make 'Acheke', and therefore Cote d'Ivoire is another market for gari. The traders from Cote d'Ivoire, just like those from Nigeria, visit Ghanaian markets on a weekly basis for trade due to the absence of travel restrictions between those neighbouring countries.

Also, there is a demand for gari from some African residents in Europe and America. Hence gari is sold in African shops in many countries in Europe, such as Germany,

the UK and Spain. However, smallholder farmers' interviews mentioned that they are not involved in the exportation of Ghanaian produce to the above countries.

There are three main benefits of gari as an alternative source of livelihoods for smallholder farmers. First, the smallholder farmers may encounter lower transactions costs and risks if any exist in the above channel of distributions discussed. The farmers can sell directly to buyers without the need for market women and commissioners' involvement. Furthermore, some of farmers processing gari who were interviewed confirmed that buyers can come and buy the gari directly from the processing site. Moreover, farmers who sell it in open markets pay a small fee (income tax) to the local authority without charges for commissions. However, they may still pay for transport from their village to the marketplace or access to information on prices.

Second, it helps the farmers to overcome spoilage of produce, which many farmers who participated in the study especially those from Gyinase pointed out to be a major problem for their market access. Process cassava (gari), unlike vegetables, can be stored for several months.

Third, it can help farmers to overcome price fluctuations. For example, gari sold in supermarkets does not experience price fluctuations compared to other produce like tomatoes and peppers.

Notwithstanding these benefits, some of the farmers interviewed in Asueyi mentioned that they need equipment to produce the gari in a form that can help them to access competitive markets at regional and international levels

Furthermore, rearing of animals (poultry and livestock) was discovered to be an alternative source of livelihoods for some farmers at Karikari farm in KMA. The farmers mentioned that the sales of the animals give them extra income for them and their families upkeep. Also, they mentioned that the wastes from the animals are used as fertiliser for their vegetable cultivations. Thus, they save money on the purchase of fertilisers (organic and inorganic).

Smallholder can use alternative livelihoods as a source of income to serve as a buffer against natural and market risks associated with their farming business (Haesra, 2018). The inability of smallholder farmers to generate income from alternative livelihoods are attributed to certain factors, such as lack of information to enable them to explore viable sources of livelihoods (International Labour Organisation, 2012).

Additionally, the interviews conducted in this study clearly revealed that alternative livelihoods for smallholder farmers have not received attention from various stakeholders, such as smallholder farmers themselves, government, NGOs, farmer association co-operative.

5.8.1 MARISCO situational (vulnerability analysis)

The MARISCO situational analysis adopted in the current study revealed that smallholder farmers have other factors that facilitate high transaction costs (see table 122). The participants, as mentioned earlier under MARISCO situational analysis, came from stakeholders, such as MOFA, NGOs, and smallholder farmers. The participants and traders revealed the following as possible factors also known as threats that have high potential to contribute to high transactions costs. These factors

include spoilage, which is already known from face-to-face interviews as transaction costs, price fluctuations, illegal logging, extreme weather patterns.

Spoilage came up third on in the chain analysis or ranking of the threats in MARISCO vulnerability analysis (table 120). The participants identified lack of post-harvest storage facilities as a contributory factor to high spoilage rate. In other words, smallholder farmers do not have the appropriate infrastructure in place to help them to overcome high spoilage.

Spoilage is classified under observable transaction (Osebeyo and Aye, 2014). According to Osebeyo and Aye (2014:339), "When transaction costs are higher than the value or utility derived from such transaction, farmers may not want to trade." Thus, If the spoilage rate is high, it may lead to high transaction costs and deters smallholder farmers from market participation.

The participants came up with a solution to address this high spoilage rate as shown in table 122, thus, developing a good policy environment that encourages investment from the private sector in Ghana. Currently, it seems there are no policies in place that facilitate a partnership between government and the private sector. In view of this, there appears to be limited or no investment in the private sector due to a lack of partnership.

Furthermore, commissioners', also known as lead boys, activities were ranked as the second challenge or threat smallholder farmers encounter in rural markets in Ghana. It was mentioned that it is a high transaction cost affecting both farmers and traders as they collect money from market transactions between both smallholder farmers and traders' activities. The participants found corruption and poor law enforcement to be

contributory factors to the commissioners' activities. The participants pointed out that smallholder farmers' participation in decision making and law enforcement can help to address the commissioners' activities in rural markets in Ghana.

The price fluctuations of agricultural produce in Ghana were ranked by the participants as another threat and transaction risks in the MARISCO situational analysis. They mentioned that this problem tends to stop many farmers from the farming business, especially those cultivating vegetables as they do not have post-harvest storage facilities to keep the produce much longer. Hence, the contributory factor for price fluctuations is a lack of storage facilities in rural areas in Ghana. Farmers do not receive any support from either private or public for this problem. The participants mentioned that this threat can be addressed through the introduction of warehouse receipts systems in a rural area, contract farming and the introduction of market information systems (MIS).

In fact, most of the findings in the MARISCO situational analysis were revealed in the other interviews used in the current study. However, it helped the farmers to come up with their own problems, identify solutions and ways to implement those solutions. Also, the approach helped to understand the root cause of most of the smallholder farmers' problems in rural areas in Ghana.

Conclusion

5.9

This is the final chapter of the research report. It discusses the sources of the data generated, a summary of the finding, conclusion, policy recommendation, the limitations of the study and future research questions. It initially looks at the summary of the findings in relation to the research objectives. The second part looks at the conclusion. In addition, it looks at the policy recommendations. The final part of this chapter looks at the limitations of the study.

5.9.1 Summary of the study

The first objective of this study as mentioned at the introduction was intended to analyse the innovative public and private institutions' role to reduce transaction costs and risks and to explore alternative sources of livelihoods to benefit smallholder farmers. The findings from all the methods used in the data collection (smallholder farmers' question interviews, key informants, and MARISCO situational analysis) revealed that, currently, there is no innovative public and private institutions partnership operating to assist farmers to address high transaction costs and risks involved in the smallholder farmers' market interactions with traders. Therefore, the innovative public and private institutions' role in reducing transaction costs and risks are not in existence.

In view of this, smallholder farmers encounter high transaction high transaction costs already known in the literature (Williamson, 1985; Goetz, 1992; Pingali, et al., 2005 and Jagwe, 2010; Mkenda and Campenhout, 2011; Okoye et al., 2016), such as high transport costs, high bargaining costs, information searching costs and spoilage which deter them from market participation. Also, the study discovered commissioners (lead boys) activities or their presence in the local markets in Ghana as another form of transaction, although, it appears little is known in the literature about them, especially in Ghana. They tend to act as an intermediary between smallholder farmers and traders in market transactions and their charges affect both smallholder farmers and traders' profits in their transactions.

In terms of risks, price fluctuations came up as major transaction risks affecting smallholder farmers. This risk was observed in all the data collection methods mentioned earlier as the biggest challenge faced by smallholder farmers in all study areas in Ghana. It is known to deter market participation and causes market failures for smallholder farmers (Page and Hewitt, 2001; Kang and Mahajan, 2006). Furthermore, Huka et al., (2014:155) found that "price fluctuation is extremely dangerous, as farmers and other agents in the food chain risk losing their investments if prices fall." In view of this, it is found to be a transaction risk in the current study.

The findings from MARISCO shown lack of storage facilities and poor enabling environment and extreme weather conditions are contributory factors to the high price fluctuations. Some of the factors identified to be the cause of high price fluctuations in the current study were identified by Huka et al., (2014), who associated high price fluctuations to change in climatic condition, government regulation, poor infrastructures, seasonal production, fluctuations of currency exchange rate, nature of product as well as low production and storage technology.

Nevertheless, the alternative sources of livelihood discovered in some of the study areas, such as Gyinase, Asueyi, and Aworowa, show that some of the farmers can overcome the high transactions costs if those alternative livelihoods are taken seriously by the key players for smallholder farmers' market access.

In addition, the study found the following innovations that can help most of the farmers to overcome high transaction costs in rural markets in Ghana. These include contract farming, smallholder involvement in decision making, public and private partnership and farmer association (co-operative). Out of all the suggested innovations for smallholder farmers from the participants, smallholder farmers' involvement or participation in decision-making came up as the best institutional innovations likely to address high transaction. Moreover, contract farming was identified by the farmers as the preferred institutional innovation. Consequently, both institutional innovations are implemented by various stakeholders, such as the government, NGOs and public sector, these innovations promote smallholder farmers' commercialisation in Ghana. Example of countries in Africa benefit was discussed in the literature review.

Also, the second objective of this study was to assess the potential of small-scale rural farmers in Ghana must access the national and West Africa markets. The key informants, smallholder farmers, questionnaire interviews and MARISCO situational analysis revealed that most of the farmers, especially in Gyinase, Karikari farm, have a vibrant association that can enable them to access markets at national and regional levels. Also, they are very informed about the existing competition in international markets and they are preparing themselves for future participation in those markets. Also, due to their association, they have high bargaining power compared to other farmers. Currently, they have buyers at local and national levels. Indeed, at the time

of the interviews, they were planning to sell their produce to hotels in Ghana and neighbouring countries.

Also, farmers in Asueyi and Aworowa have the potential to use their alternative source of livelihoods (gari) to access markets at local, national and regional levels. The gari has high demand, even in Europe and America. However, they were currently selling their produce in local and national markets. In fact, if they receive support from the government and private sector, they can access competitive markets with this product.

In terms of international markets, all the farmers interviewed from the study areas are unlikely to access markets beyond national levels due to high transaction costs, risks and other challenges, such as lack of funding, inability to produce crops through the year and weak enabling environment they are currently operating in. However, the introduction of institutional innovations, such as contract farming and participatory decision making can enable most smallholder farmers in the study areas to access national and regional markets.

The third objective was meant to find out if other factors contribute to the high transaction costs and risks associated with smallholder farmers' market transactions with traders. The findings from MARISCO situational analysis have confirmed that other factors, such as price fluctuations for agricultural produce in the local and national markets, commissioners' activities, and high spoilage rate, contribute to high transaction and risks in the transactions in rural markets in Ghana. The same findings also emerged in the interviews conducted with smallholder farmers, traders and key informants.

5.9.2 A summary key finding from the study

The current student findings from key informants, smallholder farmers, traders and MARISCO vulnerability analysis are as follows:

Smallholder farmers' major marketing problem is price fluctuations. Seventy-two (55%) of the smallholder farmers' who participated in the study (table 42) identified it as a major problem. Also, it came on top of the marketing problems affecting smallholder farmers in the traders' interviews (table 67); it was ranked as the highest threat in 'cause-effect web' in MARISCO analysis (table 102, table 122) and second major problem in the key informants' interviews (table 102).

Commissioners' activities in the local markets of Ghana are sources of high transaction costs and risks affecting most smallholder farmers market access and participation. The commissioners' activities affect both smallholder farmers and traders profit margins in the local markets. Thirty per cent of the participants who part in the smallholder farmers' interviews found it as a second major marketing problem (table 42) affecting smallholders especially on their bargaining power and profit from the sales of their farm produce. Similarly, commissioners' activities were ranked as the second major threat in MARISCO vulnerability gap analysis (table 122).

In terms of institutional innovations, contract farming was discovered from the participants as the best institutional innovation with a potential of addressing high transaction costs and risks associated with smallholder farmers market participation. It had the highest responses compared to other institutions innovations in both key informants' interviews (table 112) and smallholder farmers' interviews (table 50).

Additionally, smallholder farmers' participation or involvement in decision-making was one of the best institutional innovations emerged from the study with the potential to address most of the marketing problems affecting smallholder farmers. However, more key informants identified it to be the second-best institutional innovation (table 112) for smallholder farmers compared to the smallholder farmers interviewed responses (table 50), who ranked it to be fifth best institutional innovation. Thus, 20% of the key informants identified it as second-best institutional innovations but 8% of the smallholder farmers identified it as fifth institutional innovation.

Furthermore, government intervention is the third institutional innovation discovered in the current study likely to address high transaction costs, transaction risks, price fluctuations and other challenges affecting smallholder farmers market participation. It was identified in smallholder farmers' interviews (table 48), key informants' interviews (table 112) and MARISCO vulnerability analysis (table 122). Although, government intervention to offer insurance to smallholder farmers to address market participation challenges is seen as the least controversial one (Poole, 2017). It can still help to introduce policies that can offer insurance against price fluctuations and other marketing problems.

5.9.3 Conclusion

The high transaction costs and risks affect transactions between smallholder farmers and traders in rural markets in Ghana. However, many of the participants lacked awareness of how high transaction costs affect smallholder farmers' activities. Furthermore, some of the extension officers did not know about the impacts of high transaction costs on smallholder farmers' activities. In fact, many of the farmers associated their marketing challenges with price fluctuations, which came up as a major problem affecting smallholder farmers' activities marketing activities in both study regions in Ghana.

Additionally, commissioners' activities were identified as another marketing problem by most of the participants (smallholder farmers, traders and key informants), yet little is known in the literature about its impacts on smallholder farmers' market participation in Ghana. Furthermore, it was discovered to be one of the high transaction costs and risks as it deters smallholders' participation in the local markets in the study areas. Consequently, commissioners' activities are a new finding in relation to smallholder farmers' high transaction costs and marketing problem.

With regards to institutional innovations, the study found contract farming as an institutional innovation with the potential to address all their marketing problems, such as price fluctuations and high transaction costs. It had highest responses from all the participants (key informants, smallholder farmers and traders). Furthermore, smallholders' participation or involvement in decision-making was identified as the second institutional innovation for addressing high transaction costs and risks involve in market transaction between smallholder farmers and traders. The third institutional

innovation for addressing smallholder farmers marketing problems identified in the study is Government intervention.

Also, alternative sources of livelihoods discovered as having the potential to address smallholder farmers' high transaction costs and improve market access for smallholders include rearing of animals alongside crop farming in the Ashanti Region. Moreover, gari processing was discovered to be another alternative source of livelihoods for smallholder farmers in Aworowa and other towns and villages in the Brong Ahafo Region who cultivate cassava. These alternative livelihoods can move many farmers from rural world 3 into rural world 2 and from rural world 2 into the rural world 1 (Torero, 2011).

5.10 Recommendation

This research will recommend areas for policy formulation for smallholder agriculture in Ghana and future research:

First, all the data collected from different data collection approaches for the current study revealed price fluctuations as a major problem affecting smallholder rural farmers in Ghana. It was observed in the field data collection that price fluctuations or volatility deters smallholders from participating in markets and as a result, it can keep them in perpetual poverty. In view of this, it will be recommended that policymakers should introduce warehouse receipts systems (WRS) in rural areas in Ghana. Since WRS is known to be a modern risk management approach and practical in reducing price volatility or fluctuations with success stories in some African countries, such as Tanzania, Ethiopia and Niger (Antonaci, et al., 2014). Moreover, WRS can serve as a proof of collateral for loans for smallholder farmers if it is introduced.

Second, contract farming was discovered from the participants in the current study as the best institutional innovation likely to address marketing problems, such as exploitation from both commissioners and market women, price fluctuations and high transaction costs. For example, contract farming has helped some smallholder farmers in Ghana through Grow Africa (Grow Africa, 2017) to access ready market, financial support and data to improve their farming activities as discussed earlier in the introduction. In view of this, it will be recommended that policymakers should enable smallholder farmers in rural areas in Ghana to access contract farming, such as that of Grow Africa project.

Third, smallholder farmers' participation in decision-making on issues affecting them, such as marketing problems was the second-best institutional innovation participants believed can help to address all challenges faced by smallholder farmers in rural markets. It was discovered during the data that many of the government and non-governmental organisations initiatives on rural development normally do not meet the expectations of smallholder farmers. It will be recommended that the government should establish a legally enforceable farmers' right of participation in decision-making processes on issues affecting their livelihoods. However, smallholder farmers must be empowered to enable them to participate in decision making.

Government intervention was suggested by the participants in all the interviews conducted as a form of institutional innovation. Government of Ghana is already intervening in agriculture in the country. Moreover, some of the intervention was mentioned in the introduction, such as CGAP and partnership with Grow Africa. However, it seems government intervention is not accessible for all smallholder farmers. Hence, it will be recommended that projects, such as CGAP must be introduced all smallholder farmers. One of the objectives of GCAP to provide smallholder farmers to access contracts in addition to the commercialisation of smallholder agriculture in Ghana. While many smallholder farmers around the project sites in Accra plains and Savannah Accelerated Development Authority (SADA) zone of Northern Ghana (GCAP, 2017) have benefitted enormously from the project, other farmers in rural areas, including where the current study took place, such Akumadan, Aworowa, Tuobodum and Oforikurom are left. Additionally, direct price stabilisation policies should be introduced in rural areas of Ghana, as it can be used as a tool to address price fluctuations faced by smallholder farmers (Poole, 2017). Also, it can help to address marketing problems, such as high transactions and risks, lack of bargaining power, commissioners' activities and marketing women exploitation in agricultural markets in Ghana.

Based on interviews results from smallholder farmers and key informants' interviews on high price fluctuations, standard pricing system must be developed for smallholder farmers agricultural produce especially vegetables. This could be achieved the use of scale to determine prices of crops like tomatoes in rural markets. The prices for the produce can be communicated to various markets through a market information system. This can as well address high transaction costs involve information search.

Based on poor land ownership system discovered from participants at Gyinase, it will be recommended that appropriate land ownership legislation must be introduced to protect farmlands from the building projects resulting from urbanisation. Also, securities in the form of a lease must be provided for farmers using temporary land ownership.

5.11 Questions for future research

Factors, such as gender inequalities and climate change can affect agricultural productivity, including market participation (Mazuri, 2013). For example, Mazuri (2013:1869) observes that "The agricultural sector is under-performing in many sub-Saharan African countries, in part because women do not have equal access to the resources and opportunities, they need to become more productive." Similarly, Asafu-Adjaye (2014:ii23) points out that "The market failure in SSA agriculture exacerbates the vulnerability of resource-poor farmers and aggravates the effects of climate-induced shocks, making it more difficult for them to cope with shocks and to protect their resource base and livelihoods."

The current study did look at how gender inequalities and climate change can impact on institutional innovations to reduce high transaction costs and risks associated with market participation.

Therefore, the following are questions for future research:

- How does gender inequality in smallholder agriculture affect institutional innovations to promote market access?
- 2. Can climate change contribute to high transaction costs and risks in smallholder agriculture?
- 3. Can vulnerability analysis promote participatory decision making for smallholder farmers?

5.12 Limitations

This study had the following limitations:

First, the sample size (10) used for traders (market women) was very small compared to that of smallholder farmers and key informants sample sizes. The variations in the sample sizes could affect the reliability of the data.

Second, the study was limited in scope as two Regions were used out of the 10 Regions. In view of this, some of the challenges faced by some smallholder farmers in the remaining eight Regions might not be exactly the same as those discovered by the participants in the two Regions (Ashanti and Brong Ahafo).

Additionally, Additionally, the existing bureaucracies and fear of losing jobs in public organisations did not allow some stakeholders working with farmers to take part in the study. For example, many government departments' heads who were approached to take part in the study refused and were unwilling to give any relevant secondary data that could potentially affect their roles and responsibilities at both study Regions and national levels.

Also, the study did not apply the econometric approach to analysis high transaction costs and risks affecting smallholder farmers and traders. This could have added more understanding of the findings from an economics perspective.

Finally, time restrictions and financial support did not permit the study to cover many districts in Ghana to discover other alternative sources livelihoods for smallholder farmers in Ghana.

6 References

Abebe, G. K., Bijman, J., and Royer, A. (2016) Are middlemen facilitators or barriers to improve smallholders' welfare in rural economies? Empirical evidence from Ethiopia. *Journal of Rural Studies*, (43): 203-213.

Abdi, H. and Williams, L. J. (2010) Principal component analysis. John Wiley & Sons, Inc. *WIREs Comp Stat*, (2): 433–459.

Abu, B. M., Issahaku, H. and Nkegbe, P. K. (2017) Farmgate versus market centre sales: a multi-crop approach. *Agricultural and Food Economics*, (2016) 4:21.

ActionAid (2015) Contract farming and out-grower schemes. Appropriate development models to tackle poverty and hunger? Policy discussion paper. http://www.actionaid.org/sites/files/actionaid/contract_farming.pdf [Accessed:17 April 2017]

ACAPS (2011) *Purposive sampling and site selection in Phase 2*. Technical brief. http://www.acaps.org/img/documents/purposive-sampling-and-site-selectionpurposive-sampling-and-site-selection.pdf [accessed: 11 January 2016].

Adjognon, S. (2012) *Contract Farming as a Tool for Poverty Reduction in Sub-Saharan Africa.* Research to practice policy briefs, Policy brief N°4, CIDA-ISID McGill University, Canada. http://www.mcgill.ca/isid/files/isid/adjognon.pb4_.pdf [Accessed: 17 April 2017].

Aerni, P., Nichterlein, K., Rudgard, S. and Sonnino, A. (2015) Making Agricultural Innovation Systems (AIS) Work for Development in Tropical Countries. *Sustainability*, (7):831-850; doi: 10.3390/su7010831.

African smallholder farmers group (ASFG, 2013) *Supporting smallholder farmers in Africa: A framework an enabling environment.* http://www.asfg.org.uk/downloads/ASFG-Framework-Report.pdf [Accessed: 24 October 2016].

Aggarwal, R. M. (2007) Role of risk sharing and transaction costs in contract choice: Theory and evidence from groundwater contracts. *Journal of Economic Behaviour & Organization*, Vol. 63 (2007) 475–496

Aihoon, J. K.; Onumah, G. E. and Mukwene, M. (2009) *Empowering Smallholder Farmers in Markets: Country Background Paper – South Africa*. Prepared for National Stakeholders.

Al-Hassan, R. and Poulton, C. (2009) Agriculture and Social Protection in Ghana. FAC Working Paper No. SP04.

Allen, D. W. (1999) *Transaction Costs*. Department of Economics-Simon Fraser University. http://www.sfu.ca/~allen/allentransactioncost.pdf [accessed 25 April 2013]

Alliance for a Green Revolution in Arica (AGRA, 2014) *Introduction to smallholder farmers, food security and the climate change challenges*. Africa Agricultural status report: climate change ad smallholder agriculture in Sub-Saharan Africa. Nairobi, Kenya.

African Smallholder Farmers Group (ASFG, 2015) *Supporting Smallholders in Africa: A framework for an enabling environment*. http://www.asfg.org.uk/downloads/ASFG-Framework-Report.pdf [Accessed:06 July 2016].

Anaglo, J.N. and Boateng, S.D. and Boateng, C.A. (2014) Gender and Access to Agriculture Resources by Smallholder Farmers in the Upper West Region of Ghana. *Journal of Education and Practice*, Vol. (5).

Anseeuw, W. (2009) *Workshop report. Export Consultation on Contract farming in Africa*. Johannesburg, South Africa (04-07 May). www.namc.co.za/upload/all%20repots/Work [Accessed: 30 March 2017].

Antwi, S. and Ohene-Yankyira, K. (2017) Relationship Lending and its Effects on Transaction Cost of Obtaining Credit. The case of Maize Farmers in Ghana. *Journal of Finance and Economics*, Vol. 5 (2):38-49.

Appiah, P., Biah, W. A., Chauhan, U., Chilenga, F. W. and Reddy, R. (2010) *Exploring transactions costs in commodity chains*. Analysis of institutional arrangements that could reduce transaction costs in cashew value chains in the Brong Ahafo Region of Ghana. - ICRA Ghana field study final report. www.icra-edu.org/file.php/264/wd138.pdf [Accessed:08 May 2018]

Arias, P., Hallam, D., Krivonos, E. and Morrison, J. (2013) *Smallholder integration in changing food markets*. Food and Agriculture Organization of the United Nati ons Rome.

Asafu-Adjaye, J. (2014) The Economic Impacts of Climate Change on Agriculture in Africa. *Journal of African Economies*, Vol. 23, AERC Supplement 2, pp. ii17–ii49 doi:10.1093/jae/eju011.

Asibey-Bonsu, P. (2012) Farmer's organizations in West and Central Africa: high expectations, hard realities. Ghana Country report. http://www.fondation-farm.org/zoe/doc/etudefarm_201302_rblein_opghana_l.pdf [Accessed: 27 March 2018].

Barrett, C. B. (2008) 'Smallholder Market Participation: Concepts and Evidence from Eastern and Southern Africa', *Food Policy*, 33 (4) 299–317.

Barrientos, S. (2012) Empowering women pay. The importance of women in Ghanaian cocoa. Markets, smallholders and Empowerment. *Capacity*, Issue 44.

Bijman, J. (2008) Contract farming in developing countries: an overview. Wageningen University and Research Centre. https://www.wur.nl/upload_mm/5/c/b/79333121-6f4b-4f86-9e8e... [Accessed: 12 November 2016]

Bijman, J., Ton, G. and Meijerink, G. (2007) *Empowering Small holder Farmers in Markets: National and International Policy Initiatives*. WUR: Wageningen

Barrett, C. B. (2008) Smallholder Market Participation: Concepts and evidence from Eastern and Southern Africa. *Food Policy* (33):299-317

Bentsen, E. M. and Knudsen, M. L. (2004) *Farmer Empowerment Experiences, lessons learned and ways forward.* Volume 1: Policy Discussion Paper. Danish Institute for International Studies.

Bernard, T. and Spielman, D. J. (2009) Reaching the rural poor through rural producer organizations? A study of agricultural marketing cooperatives in Ethiopia. *Food Policy*, 34 (2009) 60–69.

Bertow, K. (2007) Impact of IMF and World Bank Policies and EPAs on smallholder farmers in Uganda, Zambia, and Ghana. http://germanwatch.org/handel/euaf07pe.pdf [accessed: 14.3.2013]

Bertow, K. and Schultheis, A. (2007) *Impact of EU's Agricultural Trade Policy on Smallholders in Africa*. African smallholders in focus - a voice in EU trade policy (2007-2009).

Bragdon, S. H. and Smith, C. (2015) *Small-scale farmer innovation*. Quaker United Nations Office, Geneva.

http://www.quno.org/sites/default/files/resources/SSF%20Innovation%20WEB.pdf [17 March 2018].

Bronwyn, B.; Patrick, D.; Karen, D.; Carla, H.; Steve, H.; Jon, L., Debbie, M.; Carol, T. and Mike, P. (1994 - 2016) *Case Studies*. Writing@CSU. Colorado State University. http://writing.colostate.edu/guides/guide.cfm?guideid=60 [accessed: 01 May, 2016]

Bryman, A. (2001) Social Research Methods. Oxford University Press: Oxford.

Bwalya R. Mugisha J. Hyuha T. (2013) Transaction Costs and Smallholder Access to Maize Markets in Zambia. *Journal of Development and Agricultural Economics* Vol.,8(9), pp. 328-336.

Caluag, M. (2013) *What is Global Food Security Index?* The borgen project. https://borgenproject.org/what-is-the-global-food-security-index/ [Accessed: 06 May 2018].

Camagni, M. and Kherallah, M., Morgan, S., Valeur, C. and Williams, J. (2013) *IFAD* and public-private partnerships: Selected project experiences.

https://www.ifad.org/documents/38714170/39135645/IFAD+and+public-private+partnerships... [Accessed: 30 June 2018].

Cambridge Graduate University (2014) *West Africa Regional Overview*. http://new1.cguedu.com/news/item/181-west-africa-regional-overview [Accessed: 21 January 2016]

Camerer C.F.; Loewenstein, G. and Rabin, M. (2004) *Advances in Behavioral Economics*, New York: Princeton University Press.

Cavaye, A. (1996) Case Study Research: a multi-faceted research approach for IS, *Information Systems Journal*, 6:227-242.

Cannon, T., John, T. and Jennifer, R. (2003) *Social Vulnerability, Sustainable Livelihoods and Disasters.* Report to DFID conflict and Humanitarian Assistance Department (CHAD) and Sustainable Livelihoods Support Office.

Centre for Econics and Ecosystem Management (2014) *Assess criticality of stresses, threats and contributing factors.* Eberswalde University for Sustainable Development and Writtle College.

Chamberlin, J. (2007) *Defining Smallholder Agriculture in Ghana: Who are smallholders, what do they do and how are they linked with markets?* Ghana Strategy Support Program (GSSP). Background Paper No.GSSP 0006.

Chamberlin, J. and Jayne, T.S. (2013) Unpacking the Meaning of "Market Access." Evidence from Rural Kenya. *World Development*, Vol. (insi41):245-262

Chamberlin, J. (2007) *Targeting smallholders for agriculture growth in Ghana. International Food Policy Research Institute*. Ghana Strategy Support Program

Chang, H.H. (2006) Technical and Management Perceptions of Enterprise Information System Importance, Implementation and Benefits, *Information System Journal*, Vol 16 (3):263-292

Chigusiwa, L.; Bindu, S.; Muchabaiwa, L. and Mudavanhu, V. (2013) *The Role of Market Middlemen in the Marketing of Smallholder Horticultural Products in Zimbabwe.* Greener Journal of Business and Management Studies, Vol. 3 (8), pp. 369-377

Chitja, J.M. and Mabaya, E. (2015) Institutional Innovations linking small-scale farmers to produce markets in South Africa. *Innovative Institutions, Public Policies and Private Strategies for Agro-Enterprise Development* (2015) Christy, R.D., da Silva, C.A., Mhlanga, N., Mabaya, E. and Tihanyi (eds.), K. Rome: World Scientific Publishing.

Chianu, J. N.; Mairura, F.; Ekise, I., and Chianu, J. N. (2008) Farm input marketing in western Kenya: Challenges and opportunities. *African Journal of Agricultural Research*, Vol. 3 (3), pp. 167-173.

Chauvin, N. D., Mulangu, F. and Porto, G. (2012) *Food Production and Consumption Trends in Sub-Saharan Africa: Prospects for the Transformation of the Agricultural Sector.* United Nations Development Programme.

http://www.undp.org/content/dam/rba/docs/Working%20Papers/Food%20Production %20and%20Consumption.pdf [Accessed:22 October 2017].

Choudhary, V., Christienson, G., D'Alessandro, S. and Josserand, H. (2016) *Ghana Agricultural Sector Risk Assessment.* Agriculture Global Practice Note. World Bank Group.

http://documents.worldbank.org/curated/en/412431468198000868/pdf/104127-BRI-Ghana-agricultural-risk-assessment-PUBLIC.pdf [Accessed:04 April 2018]

Clark, N. (2001) Innovation Systems, Institutional Change and the New Knowledge Market: Implications for Third World Agricultural Development. United Nations University

Clennan, R. and Orr, A. (2014) *Working with Smallholders.* A Handbook for Firms Building Sustainable Supply Chains. (ed. Mesko, L.) International Finance Corporation (IFC), World Bank Group.

Coase, R. H. (1937) The Nature of the Firm, Economica, 4, 386-405

Coarse, R. H. (1984) The New Institutional Economics. *Journal of Institutional and Theoretical Economics*, 140: 229-231.

Cooper, P.; Vermeulen, S.; Hansen, J.; Thorn, P.; Ramirez-Villegas, J.; Rippke, U.; Parker, L.; Jones, E.; Campbell, B. and Zougmorè (2014) *Smallholder Agriculture and Climate Variability and Change in Sub-Saharan Africa: Looking forward to 2050.* Africa Agriculture Status Report.

Coppock, D.L., S. Desta, S. Tezera, and Gebru, G. (2009) *An innovation system in the rangelands: Using collective action to diversify livelihoods among settled pastoralists in Ethiopia.* In: Sanginga, P.C., Waters-Bayer, A., Kaaria, S., Njuki, J. and Wettasinha, C. (eds.) Innovation Africa: Enriching Farmer's Livelihoods. London:Earthscan Publications, pp. 104-119.

Commission for Africa (2005) *Our Common Interest: Report of the Commission for Africa*. London: Commission for Africa.

Commons, John R. (1934) *Institutional Economics*: Its Place in Political Economy. New York: Macmillan.

Commons, J. (1931) *Institutional Economics*, American Economics Reviews:21 (1931):648-657

Common, J. R. with a new introduction by Rutherford, M. (2009) *Institutional Economics: Its Place in Political Economy (Volume 2).* New Jersey: Macmillan

Creswell, J. W. (2003) *Research design: Qualitative, quantitative and Mixed Methods approaches.* London: Sage Publications

Creswell, J. W. and Clark, V. L. P. (2007) *Designing and conducting mixed methods research.* Journal of Public Health, Volume 31 (4):388-389

Curtis, M. (2013) *Powering smallholder farmers to make food fair*. A five-point agenda. Fairtrade Foundation Report.

Delgado, C.L., 1999. Sources of growth in smallholder agriculture in Sub-Saharan Africa: the role of vertical integration of smallholders with processors and marketers of high-value items. *Agrekon*, 38: 165-189

Devas, N. and Korboe, D. (2000) City governance and poverty: the case of Kumasi. *Environmental & Urbanisation*, Vol 12 (1).

Diao, X. (2010) Economic Importance of Agriculture for Sustainable Development and Poverty Reduction: Findings from a Case Study of Ghana. IFPRI. Global Forum on Agriculture Policies for Agricultural Development, Poverty Reduction and Food Security OECD Headquarters, Paris

Diao, X. and Hazell, P. (2004) *Exploring Market Opportunities for Smallholder Farmers*. INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE. 2020 Africa Conference Brief 6

Diao, X. (2010) Economic Importance of Agriculture for Sustainable Development and Poverty Reduction: Findings from a Case Study OF Ghana. Global Forum on Agriculture 20-30 November.Policies for Agricultural Development, Poverty Reduction and Food Security. OECD Headquarters, Paris

Diao, X., Hazell, P. and Thurlow, J. (2010) The role of Agriculture in Africa Development. *World Development*, Vol. XX, No. X, pp.XXX-XXX

Diaz-Bonilla, E., D. Orden and A. Kwieciński (2014), "*Enabling Environment for Agricultural Growth and Competitiveness: Evaluation, Indicators and Indices*", OECD Food, Agriculture and Fisheries Papers, No. 67, OECD Publishing. http://dx.doi.org/10.1787/5jz48305h4vd-en

De Silva, H., Ratnadiwakara, D. and Soysa, S. (2010) *Transaction Costs in Agriculture: From the Planting Decision to Selling at the Wholesale Market*. A casestudy on the feeder area of the Dambulla Dedicated Economic Centre in Sri Lanka.http://www.cprsouth.org/wp-content/uploads/2010/03/Dimuthu-Ratnadiwakara.pdf [Accessed: 01 May 2013]

Department of Rural Economy and Agriculture (DREA, 2017) *Biennial Report to the AU Assembly on implementing the June 2014 Malabo Declaration.* The 2017 Report to the January 2018 Assembly. https://au.int/sites/default/files/documents/33005-doc-br_report_to_au_summit_draft_stc_eng.pdf [Accessed: 3 March 2018]

D'Haese, M. (2003) *Institutional Innovations and Smallholder Agriculture: A theoretical framework.* Local Institutional Innovations and Pro-Poor Agriculture Growth: The case of small-Wool growers Associations in South Africa. London: Garant publishers

D'Haese, Vink, N. Huylenbroeck, G. V., Bostyn, F. and Kirsten, J. (2003) *Local institutional innovation and pro-poor agricultural growth: The case of small-woolgrowers' associations in South Africa*. Garant publishers: London

Denscombe, M. (2007) *The Good Research Guide for small-scale social research projects*, 3rd ed. Berkshire: McGraw-Hill Education.

Denzin, N. K. (1970) The Research Act in Sociology. Chicago: Aldine Hussein, A. (2009) The Use of Triangulation in Social Sciences Research: Can qualitative and quantitative methods be combined? *Journal of Comparative Social Work*.

Devaux, A., Horton, D., Velasco, C., Thiele, G., López, Bernet, T., Reinoso, I. and Ordinola, M. (2009) Collective action for market chain innovation in the Andes. *Food Policy*, Vol. 34. pp. 31-38.

Devaux, A., Torero, M., Donovan, J. and Horton, D. (2018) Agricultural innovation and inclusive value-chain development: a review. *Journal of Agribusiness in Developing and Emerging Economies*, Volume: 8 (1)

Directorate Co-operative and Enterprise Development (2012) A framework for the development of smallholder farmers through cooperative development. Department of Agriculture, Forestry and Fisheries-Republic of South Africa. http://www.nda.agric.za/doaDev/sideMenu/cooperativeandenterprisedevelopment/do cs/FRAMEWORK-%200F%20SMALL%20FARMERS%20(2).pdf [Accessed: 16 February 2018]

DFID (2015) *DFID's Conceptual Framework on Agriculture.* Department for International Development.

Dolores, M. C. T. (2007) Purposive Sampling as a Tool for Informant Selection. *Ethnobotany Journal*. Vol 5: 147-158

Doner, F. R. (2010) *Explaining Institutional Innovation: Case studies from Latin America and East Asia*, Social Research Council (USA).

Dorward, A., Fan, S., Kydd, J., Lofgren, H., Morrison, J., Poulton, C., Rao, N., Smith, L., Tchale, H., Thorat, S., Urey, I., and Peter Wobst, P. (2004) Institutions and Policies for Pro-poor Agricultural Growth. *Development Policy Review*, 22 (6): 611-622

Doward A., Kydd, J., Poulton, C. and Stockbridge, M. (2004) *Agricultural liberalisation in Sub Sharan Africa*. Final report prepared for EC-PREP.

Dorward, A., and J. Kydd. 2004. The Malawi 2002 food crisis: the rural development challenge. *The Journal of Modern African Studies*, 42: 343-361

Dorward, A., Poole, N., Morrison, J.A., Kydd, J. and I. Urey (2003) 'Markets, Institutions and Technology: MissingLinks in Livelihoods Analysis', *Development Policy Review*, Vol. 21(3):319–32.

Dorward, A., Kydd, J., Morrison, J. and Poulton, C. (2005) Institutions, Markets and Economic Co-ordination: Linking Development Policy to Theory and Praxis. *Development and Change*, Vol. 36 (1):1-25.

Dorward, A., Hazell, P. and Poulton, C. (2007) *Rethinking Agricultural Input Subsidies in Poor Rural Economies.* Discussion Paper 005.

Driscoll, D. L., Appiah-Yeboah, A., Salib, P., and Rupert, D. J., 92007) Merging Qualitative and Quantitative Data in Mixed Methods Research: How To and Why Not. *Ecological and Environmental Anthropology (University of Georgia)*, Vol. 3 (1).

East and Southern African ACP Region. Food and Agriculture Organization of the United Nations. AAACP Paper Series – No. 11.

Edquist, C. (2001) *The systems of Innovation Approach and Innovation Policy: An account of the state of the art.* Lead Paper Presented at the DRUID Conference-Aalborg.

Enweze, C. (2005) Welcome speech by the Vice President at the IFAD Innovation *Mainstreaming*.

Eric, O. O., Prince, A.A., and Elfreda, A.N.A. (2014) Effects of education on the agricultural productivity of farmers in the Offinso Municipality. *International Journal of Development Research*, Vol. 4, Issue, 9, pp. 1951-1960

Eriksson, J. and Juhl, A. (2012) *Guide to risk and vulnerability analyses. Swedish Civil Contingencies Agency (MSB).* https://www.msb.se/RibData/Filer/pdf/26267.pdf [accessed: 23 December, 2015]

Escobal, J. A. (2003) *New Institutions for Agricultural and Rural Development in Latin America and Caribbean*. New Institutions for Agricultural Development. Food, Agriculture and Rural Development.FAO.

Fafchamps, M. (2000) Farmers and Price Fluctuations in Poor Countries. Department of Economics, University of Oxford. http://documents.worldbank.org/curated/en/762911468780586862/820140748_2004 04140034202/additional/28746.pdf [Accessed:11 October 2018]

Fafchamps M, Hill RV (2005) Selling at the farmgate or traveling to market. *Amer J Agr Econ*, 87(3):717–734.

FAO (2016) Agricultural cooperatives are key to reducing hunger and poverty. http://www.fao.org/news/story/en/item/93816/icode/ [Accessed: 03 July 2016]

FAO (Food and Agriculture Organization of the UN), 2006. Enhancing the competitiveness of agriculture and natural resources management under
globalization and liberalization to promote economic growth. Proceedings of the 24th FAO Regional Conference for Africa, 30 January – 3 February, Bamako, Mali.

FAO (2016) Public–*private partnerships for agribusiness development* – A review of international experiences, by Rankin, M., Gálvez Nogales, E., Santacoloma, P., Mhlanga, N. & Rizzo, C. Rome, Italy.

FAO. 2013. *Agribusiness public-private partnerships* – A country report of Ghana. Country case studies – Africa. Rome.

FAO (2009) *The challenge.* World Summit on Food Security Rome 16–18 November. http://www.fao.org/tempref/docrep/fao/meeting/018/k5985e.pdf [Accessed:24 May 2018].

Ferreira, T. (2018) *Does Education Enhance Productivity in Smallholder Agriculture? Causal Evidence from Malawi*. Stellenbosch Economic Working Papers: WP05/2018.

Ferris, S., Robbins, P., Best, R., Seville, D., Buxton, A., Shriver, J. and Wei, E. (2014) *Linking Smallholder farmers to Markets and the Implications for Extension and Advisory Services*. MEAS Discussion Paper 4.

Fitzpatrick, I. (2015) *From the roots up: How agroecology can feed Africa*. Global Justice Now.

http://www.globaljustice.org.uk/sites/default/files/files/resources/agroecology-reportfrom-the-roots-up-web-version.pdf [accessed: 18 June, 2015]

Fischer, D. (2013) *Working with Smallholders*. A Handbook for Firms Building Sustainable Supply Chains. International Finance Corporation, World Bank Group.

Fold, N. and Gough, K. V. (2008) From smallholders to transnationals: The impact of changing consumer preferences in the EU on Ghana's pineapple sector. *Geoforum*, 39: 1687-1697.

Friis-Hansen, E. (2010) Impact assessment of farmer institutional development and agricultural change: Soroti district, Uganda. Development in Practice, Oxfam.

Fröde-Thierfelder, B.; Renner, I. and Riha, K. (2013) *Natural solutions to climate change: The ABC of ecosystem based adaption. Summary and conclusions.* International expert workshop, Isle of Vilm, Germany.

Fudenberg, Drew. 2006. Advancing beyond "Advances in Behavioural Economics". *Journal of Economic Literature*, 44(3): 694-711.

Gatzweiler, F. W. and Braun, J. V. (2016) *Innovation for Marginalized Smallholder Farmers and Development: An Overview and Implications for Policy and Research.* https://link.springer.com/content/pdf/10.1007/978-3-319-25718-1_1.pdf [Accessed: 20 April 2018]. Geyer, L.L. (1984) *Proposals for Improvement in Agricultural Marketing Transactions or Will Farmers Join the Electronic Age.* South Dakota Law Review, 29 S. D. L. Rev. 361

Ghana Commercial Agricultural Project (2017) *Background*. http://gcap.org.gh/about/ [Accessed:07 November 2017

Ghana Statistical Service (2014) *District Analytical Report: Techiman Municipality.2010 Population & Housing census.* http://www.statsghana.gov.gh/docfiles/2010_District_Report/Brong%20Ahafo/TECHI MAN%20Municipal.pdf [accessed:27 October 2015]

Gideon E. Onumah, G.E.; Junior R. Davis. R.; Kleih, U. and Proctor, F. J. (2007) Empowering Smallholder Farmers in Markets: Changing Agricultural Marketing Systems and Innovative Responses by Producers' Economic Organizations. Brief of ESFIM Working Paper 2

GIZ (2013) Vulnerability Assessments. Federal Ministry for Economic Cooperation and Development (BMZ). https://gc21.giz.de/ibt/var/app/wp342deP/1443/wpcontent/uploads/filebase/va/vulnerability-guides-manuals-reports/giz-2013-envulnerability-assessment.pdf [Accessed: 24 December 2016]

Glatzel, K. (2015) *The farms of change African smallholders responding to an uncertain climate future*. A Montpellier panel report. http://reliefweb.int/sites/reliefweb.int/files/resources/MP_Climate_Report_Web2.pdf [Accessed: 23 October 2016]

Glover, D, 1987. Increasing the benefits to smallholders from contract farming: problems for farmers' organisations and policy makers. *World Development*, 15(4): 441-8.

Gorjão, P. (2013) *Portugal and Ghana: The Gateway to West Africa? IPRIS Viewpoints. file:///C:/Users/Alfred/Downloads/1122013_VP.pdf* [Accessed: 24 October 2015]

Government of Ghana (2003) *Analysis and Policy statement*. Vol 1 of Ghana Poverty reduction strategy 2003-2005: Agenda for growth and prosperity. <u>http://siteresource.worldbank.org/ghanaextn/Resources/GhanaPRSP</u>. pdf [Accessed 14 March 2013]

Goetz, S. J. (1992) A selectivity model of household food marketing behaviour in Sub-Saharan Africa. *American Journal of Agricultural Economics*, 74 (2):444-52

Gollin, D. (2014) *Smallholder agriculture in Africa*. An overview and Implications for policy. Working paper. Institute of Development Studies.

Grant, C. and Osanloo, A. (2014) Understanding, selecting and integrating a theoretical framework in dissertation research: creating the blueprint for your "House". *Administrative Issues journal: Connecting Education, Practice, and research*, Volume 4 (2).

Haesra, A., Novianti, C. and Wijaya, M. E. (2018) *Empowering Oil Palm Smallholder Farmers through Alternative Livelihoods.* A Business Case Study of Beef Cattle Farming and Fish Cultivation in Central Kalimantan.

https://climatepolicyinitiative.org/wp-content/uploads/2018/10/Empowering-Oil-Palm-Smallholder-Farmers-through-Alternative-Livelihoods.pdf [Accessed:26 April 2019].

Hall, A. (2009) *Innovation Systems: An Introduction*. LINK-United Nations University-MERIT.http://www.slideshare.net/LINKInnovationStudies/agricultural-innovationsystems-ar [Accessed 28 February 2013]

Hall, A., Mytelka, L. And Oyeyinka, B. (2005) *Innovation Systems: Implication for Agricultural Policy and practice*. ILAC Brief 2

Hall, A., Sulaimanb, V. R., Norman Clark, N.andYoganand, B. (2003) From measuring impact to learning institutional lessons: an innovation systems perspective on improving the management of international agricultural research. *Agricultural Systems*, 78 (2003) 213–241.

Hantuba, H. (2003) *Linkages between Smallholder Farm Producers and Supermarkets in Zambia.* Paper prepared for the FAO technical workshop on "Globalization of food systems: impacts on food security and nutrition"

Hellin, J., Lundy, M. and Meijer, M. (2009) Farmer organization, collective action and market access in Meso-America. *Food Policy*, Vol. 34. pp. 16-22.

Herbal, D., Crowley, E., Haddad, N. O. and Lee, M. (2013) *Good Practices in Building Innovative Rural Institutions to increase Food Security.* FAO. http://www.fao.org/docrep/015/i2258e/i2258e00.pdf [Accessed: 24 May 2013]

Hershberg, E. (2010) *Comparative Perspective on Institutional Origins and Evolution*. Explaining Institutional Innovation: Case studies from Latin America and East Asia, Doner, F. R. (ed.). Social Research Council (USA).

Höffler, H. (2005) *Promoting the Kenyan Potato value chain: Can contract farming help build trust and reduce transaction risks?* Paper prepared for presentation at 99th EAAE Seminar Trust and Risks in Business Networks, February 8-10, Bonn, Germany www.ageconsearch.umn.edu [Accessed:01 October 2016]

Henningsen, A., Mpeta, D. F., Adem, A. S., Kuzilwa, J. A. and Czekaj, T. G. (2015) *The Effects of Contract Farming on Efficiency and Productivity of Small-ScaleSunflower Farmers in Tanzania*. Agriculture in an interconnected world. International conference of agricultural economists, Milan-Italy.

Hess, U., Skees, J., Stoppa, A., Barry Barnett, B. and Nash, J. (2005) *Managing Agricultural Production Risk*. Innovations in Developing Countries. World Bank Report32727-GLB

High Level Expert Forum (2009) *The special challenge for sub-Saharan Africa*. How to feed the world 2050.

www.fao/fileadmin/templates/wsfs/docs/issues_papers/HLE2050_Africa.pdf [Accessed: 27 December 2015].

Hobbs, J. E. (1997) Measuring the Importance of Transaction Costs in Cattle Marketing. *American Journal of Agricultural Economics*, Vol. 79:1083-1095.

Hodgson, G. M. (2006) What are Institutions? *Journal of economic issues*, Vol. XL No. 1.

Hooggeveen, J., Tesliuc, E., Vakis, R. and Dercon, S. (2004) A Guide to the Analysis of Risk, Vulnerability and Vulnerability Groups. Social Protection Unit, Human development Network, The World Bank. The University of Oxford. http://siteresources.worldbank.org/INTSRM/Publication/20316319/RVA.pdf [Accessed:01 January 2017]

Holloway, G., Nicholson, C. and Delgado, C. (2000) *Agroindustrialization through institutional innovation: transactions costs, cooperatives and milk-market development in the Ethiopian highlands.* MSSD Discussion Paper No. 35.

Homann-Kee Tui, S.; Hendrickx, S.; Manyawu, G.; Rao, K.P., Robinson, L. (2015) *Implementing Innovation Platforms: A guideline for Dryland Systems Research*. http://oar.icrisat.org/9208/1/2015_Implementing%20Innovation%20Platforms.pdf [Accessed: 25 May 2018]

Houssou, N., Chapoto, N. and Asante-Addo, C. (2016) *Farm Transition and Indigenous Growth.* The Rise to Medium- and Large-Scale Farming in Ghana. IFPRI Discussion Paper 01499.

Hounkonnou, D., Kossou, D., Kuyper, T. W., Leeuwis, C., Nederlof, E. S., Röling, N., Sakyi-Dawson, O., Traoré, M. and van Huis, A. (2012) An innovation systems approach to institutional change: Smallholder development in West Africa. *Agricultural Systems*. Vol. 108. pp. 74-83.

Hubbard, M. (1997) The New Institutional Economics in Agricultural Development: insights and challenges. *Journal of Agricultural Economics*, 48 (2):239-249.

Hughes, E. C. (1936) The Ecological Aspect of Institution. American Sociological Review, 1:180-89

Huka, H., Ruoja, C. and Mchopa, A. (2014) Price Fluctuation of Agricultural Products and its Impact on Small Scale Farmers Development: Case Analysis from Kilimanjaro Tanzania. *European Journal of Business and Management.* Vol.6, No.36. www.iiste.org ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online).

Ibisch, P. L. and Hobson, P. (2015) Lessons from case studies applying the MARISCO approach. Centre for Econics and Ecosystem Management.

Ibisch, P. L. and Hobson, P. (eds.) 2015. MARISCO. *Adaptive MAnagement of vulnerability and RISk at COnservation sites.* Lessons from case studies applying the MARISCO approach. Centre for Econics and Ecosystem Management, Eberswalde (ISBN 978-3-9817639-0-4).

Ibisch, P. L., Schick, A., Hobson, P., Krause, A. and Lehmann, C. (2015) *Strategic analysis of risks and vulnerability by applying the MARISCO method to George Mukoya Conservancy and Community Forest & Muduva Nyangana Conservancy and Community Forest, Namibia.* Documentation of two MARISCO workshops with two Conservancies and Community Forests in Namibia, March and July 2015.

ICIPE (2013) Postharvest Losses in Africa: Analytical Review and Synthesis. Lundqvist J., C. de Fraiture, and D. Molden (2008) Saving Water: From Field to Fork - Curbing Losses and Wastage in the Food Chain, Stockholm International Water Institute (SIWI), Stockholm.

IFAD (2015) *Investing in rural people in Ghana*. Rural poverty in Ghana.https://www.ifad.org/document/10180/2a21dd44-fe65-4c67-b5ae-a39e3a16818 [Accessed:25 January 2018]

IFAD (2014) *Strengthening smallholder institutions and organizations.* Smallholder institutions and organizations. https://www.ifad.org/documents/10180/da81a38b-747b-433c-8149-d8ccc5ce439c [Accessed: 02 June 2018]

IFC (2013) *Working with Smallholders*. A Handbook for Firms Building Sustainable Supply Chains.

www.ifc.org/wps/wcm/connect/8dc5628042112fdbba2fff494779b2ad/Handbook... [Accessed: 05 January 2016].

Initiative workshop 'What are the Innovation Challenges for Rural Development?' 15-17 November. Rome: International Fund for Agricultural Development.

International Food Policy Research Institute (2012) *Public-Private Partnerships*. http://www.ifpri.org/book-780/ourwork/researcharea/public-private-partnerships [accessed: 23 June 2013].

IFC (2014) Access to finance for smallholder farmers. Learning from the experiences of Microfinance Institutions in Latin America.

http://www.ifc.org/wps/wcm/connect/071dd78045eadb5cb067b99916182e35/A2F+fo r+Smallholder+Farmers-Final+English+Publication.pdf?MOD=AJPERES [Accessed: 29 June 2016].

International Cooperative Alliance (ICA, 2005) *What is a co-operative?* http://ica.coop/es/node/10584 [Accessed:03 July 2016].

International Labour Organisation (2012) Rapid assessment of alternative or additional livelihood for cocoa farmers in the western region of Ghana / International Labour Office, International Programme on the Elimination of Child Labour. (*Geneva: ILO*, Vol. 1.

International Monetary Fund (2012) *Ghana: Poverty Reduction Strategy Paper*. IMF Country Report No. 12/203.

Jabati, M.C. (2003) *Market Access for Developing Countries of Africa-The Reality*. Agricultural Management, Marketing and Finance Occasional Paper. Food and Agriculture Organization of United Nations.

Jack, B. (2013) *Constraints on the adoption of agricultural technologies in developing countries.* Literature review, Agricultural Technology Adoption Initiative. Jameel Poverty Action Laboratory, Cambridge and Centre for Effective Global Action. Berkeley.

Jack and Suri (2011) *Risk Sharing and Transactions Costs: Evidence from Kenya's Mobile Money Revolution*. <u>http://www.mit.edu/~tavneet/Jack_Suri.pdf</u> (Accessed17 May 2013)

Jaffee, S., Henson, S. and Rios, L. D. (2011) *MAKING THE GRADE: Smallholder Farmers, Emerging Standards, and Development Assistance Programs in Africa.* A Research Program Synthesis. The World Bank. Report number 62324-AFR

Jagwe, J., Machethe, C. and Onuma, E. (2010) AfJARE, Vol 6 (1):302-315.

Jagwe, J.; Machethe, C.; and Ouma, E. (2010) Transactions costs and smallholders' participation in Banana markets in Great Lakes Region of Burundi, Rwanda and the Democratic Republic of Congo. *AfJARE*, Vol. 6, No1.

Jari, B. and Fraser, G. C. G. (2009) An analysis of institutional and technical factors influencing agricultural marketing amongst smallholder farmers in the Kat River Valley, Eastern Cape Province, South Africa. *African Journal of Agricultural Research,* Vol. 4 (11), pp.1129-1137.

Jari, B. and Fraser, G. (2012) Influence of institutional and technical factors on market choices of smallholder farmers in the Kat River Valley. Unlocking markets to smallholders: Lessons from South Africa. editors: Schalkwyk, V. D. H., Groenewald, J.A., Fraser, G.C.G, Obi, A. and Tilburg, A.V., Mansholt publication series - Volume 10. Wageningen: Wageningen Academic Publishers.

Jatoe, J. B. D. (2012) *An Analysis of Smallholder Agriculture, Policy-Making And Advocacy In Ghana*. Building an Effective Advocacy Movement for Sustainable and Equitable Agricultural Development in Africa. Trust Africa

Jasmine, B. (2013) *A New Dawn for Equitable growth in Myanmar*. Marking the Private Sector work for Small-scale Agriculture. Oxfam Issue Briefing.

Jawale, K. V. (2012) Methods of Sampling Design in the Legal Research: Advantages and Disadvantages. *Online International Interdisciplinary Research Journal*, Vol. II (V).

Jayaweera, S. (1997). Women, education and empowerment in Asia. *Gender and Education*, Vol.(9),4: 411-424. DOI: 10.1080/09540259721169

Jayne, T.S. with Haggblade, S., Minot, N., and Rashid, S. (2011). *Agricultural Commercialization, Rural Transformation and Poverty Reduction: What have We Learned about How to Achieve This?*'. Synthesis report prepared for the African Agricultural Markets Programme Policy Symposium, Alliance for Commodity Trade in Eastern and Southern Africa, April 20-22, Kigali, Rwanda.

Jacobs, P. (2009) *Agricultural markets reforms and the rural poor in South Africa*. PLAA poverty workshop. Research paper

Jensen, M. F. and Gibbon, P. (2007) Africa and WTO Doha Round: An Overview. *Development Policy Review*, 25(1):5-24

Johansson, R. (2003) *Case Study Methodology*. A key note speech at the International Conference "Methodologies in Housing Research." Organised by the Royal Institute of Technology in co-operation with the International Association of People-Environment Studies, Stockholm.

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007) Toward a definition of mixed methods research. *Journal of Mixed Methods Research*,1(2), 112–133

Joppe, M. (2000). *The Research Process*. http://www.ryerson.ca/~mjoppe/rp.htm [accessed:20 January 2016].

Kaaria, S., Sanginga, P., Njuki, J., Delve, R., Chitsike, C. and Best, R. (2007) Enabling Rural Innovation in Africa: An Approach for Empowering Smallholder Farmers to Access Market Opportunities for Improved Livelihoods.http://www.futureagricultures.org/farmerfirst/files/T1b_Kaaria.pdf (Accessed 02 April 2013)

Kabeer, N. (1999). Resources, agency, achievement: Reflections on the measurement of women's empowerment. *Development and Change, 30*(3), 435-464.

Kang, M.G. (2005) An introduction to market-based instruments for agriculture price risk management. Food and Agriculture Organization of the United Nations (FAO)

Kang, M.G. and Mahajan, K.N. (2006) *An introduction to market-based instruments for agricultural price risk management*. Agricultural management, marketing and finance working document. Food and Agriculture Organization of the United Nations

Kent, R. and Poulton C. (2008) *Marginal farmers, a review of the literature. Centre for Development, Environment and Policy*. School of Oriental and African Studies. https://www.concern.net/sites/defaults/files/resource/2009/04/3573-marginalfarmers [accessed: 8 December 2015]

Keohane, R. O. (1988) International Institutions: Two Approaches. *International Studies Quarterly*, 32:379-396

Key, N. and D. Runsten (1999) Contract Farming, Smallholders, and Rural development in Latin America: The Organization of Agro-processing Firms and the Scale of Outgrower Production. *World Development*, Vol. 27(2): 381-401

Key, N., Sadoulet, E., and Janvry, D. A. (2000) Transaction costs and agricultural household supply response. *American Journal of agricultural Economics*, 82(2):245-259.

Kherallah, M.; Delgado, C.; Gabre-Madhin, E.; Minot, N. and Johnson, M. (2000) *The road half traveled: Agricultural market reform in Sub-Saharan Africa*. Food policy report. International Food Policy Research Institute, Washington, D.C.

Kherallah, M. and Kirsten, J.F. (2002) The New Institutional Economics: Application for Agricultural Policy Research in Developing Countries. *Agrekon*, Vol 41, No 2.

Kirsten, J. and Sartorius, K. (2002) Linking agribusiness and small-scale farmers in developing countries: is there a new role for contract farming? *Development Southern Africa*, Volume 19, Issue 4.

Kirsten, J., Mapila, M., Okello, J. and De, S. (2013) *Managing Agricultural Commercialisation for Inclusive Growth in Sub-Saharan Africa*. Working Papers 206518, University of Pretoria, Department of Agricultural Economics, Extension and Rural Development.

Kirsten, J.; Mapila, M.; Okello, J. and De, S. (2012) *Managing agricultural commercialization for inclusive growth in Sub-Saharan Africa*. http://www.gdn.int/admin/uploads/editor/files/SSA_1_PolicyBrief_Agricultural_Comm ercialization.pdf [Accessed:27 December 2015]

Kleemann, L. (2011) Organic Pineapple Farming in Ghana - A Good Choice for Smallholders? Kiel Institute for the World Economy. Kiel Working Paper No. 1671.

Kwadwo, A.O.; Davis, K. and Aredo, D. (2008) *Advancing Agriculture in Developing Countries through Knowledge and Innovation*. International Food Policy Research Institute. Evidence from 20 Years of Data in Ghana.

Lambrecht, I., Schuster, M., Asare, S. and Pelleriaux, L. (2017) *Changing Gender Roles in Agriculture?* IFPRI Discussion Paper 01623.

Langat, R.j., Litando, K.O.and Ntale, J.F. (2016) Information Communication Technologies and Marketing Decisions among Small Scale Farmers in Kenya: review of evidence. *International Journal of Economics, Commerce and Management United Kingdom*, Vol. IV, Issue 4.

Larson, D. F., Anderson, J.R. and Varangis P. (2004) The World Bank Research *Observer*, Vol. 19 (2).

Leitão, I., Sarmento, E.M. and Aleluia, J. (ed.) (2018) The Emerald Handbook of public-Private Partnership in Developing and Emerging Economics. Perspectives on public policy, Entrepreneurship and poverty. Bingley: Emerald Publication

Leonardo, W.J., Bijman, J. and Slingerland, M.A. (2015) The Windmill Approach. Combining Transaction Cost Economics and Farming Systems Theory to Analyse Farmer Participation in Value Chains. *Outlook on Agriculture*, Vol. 44 (3):207-214. Livingston, G., Schonberger, S. and Delaney, S. (2011) *Sub-Sharan Africa: The state of smallholder farmers in Agriculture*. Paper presented at the IFAD conference on New Direction for Smallholder Agriculture, 24-25

Llanto, G.M. and Laviña, G.R. (2006) *Innovations as a response to failures in rural financial markets.* Philippine Institute for Development Studies, Makati City.

Lobo, C. (2008) *Institutional and Organisational Analysis for Pro-poor change: Meeting IFAD's Millennium Challenge*. Rome: International Fund for Agricultural Development.

Lonely Planet (2017) *Map of Ghana*. http://www.lonelyplanet.com/maps/africa/ghana/ [Accessed: 20 January 2017].

Low, P., Piermartini, R. and Richtering, J. (2005) *Multilateral Solutions to the Erosion of Non-Reciprocal Preferences in NAMA*, Working Paper ERSD-2005-05, WTO, Geneva.

Low, P., Piermartini, R. and Richtering, J. (2006), "*Non-Reciprocal Preference Erosion Arising from MFN Liberalisation in Agriculture: What Are the Risks?*" Working Paper ERSD-2006-2,

Ludi, E., Stevens, C., Peskett, L. and Cabral, L. (2007) *Climate Change and Agriculture trade, markets and investment.* https://www.odi.org/sites/odi.org.uk/files/odi-assets/publication-opinion-files/188 [Acccessed:04 March 2017]

Lund, J. R. (1993) Transaction Risk versus Transaction Costs in Water Transfers. *Water Resources Research*, Vol. 29, No. 9, pp. 3103-3107

MacInnis, B. (2003) Transaction Costs and Organic Marketing: Evidence from U.S. Organic Produces

Farmers.<u>http://are.berkeley.edu/fields/erep/seminar/f2003/bo_organic1020.pdf</u> [Accessed15 May 2013]

Magingxa, L. L. and Kamara, A. B. (2003) *Institutional Perspectives of Enhancing Smallholder Market Access in South Africa*. Contributed Paper Presented at the 41st Annual Conference of the Agricultural Economics Association of South Africa (AEASA)

Mapila, M. A. T. J., Makwenda, B. and Chitete, D. 2010. Elitism in the farmer organisation movement in post-colonial Malawi. *Journal of Agricultural Extension and Rural Development*. Vol 2 (8): 144-153.

Maumbe, B. and Okello, J.J. (2013) *Technology, Sustainability, and Rural Development in Africa*.PA: Information Science Reference (an imprint of IGI Global).

Mgbenka, R. N. and Mbah, E. N. (2016) A review of smallholder farming in Nigeria: need for transformation. *International Journal of Agricultural Extension and Rural Development Studies*. Vol.3, No.2, pp.43-54

Maltsoglou, I. and Tanyeri-Abur, A. (2005) *Transaction Costs, Institutions and Smallholder Market Integration: Potato Producers in Peru*. ESA Working Paper No. 05-04

Maminimini, O., Strengthening Smallholder market linkage through contract farming. Moving forward: agriculture's role in the transition to development. FAO-Zimbabwe) <u>http://www.fao.org/fileadmin/user_upload/emergencies/docs/Africa-Zim_farming.pdf</u> [accessed:28 June 2013]

Mangisoni, A. (2006) *Markets, Institutions and Agricultural Performance in Africa.* ATPS special paper series No. 27.

Mapila,M.A.T.J., Kirsten, J.F.andMeyer, F.H. (2011) *Agricultural rural innovation and improved livelihood outcomes in Africa*. http://www.csae.ox.ac.uk/conferences/2011-EDiA/papers/017-Mapila.pdf [Accessed 02 April 2013]

Markelova, H. and Meinzen-Dic, R. (2009) *Collective Action for Smallholder Market Access*. Cgiar System Wide Program on Collective Action and Property Rights. Policy Brief Number 6.

Mathison, S. (1998) Why Triangulation. Educational researcher, Vol. 17 (2): 13-17

Mathers N, Fox N. and Hunn A. (2007) *Surveys and Questionnaires*. The NIHR RDS for the East Midlands / Yorkshire & the Humber.

Maltsoglou, I. and Tanyeri-Abur, A. (2005) *Transaction Costs, Institutions and Smallholder Market Integration: Potato Producers in Peru*. ESA Working Paper No. 05-04.

Mburu, S., Ackello-Oguu, C. and Mulwa, R. (2014) Analysis of Economic Efficiency and Farm Size: A Case Study of Wheat Farmers in Nakuru District, Kenya.

Economics Research International, Vol. 2014, Article ID 802706, 10 pages http://dx.doi.org/10.1155/2014/802706.

Medius, B., Kinyua, H., Mugoya, M. Shariff, M. and wakakamba, M. (2012) Innovating to compete: Smallholder farmers' agency and markets in East Africa. IIED/HIVOS/Mainumby, London/The Hague/La Paz.

Mendes, D.M., Paglietti, L., Jackson, D. and Altozano, A. G. (2014) *Ghana: Irrigation market brief.* FAO/IFC Cooperation Programme.

Meijerink, G. and Eaton, E. (2009) *Transaction risks and trust: A tale of two regions sesame markets in Ethiopia.* Presented at the 13th Annual Conference of the international society for New Institutional Economics.

Merriam, S. B., Johnson-Bailey, J., Lee, M., Kee, Y., Ntseane, G. and Muhamad, M. (2001) Power and Positionality:negotiating insider/outsider status within and across culture. Int. J. of Lifelong Education, Vol. 20, No. 5 (September–Qctober 2001), 405–416.

Mitchell, T. (2011) *Middlemen, Bargaining and Price Information: Is Knowledge Power*? https://www.tcd.ie/Economics/assets/pdf/JMPTara_Mitchell1.pdf [accessed: 7 November 2015]

Ministry of Food and Agriculture (2015) *Techiman Municipal*. The Republic of Ghana. http://mofa.gov.gh/site/?page_id=1387 [accessed: 27 October 2015]

Ministry of Food and Agriculture (2015) *Expert on Smallholder Farmers' Access to Agriculture Mechanization in Ghana.* Japan International Cooperation Agency (JICA). Project completion report.

Ministry of Food and Agriculture (MOFA, 2007) *Food and Agriculture Sector Development Policy (FASDEP II)*. http://mofa.gov.gh/site/wp-content/uploads/2011/06/FASDEP-II-FINAL1.pdf [Accessed:29 March 2018].

Ministry of Finance and Economic Planning (MOFEP, 2011) *National Policy on Public-private partnerships (PPP).* Government of Ghana. Private Participation in Infrastructure and Services for Better Public Services Delivery.

Minot, N. (2011) Contract Farming in sub-Saharan Africa: Opportunities and Challenges. Prepared for the policy seminar Smallholder-led Agricultural Commercialization and Poverty Reduction: How to achieve it? http://fsg.afre.msu.edu/aamp/Kigali%20Conference/Minot_Contract_farming_(AAMP %20Kigali).pdf [Accessed: 12 November 2016].

Mitchell, T. (2011) *Middlemen, Bargaining and Price Information: Is Knowledge Power*? https://www.tcd.ie/Economics/assets/pdf/JMPTara_Mitchell1.pdf [accessed: 4th October 2015]

Mkenda, B. K. and Campenhout, B. V. (2011) Estimating Transaction Costs in Tanzanian Supply Chains. International Growth Centre. Working Paper 11/0898. http://www.theigc.org/wp-content/uploads/2014/08/Mkenda-and-Van-Campenhout-Transaction-costs-0.pdf [Accessed:27 May 2016].

Mojo, D., Fischer, C. and Degefa, T. (2015) *Who benefits from collective action?* Determinants and economic impacts of coffee farmer co-operatives in Ethiopia. Agriulture in an interconncted world.

www.ageconsearch.umn.edu/bistream/211889/2/Yadate [Accessed:10 March 2017]

Morchain, D. and Kelsey, F. (2016) *The Vulnerability and Risk Assessment Methodology*. Finding ways together to build resilience. Oxfam GB: Oxford

Moret, W. (2014) *Vulnerability Assessment Methods*.ASPIRES. https://www.fhi360.0rg/sites/default/files/media/documens/Vulnerability%20Methods. pdf [Accessed: 01 January 2017]

Morse, J. M. (1991) Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, Vol. (40):120-123.

Morton, J.F. (2007) The impact of climate change on smallholder and subsistence agriculture. *PNAS*, Vol. 104 (50)

Musa, A.B.; Bonsu, O. Y. and Seini, W. (2014) Market Participation of Smallholder Maize Farmers in the Upper West Region of Ghana. *African Journal of Agricultural Research*, Vol. 9 (31):2427-2435

Mukwevho, R. and Anim, F. D. K. (2014) Factors affecting small-scale farmers in accessing markets: A case study of cabbage producers in the Vhembe District, Limpopo Province of South Africa. J Hum Ecol, 48 (2):219-225

Mullainathan, S. and Thaler, R. H. (2000) *Behaviour Economics*. NBER Working Papers Series. Working Paper 7948

Murphy-Graham, E. (2008). Opening the black box: Women's empowerment and innovative secondary education in Honduras. *Gender and Education*, Vol. (20):1, 31-50.

Muzari, W. (2013) Gender Disparities and the Role of Women in Smallholder Agriculture in Sub-Saharan Africa. *International Journal of Science and Research (IJSR)*, ISSN (Online): 2319-7064.

Narayan, Deepa. (2002) *Empowerment and Poverty Reduction: A Sourcebook*. Washington, DC: World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/15239 License: CC BY 3.0 IGO."

Nee, V. (2003) *New Institutionalism, Economic and Sociological*. Princeton: Princeton University Press.

Ngasongwa, J. A. (2003) *Trade Policy for Competitive Economy and Export Led-Growth.* The United Republic of Tanzania National Trade Policy. http://www.tanzania.go.tz/pdf/tradepolicy.pdf [Accessed:08 June 2013]

Ngwenya, H. and J. Hagmann, (2011) "Making innovation systems work in practice: experiences in integrating innovation, social learning and knowledge in innovation platforms", *in Knowledge Management for Development Journal*, 7:1, 109-124

Nicolas Depetris Chauvin, N. D., Mulangu, F. and Porto, G. (2012) Food Production and Consumption Trends in Sub-Saharan Africa: Prospects for the Transformation of the Agricultural Sector. United Nations Development Programme. http://www.undp.org/content/dam/rba/docs/Working%20Papers/Food%20Production %20and%20Consumption.pdf [Accessed:22 October 2017].

North, D.C. (1991). Institutions. *Journal of Economic Perspective*, 5 (1): 97-112.

North, D.C. (1993) *Five Propositions about Institutional Change*. http://128.118.178.162/eps/eh/papers/9309/9309001.pdf [Accessed:30.4.2013] North, D. (1990) *Institution, Institutional change and economic performance*. Cambridge: Cambridge University Press.

North, D. C. (1997) *Transaction Costs Through Time*. In Menard, Claude. Ed. Transaction Cost Economics: Recent Developments. Northampton, MA: Edward Elgar Publishing, Inc

Obi, A.; Schalkwyk, H. D. and Tilburg, A. V. (2012) *Unlocking markets to smallholders*. Lessons from South Africa. Mansholt Publication Series (MPS): Wageningen

Onwuegbuzie, A. J. and Collins, K. M. T. (2007) A Typology of Mixed Methods Sampling Designs in Social Science Research. *The Qualitative Report*, Vol (12):281-316.

Onumah, G., Davis, J., Kleih, U. and Proctor, F. (2007) *Empowering Smallholder Farmers in Markets: Changing agricultural marketing systems and innovative responses by producer organizations.* MPRA Paper No. 25984, posted 23.

Obi, A. and Seleka, T. (2011) *Institutional constraints to small farmer development in Southern Africa*. Wageningen Academic Publishers: Wageningen.

Okoye, B.C., Abass, A., Bachwenkizi, B., Asumugha, G., Alenkhe, B., Ranaivoson, R., Randrianarivelo, Rabemanantsoa, R. N. and Ralimanana, I. (2016) Effect of transaction costs on market participation among smallholder cassava farmers in Central Madagascar. *Cogent Economics & Finance,* Vol. (4): 1143597.

Orozco, J. (2009) *Institutional innovation and inclusive growth: lessons from the coffee and palm oil sectors in Costa Rica*. Preliminary DRAFT – Paper for Globelics 2009, 7th International Conference, 6-8 October, Dakar, Senegal. https://smartech.gatech.edu/bitstream/handle/1853/35117/1238185054_JO.pdf [Accessed: 16 February, 2017].

Page, S. and Hewitt, A. (2001) *World Commodity Prices: Still a problem for developing Countries*. Overseas Development Institute. https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/2420.pdf [Accessed: 12 April 2019].

Pant, L. P. and Hambly-Odame, H. (2010) Creative Commons: Non-Proprietary Innovation Triangles in International Agricultural and Rural Development Partnerships. *The Innovation Journal: The Public-Sector Innovation Journal*, Vol. 15(2), article 4.

Pedercini, M., Kanamaru, H. and Derwisch, S. (2012) *Potential impacts of climate change on food security in Mali.* Natural Resources Management and Environment Department, FAO, Rome.

Pesendorfer, W. (2006) Behaviour Economics Comes of Age: A review Essay on Advances in Behaviour Economics. *Journal of Economic Literature*, Vol. XLIV, pp.712–721.

Phelan, C. and Wren, J. (2005-06) *Exploring reliability in academic assessment*. https://www.uni.edu/chfasoa/reliabilityandvalidity.htm [accessed: 19 January 2016].

Pierre, L. and Hobson, P. (eds.) 2014. *MARISCO: adaptive Management of vulnerability and RISk at Conservation sites*. A guidebook for risk-robust, adaptive and ecosystem-based conservation of biodiversity. Centre for Econics and Ecosystem Management, Eberswalde (ISBN 978-3-00-043244-6).

Pingali, P. (2005) *Commercializing Small Farms: Reducing Transaction Costs.* The Future of Small Farms Proceedings of a Research Workshop Wye, UK June 26-29.

Pingali, P, Khwaja, Y. and Meijer, M. (2005). *Commercializing small farms: Reducing transaction costs*. ESA Working Paper No. 05-08. www.ifpri.org/events/seminars/SmallFarms/ [Accessed: 02 October 2016].

Poole, N. and Buckley, C. P. (2006) *Innovation challenges, constraints and opportunities for the rural poor*. Background paper. http://www.ifad.org/events/gc/29/panel/e/poole.pdf [Accessed 23 May 2013].

Poole, N. (2010) A Review of Existing Organisational Forms of Smallholder Farmers' Associations and their Contractual Relationships with other Market Participants in the in the East and Southern African ACP Region. AAACP Paper Series – No. 11.

Poole, N. (2017) *Smallholder Agriculture and Market Participation*. Food and Agriculture Organization of the United Nations. Warwickshire: Practical Action Publishing.

Polski, M. M. (2001) *Measuring transaction costs and institutional change in the U.S. commercial banking industry*. Indiana University.

http://mason.gmu.edu/~mpolski/documents/PolskiBankTCE.pdf. [Accessed: 07 October 2016].

Poulton, C. Kydd, J. and Dorward, A. (2006) Overcoming Market Constraints on Pro-Poor Agricultural Growth in Sub-Saharan Africa. *Development Policy Review*, 2006, 24 (3): 243-277.

Prato, B. (2013) Supporting poor rural people's empowerment through policy solutions for natural resource management and agriculture. http://www.un.org/esa/socdev/egms/docs/2013/EmpowermentPolicies/Expert-paper_Bettina-Prato.pdf [Accessed: 28 April 2018]

Proctor, F. and Ton, G. (2012) *Turning Innovations into Market opportunities. Partnerships for Livelihood Impacts. Second Global Conference on Agricultural Research for Development.*

www.fao.org/docs/eims/upload/305819/Briefing_Paper_Session_P3_2_Turning [Accessed: 10 May 2013].

Obwona, M. and Chirwa, E. (2007) *Impact of Asian Drivers on SSA agriculture and food security: Issues and challenges.*

https://www.fanrpan.org/archive/documents/d00324/SSA_Agriculture.pdf [Accessed: 3 March 2018].

Oguoma, O.N.; Nkwocha, V.I. and Ibeawuchi, I.I. (2010) Implications of middlemen in the supply chain of agricultural products. *Journal of Agriculture and Social Research (JASR)*, VOL. 10, No. 2,

Okoye, B.C., Abass, A., Bachwenkizi, B., Asumugha, G., Alenkhe, B., Ranaivoson, R., Rabemanantsoa, N. and Ralimanana, I. (2016) Effects of transaction costs on market participation among smallholder farmers in Central Madagascar. *Cogent Economics & Finance*, Vol. (4): 1143597

Oluoch-Kosura, W. (2010) Institutional innovations for smallholder farmers' competitiveness in Africa. *AfJARE*, Vol 5 No 1.

Onumah, G. E.; Junior, R. D.; Kleih, U. and Proctor, F. J. (2007) *Empowering Smallholder Farmers in Markets: Changing Agricultural Marketing Systems and Innovative Responses by Producer Organisation*. ESFIM Working Paper 2

Orden, D., Torero, M. and Gulati, A. (2004) *Agricultural Markets and the Rural Poor*. <u>http://dfidagricultureconsultation.nri.org/theme4/keypapers/povnet</u>... [Accessed 10 May 2013]

Organization for Economic Cooperation and Development (OECD, 1999) *Managing National Systems.* Paris: OECD.

Organisation for Economic Co-operation and Development (OECD, 2012), *Farmer Behaviour, Agricultural Management and Climate Change*, OECD Publishing. http://dx.doi.org/10.1787/9789264167650-en [Accessed: 10 May 2013].

Organisation for Economic Co-operation and Development (OECD, 1997) *National Innovation Systems.* https://www.oecd.org/science/inno/2101733.pdf [Accessed: 17May 2018].

Ortmann, G. F. and King, R. P. (2007) Agricultural Cooperatives I: History, Theory and Problems. *Agrekon*, Vol 46, No 1.

Ortmann, G. F. and King, R. P. (2007) Agricultural cooperatives II: Can they facilitate access of small-scale farmers in South Africa to input and product markets? *Agrekon,* Vol 46, No 2.

Osei-Kyei, R., Chan, A.P.C and Dansoh, A. (2017) *Public-Private Partnership in Ghana*.https://www.researchgate.net/publication/319291858 [Accessed: 15 July 2018].

Ostrom, E. (2007) *Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework*. Theories of the Policy Process. Boulder, CO: Westview Press.

Oxfam (2013) *Power, Rights, and Inclusive Markets. Public policies that support small-scale Agriculture.* Briefing Note. www.oxfam.org/sites/www.oxfam.org/files/bn-power-rights-inclusive-markets-agriculture-050613-en_1.pdf [accessed: 21 August 2013].

Palmer, K. (2002) Achieving Higher Growth and Poverty Reduction in Sub-Saharan Africa A Note for the Commission on Africa. Cambridge Economic Policy Associates (CEPA).http://www.agdevco.com/sysimages/commission%2520for%2520africa%252 0paper_rpt18.pdf [accessed: 22 July 2013]

Phellas, N., Bloch, A. and Seale, C. (2011) *Structured methods: interviews, questionnaires and observation.* www.sagepub.com/sites/defaults/upm-binaries/47370_Seale-Chapter_11.pdf [accessed: 17 January 2016]

Preskill, H and Jones, N (2009) *A Guide for Engaging Smallholders in Developing Evaluation Questions*. Robert Wood Johnson.

Foundation.http://www.rwjf.org/content/dam/web-assets/2009/01/a-practical-guide-for-engaging-stakeholders-in-developing-evalua (accessed: 02 December 2013)

Posner, R. A. (1997) Rational Choice, Behavioural Economics, and the Law. *Stanford Law Review*, Vol.50:1551

Ponnusamy, K. (2013) Impact of public private partnership in agriculture: A review. *Indian Journal of Agricultural Sciences*, Vol. 83 (8): 803–8.

Proctor, F. and Ton, G. (2012) *Partnerships for livelihood impacts: Turning Innovations into Market Opportunities.* Second Global Conference on Agricultural Research for Development (GCARD).

www.fao.org/docs/eims/upload/305819/Briefing_Paper_Session_P3_2_Turning. [Acessed: 01July 2016]

Prowse, M. (2008) Making contract farming work with cooperatives. Producer organisations and poverty reduction. A gateway for capacity development. <u>http://www.ilo.org/public/english/employment/ent/coop/africa/download/contract.pdf</u> [accessed: 28 June 2013] and Adegbola, P.Y. (2012) An Institutional Innovation for Agricultural Technology Adaptation and Adoption: Rice in West and Central Africa. *Sociology Study*, Vol.2 (11):848-867

Quartey, P.; Udry, C.; Al-Hassan, S. and Seshie, H. (2012) *The Role of Middlemen in Marketing and Credit Outcomes in Ghana. Agricultural Financing and Credit Constraints.* International Growth Centre (IGC), Working Paper.

Qin, D. (2016) *Positionality.* John Wiley & Sons, Ltd. https://onlinelibrary.wiley.com/doi/pdf/10.1002/9781118663219.wbegss619 [Accessed: 25 March 2019].

Rajalahti, R. (2011) World Bank. Agricultural Innovation System. An Investment Sourcebook. Overview. http://siteresources.worldbank.org/INTARD/825826-

1111044795683/23131301/WB_AIS_Sourcebook_Overview_web_final.pdf [Accessed 20 May 2018].

Rajan, R. (2017) Challenges to Farm Produce Marketing: A Model of Bargaining between Farmers and Middlemen under Risk. *Journal of Agricultural and Resource Economics*, 42(3):386–405.

Rakotoarisoa, M. A., Lafrate, M. and Paschali, M. (2011) *Why has Africa become a net food importer? Explaining Africa agricultural and food trade deficits.* http://www.fao.org/docrep/015/i2497e/i2497e00.pdf [Accessed: 3 March 2018].

Ritchie, J., Zwi, A.B., Bligault, I., Bunde-Birouste, B. and Silove, D. (2009). Insider outsider positions in health development research: reflections for practice. *Development in Practice*, 19(1):106-112.

Royer, A., Bijman, J. and Bitzer, V. (2016) *Linking smallholder farmers to high quality food chains: appraising institutional arrangements*. Quality and innovation in food. http://www.wageningenacademic.com/doi/pdf/10.3920/978-90-8686-825-4_2 [Accessed: 17 March 2018]

Rutten, M. and Verma, M. (2014) *The Impacts of Reducing Food Loss in Ghana*. A scenario study using the global economic simulation model MAGNET. http://edepot.wur.nl/328240 [Accessed: 2 March 2018].

Rwelamira, J. (2015) *Strengthening Farmers Organizations and Civil Society Organisations*.https://www.afdb.org/fileadmin/uploads/afdb/Documents/Events/DakA gri2015/Strengthening_Farmers_Organizations_and_Civil_Society_Organizations.pd f [Accessed: 03 March 2017]

Sadoulet, E. and de Janvry, A. (1995) *Quantitative Development Policy Analysis*. Bailtimore: John Hopkins University Press.

Sahin, S. (2014) Agriculture and the private sector. Department for International Development. Agriculture and growth evidence paper series, 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/31835 3/AG_and_private_sector__final_.pdf [Accessed: 11 November 2016]

Sarkar, R. (2009) *Rule of Law, Human Rights, & Global Finance. International Development Law.* Oxford University Press, Inc.: New York.

Samuel O. Osebeyo & Goodness C. Aye (2014) Transaction costs and marketing decision: a case study of smallholder tomato farmers in Makurdi, Nigeria, Urban, Planning and Transport Research, 2:1, 333-340, DOI: 10.1080/21650020.2014.939296

Schaffnit-Chatterjee, C. (2010) *Risk Management in Agriculture: Towards market solutions in the EU.Deutsche Bank Research.*

Schalkwyk, F. V., Young, A. and Verhulst, S. (2017) *Ghana. Esoko-leveling the Information Playing Field for Smallholder Farmers in Ghana*. Open data's impact. http://odimpact.org/files/case-esoko.pdf [Accessed: 13 February 2018]

Schlag, P. (1989) The problem of Transaction Costs. *Southern California Law Review*, Vol. 62:1661.

Schumpeter, J. (1946) *Economic Theory and Entrepreneurial History.* Cambridge: Harvard University Press.

Seini, W., Jones, M., Tambi, E. and Odularu, G. (2011) *Input Market Initiatives that Support Innovation Systems in Africa.* Forum for Agricultural Research in Africa 12 Anmeda Street, Roman Ridge, PMB CT 173, Accra, Ghana.

Sen, S. and Choudhary, V., *Module 11: ICT Applications for Agricultural Risk Management*. World Bank. http://www.ictinagriculture.org/sites/ictinagriculture.org/files/final_Module11.pdf

[Accessed: 22 May 2013]

SEND-Ghana (2014) *Women and Smallholder Agriculture in Ghana.* Policy Brief No. 4.www.sendwestafrica.org/phocadownload/Women%20and%20Smallholder%20Agri culture%20in%20Ghana%20Policy%20Brief%20-%20Copy.pdf?lbisphpreq=1 [Accessed: 08 October 2018].

SEND (2004) The National Trade Policy: How Different? Unpublished Manuscript, Accra.

Sharma, R. (2009) Ghana - *Mainstreaming trade policy. Articulating and mainstreaming agricultural trade policy and support measures.* http://www.fao.org/docrep/014/i2305e/i2305e09.pdf [Accessed: 29 March 2018].

Shiller, J. R. (2005) *Behavioral Economics and Institutional Innovation*. Cowles foundation discussion paper no. 1499.

Singh, R.B., Kumar, P. and Woodhead, T. (2002) *Smallholder Farmers in India: Food Security and Agriculture Policy.* Food and Agriculture Organisation of the United Nations Regional Office for Asia and the Pacific Bangkok, Thailand

Singh, N. (2008) *Transaction Costs, Information Technology and Development.* MPRA Paper No. 9095. https://mpra.ub.unimuenchen.de/9095/1/MPRA_paper_9095.pdf [Accessed: 17 February 2018].

Shiferaw, B.; Obare, G. and Muricho, G. (2006) Rural Institutions and Producer Organisations in Imperfect Markets: Experiences from Producer Marketing Groups in Semi-Arid Eastern Kenya. *SAT journal*, Vol 2 (1).

Sørensen, E. and Torfing, J. (2012) Collaborative Innovation in the Public Sector. *The Innovation Journal: The Public Sector Innovation Journal*, Volume 17(1), article 1.

Spielman, D. J. (2005) *Innovation Systems Perspectives on Developing-Country Agriculture: A Critical Review*. International Food Policy Research Institute. ISNAR Discussion Paper 2.

Stake, R. (1998). *"Case Studies" in: Norman Denzin & Yvonna Lincoln. (eds.): Strategies of Qualitative Inquiry*. Thousand Oaks, London, New Delhi: Sage

Stringfellow, R.; Coulter, J.; Lucey, T. McKone, C. and Hussain, A. (1997) *Improving the access of smallholders to agricultural services in Sub-Saharan Africa: farmer cooperation and the role of the donor community*. Natural Resources Perspective, Number 20

Swinnen, J., Colen, and Maertens, M. (2013) *Constraints to smallholder participation in high-value agriculture in West Africa*. In: Rebuilding West Africa's Food Potential, A. Elbehri (ed.), FAO/IFAD

Tashakkori, A., and C. Teddlie (1998) *Mixed Methodology: Combining Qualitative and Quantitative Approaches*. Thousand Oaks, CA: Sage Publications.

Tatwangire, A. (2013) Successes and failures of institutional innovations to improve access to services, input and output markets for smallholder pig production systems and value chains in Uganda. Research program for livestock and fish. CGIAR.

Taylor, B., Sinha, G. and Ghoshal, T. (2008) Research Methodology. *A guide for researchers in Management and Social Sciences*. Prentice Hall of India: New Delhi

Techiman Municipal Assembly (2006), *Medium Term Development Plan (2006-2009)*. Techiman, Ghana.

Teddlie, C. and Yu, F. (2007) Mixed Methods Sampling: A Typology with Examples. *Journal of Mixed Methods Research*. Vol. 1, (1):77-100

Teijlingen, E. V. and Hundley, V. (2002) *The importance of pilot studies. Nursing Standard; ProQuest Nursing & Allied Health Source.* http://fhs.mcmaster.ca/surgery/divisions/postgrad/documents/Research7ReadingPilo tStudies06Apr2011.pdf [accessed: 14 January 2016]

Tenywa, M. M., Rao, K.P.C., Buruchara, R., Kashaija, I., Majaliwa, J.D., Tukahirwa, J.B., Adekunle, A. A., Fatunbi, A.O., Mugabe, J., Wanjiku, C., Mutabazi, S., Pali, P., Mapatano, S., Lunze, L., Mugabo, J. and Ngaboyisonga, C. (2010) Institutional Innovations for Building Impact-oriented Agricultural Research, Knowledge and Development Institutions. *Learning Publics Journal of Agriculture and Environmental Studies*, Vol2 (1):24-55

Thapa, G. (2009) *Smallholder farming in Transforming Economies of Asia and Pacific: challenges and opportunities.* Discussion paper for the side event organized during the thirty-third session of IFAD's governing Council.

The Canada Program Support Unit (PSU-Ghana, 2011) *Ghana, Country Overview*. http://www.psu-ghana.org/countryoverview.htm [Accessed: 10 January 2016]

The Economist Intelligence Unit Limited (2017) *Global Food Security Index. Measuring Food Security and the Impact of Resource Risks.* http://foodsecurityindex.eiu.com/Home/DownloadResource?fileName=EIU%20Globa I%20Food%... [Accessed:2 March 2018].

The Rural Poverty Report (2011) *New Realities, New Challenges: New Opportunities for Tomorrow's Generation*. IFAD. http://www.ifad.org/rpr2011/report/e/rpr2011.pdf [accessed 22 July 2013]

Tenywa, M.M., Rao, K, P.C., Buruchara, R., Kashaija, I., Majaliwa, J.D., Tukahirwa, J.B., Adekunle, A. A., Fatunbi, A.O., Mugabe, J., Wanjiku, C., Mutabazi, S., Pali, P., Mapatano, S., Lunze, L., Mugabo, J. and Ngaboyisonga, C. (2010) Institutional Innovations for Building Impact-oriented Agricultural Research, Knowledge and Development Institutions. *Learning Publics Journal of Agriculture and Environmental Studies*, Vol 2 (1). 24-55

Thindwa, J., "Enabling environment for Civil Society in CDD Projects", Washington, DC: World Bank, Social Development Family, CDD Learning Module, 2001. http://www.worldbank.org/participation/enablingenvironment/EnablingenvironmentCE CDD.pdf [Accessed: 21 May 2016]

Thomas, G. (2009) How to do your research project. Sage: London.

Tolani, O. V. (2013) An examination of risk allocation preferences in public-private partnerships in Nigeria. Afe Babalola University: *Journal of Sustainable Development Law and Policy*, Vol. 2 Iss. 1 (2013), pp. 206-221.

Torero, M. (2011) *A framework for Linking Small Farmers to Markets*. Paper presented at the IFAD Conference on New Directions for Smallholder Agriculture

Torero, M. (2007) *Markets, Trade, and Institutions*. International Food Policy Research Institute.

Ugwu, D. S. and Kanu, I. O. (2012) Effects of agricultural reforms on the agricultural sector in Nigeria. *Journal of African Studies and Development*, Vol. 4(2), pp. 51-59.

Uphoff, N. and Buck, L. (2006) Strengthening rural local institutional capacities for sustainable livelihoods and equitable development. Paper prepared for the Social Development Department of the World Bank, Washington, DC.

USDA Foreign Agricultural Service (2012) *Gain Report*. Global Agricultural Information Network. https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Ghana%20Exporter%20

Guide%202012_Accra_Ghana_11-2-2012.pdf [3 March 2017].

UN Millennium Development Project. (2005). Innovation: Applying Knowledge in Development. London: Earthscan.

UNCTAD Secretariat (2015) *The role of smallholder farmers in sustainable commodities production and trade.* Trade and Development Board Sixty-second

session Geneva. http://unctad.org/meetings/en/SessionalDocuments/tdb62d9_en.pdf [Accessed: 28 June 2018]

Vakis, R., Sadoulet, E. and de Janvry, A. (2003) *Measuring Transactions Costs from Observed Behavior: Market Choices in Peru*. <u>http://are.berkeley.edu/~esadoulet/</u>... [Accessed 15 May 2013]

Valentinov, V. and Baum, S. (2008). The Institutional Economics of Rural Development: Beyond Market Failure. *Journal Central European Agricultural*, Vol. 9 (3):

Veblen, T. (1898) *Why is Economics Not an Evolutionary Science*. The Quarterly Journal of Economics: 12.

Vargas-Lundius, R. (2009) Smallholder Agriculture and Food Security in the 21st Century Proceedings of the Governing Council Rounds Tables. https://www.ifad.org/documented101801e37d6de2-8f79-48b7-be55d6a8e16d16d168d [accessed: 20 September 2016].

Vorley, B., Pozo-Vergnes, E. D., Gribnau, C., Ghose, B. and Munoz, D. (2012) *Making market work for smallholders? Capacity*, Issue 44.

Wajda, E. O. (2016) The New Institutional Economics main theories. *Financial Internet Quarterly.e-Finanse*, Vol. 12 (1):78-85.

Wander, A.E. (2013) The importance of transaction costs in agriculture – a review of selected empirical studies. *RBPD*, Vol 2 (2):118-129.

Weatherspoon, D, Cacho, J and Christy, R, (2001) Linking globalization, economic growth and poverty: impacts of agribusiness strategies on sub-Saharan Africa. *American Journal of Agricultural Economics*, Vol. 83(3): 722-29.

Weir, S. (1999) *The Effects of Education on Farmer Productivity in Rural Ethiopia.* Centre for the Study of African Economies Department of Economics, University of Oxford. https://www.csae.ox.ac.uk/materials/papers/9907text.PDF [Accessed:09 October 2018].

Wiggins, S. and Keats, S. (2013) *Leaping and Learning: Linking smallholders to markets in Africa*. London: Agriculture for Impact, Imperial College and Overseas Development Institute.

Wiggins, S., Kirsten, J., & Llambı', L. (2010). *The future of small farms*. World Development, 38(10), 1341–1348.

Williamson, O.E. (1985) *The Economic Institutions of Capitalism: Firms, Markets, Rational Contracting*. New York: The Free Press.

Williamson, O.E. (2000). The New Institutional Economics: Taking Stock, Looking Ahead. *Journal of Economic Literature*, Vol. 38 (3): 595-613.

Wisner, B., Blaikie, P., Cannon, T., Davis, I. (2004) At Risk. Routledge, London.

Wolter, D. (2008) *Ghana Agriculture is Becoming a Business*. Business for Development. OECD. www.oecd.org/dev/publications/businessfordevelopment [Accessed:16 October 2017]

World Bank (2011), *Missing Food: The Case of Postharvest Grain Losses in Sub-Saharan Africa*. The World Bank, Washington D.C.

World Banks (2008) *The Growth Report: Strategies for sustained Growth and Inclusive Development*. Commission on Growth and Development. World Bank, Washing D.C.

World Bank (2007) Enhancing Agricultural Innovation. How to Go Beyond the Strengthening of Research Systems. Washington DC 20433

World Bank (2007) World Development Indicators. Green Press Initiative. Washington, D.C.

World Bank (2005) Food Safety and Agricultural Health Standards: Challenges and Opportunities for Developing Country Exports. Poverty Reduction & Economic

World Bank (2003) *Reaching the rural poor: A renewed strategy for rural development.* Washington, DC.

World Bank (2005) *Management Trade Unit and Agriculture and Rural Development Department.* The World Bank Report No. 31207. Washington, DC, January 2005

World Bank (2016) *Creating an Enabling Environment for Agricultural Innovation.* http://elibrary.worldbank.org/doi/abs/10.1596/9780821386842_CH06 [Accessed: 20 May,2016]

WTO, Geneva World Bank (2002). *Building institutions for markets*. World Development Report. Washington, DC

Wroblewski, J. and Wolff, H. (2010) *Risks to Agribusiness Investment in Sub-Saharan Africa*. Evan School of Public Affairs. Prepared for the Agricultural Policy and Statistics team. Bill & Melinda Gates Foundation

Wurtz, K., Using mixed methods research to analyse surveys. http://www.chaffey.edu/research/IR_PDF_Files/Presentations/Other/0809-MixedMethods.pdf (Accessed: 17 January 2014)

Yeasmin, S. and Rahman, K. F. (2012) 'Triangulation' Research Method as the Tool of Social Science Research. *BUP Journal*, Volume 1(1).

Yin, R. (1994) *Case Study Research: Design and Methods*. Thousand Oaks, London, New Delhi: Sage

Yin, R. K. (2003) *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Yin, R. K. (2004). *Case study methods*. COSMOS Corporation. www.cosmoscorp.com/Docs/AERAdraft.pdf [accessed:17 December 2015]

Yustika, A. E., Abdullah, B. R. and Aini, D. N. (2014) *Institutional Innovation in Agriculture and Industry Sectors: A case of Indonesia*. 12th International Academic Conference, Prague.

Zanella, G.; Shank, B. and Srinivasan, C. S. (2014) Transaction costs, information technologies and the choice of marketplace amongst farmers in Northern Ghana. *The Journal of Development Studies*, Vol. 50 (9):1226-1239

Zohrabi, M. (2013) Mixed Method Research: Instruments, Validity, Reliability and Reporting Findings. *Theory and Practice in Language Studies*, Vol. 3, No. 2, pp. 254-262

Websites

Ghanaweb (2018) *Gari.* https://www.ghanaweb.com/GhanaHomePage/food/gari.html [Accessed: 01 August 2018]

Grow Africa (2017) *Overview*. At a glance-agriculture in Ghana. https://www.growafrica.com/countries/Ghana [Accessed: 26 October 2017].

7 Appendices

7.1 Appendix 1: Participants' information sheet (questionnaire)

Participants' information sheet (questionnaire)



I am Alfred Mensah a, research student from Writtle College/Essex University in Chelmsford (UK). The title of my project is: "Institutional innovations to reduce transaction costs and risk between farmers and traders in rural markets in Ghana." The project aims to understand how smallholder farmers in rural Ghana can use institutional innovations to access markets in national and neighbouring countries in West Africa, in order to improve and sustain their livelihoods and overcome the competition within the developed countries markets. No study has been conducted in the Kumasi and Techiman districts on the above topic. Hence, it is possible the study will offer valuable results that could promote institutional innovation for smallholder rural farmers' of Ghana access to more or different markets. As part of this project, a survey is required to gain opinions of the various stakeholders. Should you agree to take part in this survey, you would be required to complete the attached questionnaire. The questionnaire seeks your views on the need for institutional innovation to reduce transaction costs needed to facilitate market access for smallholder vegetable farmers. In addition, your views on the importance of alternative market sources of markets for smallholder rural vegetable farmers in Ghana are also essential.

Please note that this is an anonymous questionnaire and its data will be analysed in a statistical form and the results will be presented as group data. This means that your identity will not be revealed at any stage of the study. In light of the above, I would appreciate your cooperation in not entering your names(s) on the questionnaire

The consent form



The project title: "Institutional innovations to reduce transaction costs and risk between farmers and traders in rural markets in Ghana."

I have read and understood the information sheet and this consent form. I have had the opportunity to ask questions regarding my participation.

I understand that it is a voluntary participation and I can withdraw from the study at any time.

I have agreed to participate in this study.

Name of participant:	15
Signature of the participant	••••
Signature of the researcher:	

7.2 Appendix 2: Questionnaire for smallholder farmer



Questionnaire for smallholder farmers

Name of the interviewer.....

Questionnaire number.....

Survey date.....

Can you please spend approximately 15 minutes of your time to complete the following questions for me:

A: Demographic information

Please tick the relevant box

Age	Gender	Marital status	Educational level	Family size/ dependants
19 and under	Male ()	Married []	Primary []	0 []
20-29 []	Female()	Single []	Secondary []	1-3 ()
30-39 []	5. S.	Divorced []	Vocational/technical	4-7 []
40-4 []		Widow/widower()	degree []	8-11 ()
50-59 []	2 ×		Other (please state below):	12-15 ()
				r
60+ []			No education []	16+ []

B: Farming information

Farm size (ha)	Source(s) of labour	Source (s) of capital	Sources of market information	Source of income	Position in farm
1-3 ()	Family ()	Family []		Sales of () products	Owner []
4-7 []	Hired labour	Bank loan ()		Salary/wage	Tenant ()
8-11	Co-operative	Savings []		family []	Manager[]
12-15	friends ()	Credit union ()		NGO ()	Relative of owner []
16-18 ^[]	Other [] Please state:	Co-operative ()		Pension []	Hired [] Labour
19+ 〔〕	None []	other () (Please state below):		Other () (Please state below):	Other () (Please state):

C. Farming activities

- 1. Please, explain your main reason (goal) for involvement in farming. (Tick)
- a) Marketing/income [] b) Food for family [] c) Hobby []
- b) d) Other []

Please state.....

2 | Page

2.	Are you achieving your goal? (Tick)
a)	Yes [] b) No []
3.	If no to Q2, what you see as a challenge to your goal? (Tick)
a)	Land tenure arrangement [] b) marketing related [] c) Capital []
b)	d) other
	Please state
4.	How do you rate your farming knowledge? (Tick)
	a) Very good [] b) Good [] c) Poor[] d) Very poor[]
5.	Do you need further training on farming? (Tick)
	a) Yes [] No []
6.	If yes to Q 5, what specific training you require?
	a) Finance/accounting [] b) Decision making [] c) Use of tools []
	d) Other []
	Please state
7.	What type of infrastructure do you have access to? (Tick)
	a) machinery [] b) Telephone/internet[] c)storage []
	d)irrigation equipment [] d)transport[]
8.	What types of crop do you grow beside vegetables? (Tick)
а) Cereals (eg, maize, wheat, millet) [] c) Root and tuber crops (eg, cassava,
	sweet potato, yam) [] b) Cocoa [] c) Citrus []
	other[] Please state
9.	How many of your products are used at home? (Tick)

- a) All the products (100%) [] b) Half of the products (1/2 or 50%) [] c) threefourth of the products (3/4 or 75%) [] d) None of the products []
- e) Other [] Please state

D. Marketing information

Type of market access	Channel of distribution	Source of market information	Kind of market information	How information is access
Export market	Spot market/farm gate []	Market Agent /buyers ()	Market demand	Post
Regional market	Contractual [] arrangements	Extension () officers	Market () opportunities	Telephone
Domestic market	Agents/middlemen	Family []	Buyers ()	Internet ()
Subsistence ()	Self []	Media ()	Prices ()	Farmer () group meetings
Other () Please state:	Other () Please state:	other () Please state	Other () Please state	Other () Please state

E. Marketing challenges

- 1. What marketing problems do you experience in your farming activities? (Tick)
- a) Poor roads [] b) High transport costs [] c) Low prices [] d) Lack of transport []
- e) Lack of market information [] f) other [] Please state.....

- 2. Who would you contact to discuss these problems mentioned in Q1?
 - a) Extension service [] b) Co-operative society] c) marketing agents/middlemen]
 - d) NGO[] e) other[] Please state..... f) None of the above []
- 3. Which market do you prefer over your current market? (Tick)
 - a) International market [] b) Regional market [] c) Domestic markets [] d) other []
- 4. Why would you prefer this market? (Tick)
 - a) Ready market [] b) More money [] c) easy access [] d) other []
- 5. Do you think that small-scale rural farmers of Ghana may get benefits from accessing the national (or domestic) and West Africa markets instead of international markets? (Tick)

Yes [] No []

 If yes to Q5 what benefit(s) do you exist in those markets compared to international market

a) Less competition () b) standards are low () c) low transaction costs

e) Other []Please state.....

- 7. Do you receive any support on market access from private or government sector? (Tick)
 - Yes [] No[]
- 7. If yes to Q5, who support you? (Tick)
- a) Extension services [] b) co-operative [] c) Middlemen/agents [] d)NGO []
- e) Other [] Please state.....

F. Transaction costs

(Transaction costs refer to marketing costs such as transport, handling, packaging, storage, spoilage, information search, bargaining, and enforcement of contracts and much more that can affect farmers' returns).

1. Are you aware of how transaction costs are affecting your market access? (Tick)
Yes [] No []
2. If yes to Q1 what transaction costs do you encounter? (Tick)
a) Marketing information costs [] b) Buyers searching costs [] c) Negotiation
costs [] d) Bargaining costs [] e) Contracting [] f) other []
3. If the transaction costs are high, what are the implications on market access?
a) Reduce profit margins [] b) affect livelihoods []
c) Lower trading/market participation [] d) other [] Please state
G. Institutional innovations to reduce transaction costs
1. What institutional innovations (ways) do you think transactions cost can be reduced?
a) Smallholder farmer empowerment [] b) co-operative society []
c) Smallholder farmer participation in decision [] d Government intervention[]
e) Contracting [] f) public and private partnerships [] h) other []
2. Do local smallholder farmers participate in major decisions on market access issues?
Yes [] No []
3. If yes to Q2, what areas are they allowed to participate in decision making? (Tick)
a) Government interventions [] b) stakeholders meeting [] c) NGOs []
d) Farmer association meetings [] e) other [] f) none of the above []
4. If No to Q2, why you think farmers are excluded from participatory decision making?
(Tick)
a) Educational level [] b) incompetent [] c) ignorance [] d) Bureaucracy []
e) other [] Please state
5. How will farmer participation in decision-making promote market access? (Tick)

a) Needs will be addressed properly $\left[\begin{array}{c} \end{array} \right]$

b) improve bargaining power $\left[\begin{array}{c} \end{array}
ight]$

c) Reduce their transaction costs []

e) Other (

Please sta	ate
------------	-----

d) Access to information

7 | Page

B. Marketing information

Type of market access for produce purchased from farmers	Channel of distribution	Source of market information	Kind of market information	How information is access
Export market	Spot market/farm gate []	Market Agent /buyers ()	Market demand	Post
Regional market	Contractual [] arrangements	Extension officers	Market () opportunities	Telephone
Domestic market	Agents/middlemen	Family	Buyers ()	Internet (
Subsistence ()	Self []	Media (Prices ()	Farmer () group meetings
Other []	Other []	other []	Other ()	Other []
Please state:	Please state:	Please state	Please state	Please state

C. Marketing challenges

1. What marketing problems do you think smallholder farmers' experience in their farming activities? (Tick)

a) Poor roads [] b) High transport costs [] c	c) Low prices []	d) Lack of transport
---	-------------------	----------------------

Please state.....

e) Lack of market information	f) other[]]
c) Lack of market mormation []	i) outer []

2 | Page

2. In your personal view, who would smallholder farmers contact to discuss these problems mentioned in Q1?

- a) Extension service [] b) Co-operative society [] c) marketing agents/middlemen[]
- d) NGO[] e) other[] Please state..... f) None of the above []

3. Which market do you prefer over your current market? (Tick)

- a) International market [] b) Regional market [] c) Domestic markets [] d) other []
- 4. Why would you prefer this market? (Tick)
 - a) Ready market [] b) More money [] c) easy access[] d) other []
- 5. Do you think that small-scale rural farmers of Ghana may get benefits from accessing the national (or domestic) and West Africa markets instead of international markets? (Tick)
 - Yes [] No []
- If yes to Q5 what benefit(s) do you exist in those markets compared to international market

a) Less competition () b) standards are low () c) low transaction costs

e) Other []Please state.....

Do you think smallholder receive any support on market access from private or government sector? (Tick)

Yes [] No[]

- 7. If yes to Q7, who support them? (Tick)
- a) Extension services [] b) co-operative [] c) Middlemen/agents [] d)NGO []

e) Other [] Please state.....

D. Transaction costs

(Transaction costs refer to marketing costs such as transport, handling, packaging, storage,

spoilage, information search, bargaining, and enforcement of contracts and much more that can affect farmers' returns).

 Are you aware of how transaction costs are affecting smallholder farmers' market access? (Tick)

Yes [] No []
2. If yes to Q1 what transaction costs do farmers encounter? (Tick)
a) Marketing information costs [] b) Buyers searching costs [] c) Negotiation
costs [] d) Bargaining costs [] e) Contracting [] f) other []
3. If the transaction costs are high, what are the implications on market access?
a) Reduce profit margins [] b) affect livelihoods []
c) Lower trading/market participation [] d) other [] Please state
G. Institutional innovations to reduce transaction costs
1. What institutional innovations (ways) you think can be used to reduce the transactions
cost?
a) Smallholder farmer empowerment [] b) co-operative society []
c) Smallholder farmer participation in decision [] d Government intervention[]
e) Contracting [] f) public and private partnerships [] h) other []
2. Do you think local smallholder farmers participate in major decisions on market access
issues?
Yes [] No []
3. If yes to Q2, what areas are they allowed to participate in decision making? (Tick)
a) Government interventions () b) stakeholders meeting () c) NGOs ()
d) Farmer association meetings [] e) other [] f) none of the above []
4. If No to Q2, why you think farmers are excluded from participatory decision making?
(Tick)
a) Educational level [] b) incompetent [] c) ignorance [] d) Bureaucracy []

e) other	[]	Please state

5. Do you think smallholder farmers participation	ation in decision making promotes market
access? (Tick)	
a) Needs will be addressed properly []	b) improve bargaining power
c) Reduce their transaction costs $\left(\begin{array}{c} \end{array} \right)$	d) Access to information[
e) Other []	
Please state	

5 | Page


Questionnaire for Key informants

Name of the interviewer	
-------------------------	--

Questionnaire number.....

Survey date.....

Can you please spend approximately 15 minutes of your time to complete the following questions for me:

A: Demographic information

Please tick the relevant box

Age	Gender	Marital status	Educational level	Family size/ dependants
19 and under ()	Male ()	Married [] How many wives?	Primary ()	0 ()
20-29 ()	Female ()	Single []	Secondary []	1-3 ()
30-39 []		Divorced []	Vocational/technical []	4-7 ()
40-49 []		Widow/widower ()	degree [] Subject	8-11 ()
50-59 ()	2		Other (please state [] below):	12-15 ()
60+ ()			No education []	16+ []

1.	What is your job?
	Please state
2.	Please, what is your main reason for involvement in farming?
	Please state
3.	Do think farmers are knowledgeable regarding available markets for their produce?
	Yes[] / No[]
	Please, explain
4.	Do you think smallholder farmers need training/education? (Tick)
	Yes [] / No []
	If yes what areas (or reason for your answer)
5.	What types of infrastructure do smallholder farmers have access to (e.g.
	transportation, good road, access to machinery, support services)?
	Please state
6.	What types of crops do smallholder farmers normally grow in this area?
	Please list them
7.	How would you classify most of the farmers in this area (e.g. subsistence farmers,
	commercial farmers, other)?
	Please state
	(a) If you have chosen subsistence farming for Q9, could please give the possible
	reasons behind the above system of farming adopted by the smallholder
	farmers?
	Please, explain briefly
	(b) If you have chocon commercial forming at O0, could evaluate in your entities
	the second (a) behind for commercial forming at Q9, could explain in your opinion
	the reason (s) bening for commercial farming?

	(c) If you have chosen another form of farming at Q 9, Please explain
8.	Do the smallholder farmers rear animals alongside crop farming? Yes [] / No[]
	Please, explain
	(a) If you have answered yes to Q8, could please give reason(s) for livestock rearing
	alongside crop farming carried out by farmers?
. Ma	arketing challenges
1.	What marketing problems do farmers experience in your own opinion (e.g. poor
	roads, high transport costs, low prices, lack of transport, lack of market information,
	etc)?
	Please, explain
2.	Who do farmers contact to discuss these problems mentioned in Q1 (e.g. extension
	service, co-operative society, marketing agents/middlemen)?
	Please, explain
3.	What is their main current market (e.g. international market, regional market,
	domestic markets, other)?
	Please state
	a) If other market(s) is chosen at Q3 please explain
4.	Why would farmers prefer these markets (e.g. Ready market, more money, easy
	access, less competition and other)?
	Please explain

5.	Do you think that small-scale rural farmers of Ghana may get benefits from accessing				
	the national (or domestic) and West Africa markets instead of international markets?				
	Yes[]/No[]				
	(a) If yes to Q5, what benefit(s) do you think to exist in those markets compared to				
	international markets (e.g. less competition, standards are low, low transaction				
	costs and other)?				
	Please explain				
	(b) If No to Q5, what benefits do you think farmers may get from international				
	Please explain				
-					
6.	(Tick)				
	Yes []/ No []				
(a) If yes to Q6, who supports farmers? Please explain				
(b) If No to Q6, please explain				

F. Transaction costs

(Transaction costs refer to marketing costs such as transport, handling, packaging, storage, spoilage, information search, bargaining, and enforcement of contracts and much more that can affect farmers' returns).

- Are you aware of how transaction costs are affecting farmers' market access? (Tick)
 Yes[]/No[]
- 2. If yes to Q1 what specific transaction costs do farmers encounter (e.g. marketing information costs, buyers searching costs, negotiation costs, bargaining costs, contracting)?
- If the transaction costs are high, what are the implications on market access?
 Please, explain......

4

7.5 Traders questionnaire



Questionnaire for Agents/Middlemen

Name of the interviewer	*
Questionnaire number	
Survey date	
Can you please spend approximately 15 minutes of your time to complete the following	es?

questions for me:

A: Demographic information

Please tick the relevant box

1

1ge	Gender	Marital status	Educational level	Family size/ dependants	
9 and under	Male (] Married ()	Primary ()	0 ()	
20-29 ()	Female [] Single ()	Secondary []	1-3 ()	
80-39		Divorced []	Vocational/technical	4-7 ()	
10-4 ()		Widow/widower[]	degree []	8-11 []	
50-59 []			Other (please state [] below):	12-15 []	
		•	•••••		
i0+ ()			No education []	16+ ()	

1 | Page

5

* "

Type of market access for produce purchased from farmers	Channel of distribution	Source of market information	Kind of market information	How information is access
Export market	Spot market/farm gate []	Market Agent /buyers []	Market demand	Post
Regional market	Contractual () arrangements	Extension []	Market () opportunities	Telephone
Domestic market	Agents/middlemen	Family	Buyers	Internet ()
Subsistence []	Self ()	Media ()	Prices ()	Farmer () group meetings
Other	Other ()	other ()	Other (Other ()
Please state:	Please state:	Please state	Please state	Please state

B. Marketing information

C. Marketing challenges

1. What marketing problems do you think smallholder farmers' experience in their farming activities? (Tick)

a) Poor roads [] b) High transport costs [] c) Low prices [] d) Lack of transport [] e) Lack of market information [] f) other[] Please state.....

21 Page

2. In your personal view, who would smallholder farmers contact to discuss these problems mentioned in Q1?

- a) Extension service () b) Co-operative society () c) marketing agents/middlemen (
- d) NGO[] e) other[] Please state.... f) None of the above []
- 3. Which market do you prefer over your current market? (Tick)
 - a) International market [] b) Regional market [] c) Domestic markets [] d) other []
- 4. Why would you prefer this market? (Tick)
 - a) Ready market () b) More money () c) easy access () d) other ()
- 5. Do you think that small-scale rural farmers of Ghana may get benefits from accessing the national (or domestic) and West Africa markets instead of international markets? (Tick)

Yes [] No []

 If yes to Q5 what benefit(s) do you exist in those markets compared to international market

a) Less competition [] b) standards are low [] c) low transaction costs

e) Other []Please state.....

7. Do you think smallholder receive any support on market access from private or government sector? (Tick)

Yes () No ()

7. If yes to Q7, who support them? (Tick)

a) Extension services [] b) co-operative [] c) Middlemen/agents [] d)NGO []

e) Other () Please state.....

D. Transaction costs

(Transaction costs refer to marketing costs such as transport, handling, packaging, storage, spoilage, information search, bargaining, and enforcement of contracts and much more that can affect farmers' returns).

3]Page

1. Are you aware of how transaction costs are affecting smallholder farmers' market access? (Tick)

Yes No

2. If yes to Q1 what transaction costs do farmers encounter? (Tick)

a) Marketing information costs [] b) Buyers searching costs [] c) Negotiation

costs [] d) Bargaining costs [] e) Contracting [] f) other []

3. If the transaction costs are high, what are the implications on market access?

a) Reduce profit margins b) affect livelihoods b)

c) Lower trading/market participation () d) other () Please state.....

G. Institutional innovations to reduce transaction costs

1. What institutional innovations (ways) you think can be used to reduce the transactions cost?

a) Smallholder farmer empowerment ()

b) co-operative society

c) Smallholder farmer participation in decision [] d Government intervention []

e) Contracting () f) public and private partnerships () h) other ()

2. Do you think local smallholder farmers participate in major decisions on market access issues?

Yes No

3. If yes to Q2, what areas are they allowed to participate in decision making? (Tick)

a) Government interventions () b) stakeholders meeting () c) NGOs ()

d) Farmer association meetings () e) other () f) none of the above (

4. If No to Q2, why you think farmers are excluded from participatory decision making? (Tick)

a) Educational level [] b) incompetent [] c) ignorance [] d) Bureaucracy []

'4|Page

e) other () Please state	
5. Do you think smallholder farmers particip access? (Tick)	ation in decision making promotes market
a) Needs will be addressed properly	b) improve bargaining power
c) Reduce their transaction costs() e) Other()	d) Access to information[]

Please state.....

5 | Page

.

7.6 Appendix 3: Tomatoes boxes use by market women to purchase smallholder farmers' tomatoes.



Plate 7:Tomatoes boxes use by market women to purcahse tomatoes from farmers in Tuobodum and Akumadan

7.7 Some interviews photos

Interview photos



Plate 8:Interview pictures for MARISCO, questionnaire and key informants interviews

7.8 Cassava (Gari) processing site at Aworowa, Techiman



Plate 11:Gari or cassava processing site at Aworowa

The Gari is a common food in Ghana made from cassava. Smallholder farmers at Aworowa, a suburb of Techiman process and package them in sealed rubber bags and sell them in supermarkets. Furthermore, some farmers manage to export them to African shops in Europe and the USA. Also, they sell them in unpacked form (bowls) in open markets in Ghana.

7.9 Interview with the best farmer at Aworowa (Brong Ahafo Region)

Interview at the farm site of the Techiman Municipal best farmer in 2013 in Aworowa (in the Brong Ahafo Region)



Plate 12:Interview with the best farmer at Aworowa (Brong Ahafo)