

**HOW EFFECTIVE ARE FARMER-BASED ORGANISATIONS IN
GHANA'S SMALLHOLDER AGRICULTURE?**

Adam Salifu

BA (Hons) University of Ghana, MPhil (University of Cambridge)

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DEDICATION

I dedicate this thesis to my mother and late father, who both did not have formal education but committed the little resources they had to give me formal education.

STATEMENT OF AUTHENTICATION

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, in either full or in part, for a degree at this or any other institution.

.....

Adam Salifu

Western Sydney University

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TABLE OF CONTENTS

LIST OF TABLES.....	vi
LIST OF FIGURES.....	viii
LIST OF BOXES.....	x
LIST OF APPENDICES.....	xi
LIST OF ABBREVIATIONS AND ACRONYMS.....	xiii
ABSTRACT.....	xv
CHAPTER ONE: INTRODUCTION.....	1
1.1 Setting the context: the research problem.....	1
1.2 The research aim and questions.....	7
1.3 Farmer-based organisations in Ghana.....	8
1.4 Theoretical perspectives on the roles of FBOs in smallholder agriculture.....	11
1.5 The roles and impact of FBOs on smallholder agriculture: evidence and knowledge gaps.....	15
1.6 The argument of the thesis and an outline.....	18
CHAPTER TWO: RURAL COLLECTIVE ACTION AND ITS ROLE IN AGRICULTURAL DEVELOPMENT	22
2.1 Introduction.....	22
2.2 Improving smallholder agriculture: some theoretical debates.....	23
2.2.1 The principal challenges confronting smallholder agriculture.....	24
2.2.2 Strategies for improving smallholder agriculture.....	26
2.3 The theory of collective action.....	29
2.4 The role of FBOs in agricultural development.....	33
2.4.1 Providing internal services to their members.....	34
2.4.2 Improving their members' access to external services.....	35
2.4.3 Representing the interest of farmers in policymaking and implementation.....	37
2.4.4 Providing services to the larger community.....	38
2.4.5 Summary.....	38
2.5 Factors that influence rural collective action in FBOs.....	39
2.5.1 The purpose and how FBOs are formed.....	39
2.5.2 Governance and managerial capacities of FBOs.....	40
2.5.3 The membership characteristics of FBOs.....	43

2.5.4 The interactions of FBOs with their external environment	46
2.5.5 Summary	47
2.6 A conceptual framework for understanding collective action among smallholder farmers	47
2.6.1 The environment.....	48
2.6.2 FBOs and their attributes.....	50
2.6.3 Key actors and their attributes	51
2.6.4 Outcome	52
2.6.5 Summary	53
2.7 Conclusion.....	53
CHAPTER THREE: THE RESEARCH METHODOLOGY AND METHODS.....	56
3.1 Introduction	56
3.2 The research design	57
3.3 The study sample	60
3.3.1 The sample of smallholder farmers	61
3.3.2 The sample of government and NGO officials	67
3.4 Methods of data collection	69
3.4.1 Questionnaires/surveys	71
3.4.2 Semi-structured interviews.....	73
3.4.3 Participant observation.....	75
3.4.4 Secondary sources	76
3.5 Data analysis	77
3.5.1 Quantitative analysis.....	78
3.5.2 Qualitative analysis	84
3.6 Conclusion.....	85
CHAPTER FOUR: UNDERSTANDING THE FORMATION, TYPES AND ACTIVITIES OF FBOs IN GHANA	86
4.1 Introduction	86
4.2 Defining the farmer-based organisation.....	86
4.3 Typologies of farmer-based organisations	88
4.3.1 Types of FBOs based on location	88
4.3.2 Types of FBOs based on legal status	93

4.3.3 Types of FBOs based on activity.....	97
4.4 The prevalence of village-level FBOs	100
4.4.1 Understanding the growth of FBOs in Ghana	104
4.4.2 Farmers’ perceived benefits of membership of FBOs	106
4.5 Participation and collective action in FBOs.....	109
4.5.1 Participating in FBOs	109
4.5.2 Collective activities in FBOs	120
4.6 Conclusion.....	124
CHAPTER FIVE: IMPROVING ACCESS TO EXTENSION SERVICES: DO FBOs MAKE A DIFFERENCE?	
.....	126
5.1 Introduction	126
5.2 Approaches to the delivery of extension services in Ghana: some established facts	127
5.3 Delivering extension services through FBOs.....	130
5.3.1 The roles of agricultural extension agents.....	130
5.3.2 How are extension services delivered in FBOs?	131
5.3.3 Technologies promoted to farmers	136
5.4 Smallholders’ access to extension services.....	139
5.4.1 A measure of accessing extension services: do FBOs count?	140
5.4.2 Does membership of an FBO guarantee equal access to AEA visits?	148
5.4.3 Determinants of accessing extension services: do they go beyond the existence of FBOs?	151
5.4.4 Accessing extension services in FBOs: what are the impediments?.....	160
5.5 Conclusions	166
CHAPTER SIX: PROMOTING ACCESS TO INPUTS AND ADOPTION OF TECHNOLOGY: THE ROLE OF FBOs	172
6.1 Introduction	172
6.2 The role of farm inputs in productivity	173
6.3 Accessing inputs among smallholder farmers	178
6.3.1 Collective purchase of inputs in FBOs.....	179
6.3.2 Supporting FBOs with inputs	180
6.3.3 Inputs use among smallholder farmers: do FBOs make a difference?	182
6.4 Beyond FBOs: understanding the intensity of fertiliser and herbicide use	194

6.4.1 The intensity of fertiliser utilisation	194
6.4.2 The intensity of herbicide use.....	199
6.5 Adoption of technology	201
6.5.1 Row planting	202
6.5.2 Recommended application of fertiliser	205
6.5.3 Recommended application of herbicide.....	209
6.6 Conclusion.....	210
CHAPTER SEVEN: THE ROLE OF FBOs IN THE PROVISION OF AGRICULTURAL CREDIT TO SMALLHOLDER FARMERS.....	216
7.1 Introduction	216
7.2 Sources of credit to smallholder farmers: an overview of rural financial structure in Ghana.....	217
7.3 Accessing credit among smallholder farmers.....	221
7.4 Do FBOs enhance smallholder farmers' access to credit?.....	224
7.5 Credit schemes with FBOs: what conditions make them successful?	229
7.5.1 Government credit schemes with FBOs.....	229
7.5.2 NGO credit program with FBOs	237
7.6 Conclusion.....	244
CHAPTER EIGHT: CONCLUSION: UNDERSTANDING THE EXTENT TO WHICH FBOs MAKE A DIFFERENCE AMONG SMALLHOLDER FARMERS.....	246
8.1 Introduction	246
8.2 Improving smallholders' access to extension services, inputs and credit: the role of FBOs	249
8.2.1 Improving access to extension services.....	250
8.2.2 Improving access to inputs	253
8.2.3 Improving adoption of technology	256
8.2.4 Improving access to credit	257
8.3 Theoretical and conceptual implications.....	261
8.3.1 Forming FBOs and nurturing their capacity for sustainable development.....	261
8.3.2 Does FBO membership size and composition matter?.....	264
8.4 Policy implications	267
8.5 Directions for future research and conclusions.....	270
REFERENCES.....	273

APPENDICES 291

LIST OF TABLES

Table		Page
3.1	The sample for smallholder farmers, using a multi-stage sampling procedure	63
3.2	The sample of smallholder farmers	67
3.3	The sample of government and NGO officials	68
3.4	The participants for the semi-structured interviews	74
3.5	Matched FBO members and non-members by region and district	81
3.6	Descriptive statistics of key variables for smallholder farmers in the reduced sample according to FBO members and non-members	83
4.1	FBO registration by different institutions	95
4.2	The regional distribution of FBOs according to two MOFA sources	102
4.3	Descriptive statistics on FBO savings	117
5.1	Smallholders' perspective on their frequency of access to extension services	141
5.2	Whether FBO non-members received extension services based on the type of community	142
5.3	Determinants of smallholder farmers' access to extension using binary logistic regression (Dep. Var.: Whether farmer received extension services)	143
5.4	The average number of AEA visits to farmers in a season, by region	145
5.5	The average number of AEA visits to farmers in a season, by FBO members and non-members	147
5.6	The average number of AEA visits to farmers in a season, by	150

	type of FBO member	
5.7	Descriptive statistics of selected variables for smallholder farmers, FBO members and FBO non-members	153
5.8	Determinants of access to extension services (OLS regression, Dep. Var.: number of AEA visits to farmers in a season)	156
6.1	The use of inputs based on membership of FBOs	185
6.2	Determinants of smallholder farmers' use of certified seeds using binary logistic regression (Dep. Var.: Whether farmer use certified seeds)	186
6.3	Determinants of smallholder farmers' use of fertilizer using binary logistic regression (Dep. Var.: Whether farmer use fertilizer)	189
6.4	Average quantities of inputs use per hectare, according to FBO members and non-members	190
6.5	Average prices of inputs according to membership of FBOs	191
6.6	Mean statistics of selected variables according to FBO members and non-members	195
6.7	Factors that influence intensification of fertiliser use (OLS regression, Dep. Var.: quantity of fertiliser (kilograms) per hectare)	198
6.8	Factors that influence intensification of herbicide use (OLS regression, Dep. Var.: quantity of herbicides (litres) per hectare)	200
6.9	Average numbers of bags (50 kilograms per bag) of fertiliser use per acre of maize farm, according to FBO membership	206
6.10	Average litres of herbicides used per acre of maize farm, according to FBO membership	209
7.1	The numbers of FBOs under the credit scheme of the Millennium Challenge Account Program, by region	231

LIST OF FIGURES

Figure		Page
2.1	A conceptual framework for understanding collective action in FBOs	48
3.1	The two study regions, out of the ten administrative regions of Ghana	62
3.2	The districts selected for the study	63
3.3	Map of Ghana showing the studied communities	64
3.4	The sampling strategy in each district	66
4.1	Types of FBOs according to geographical scope	89
4.2	The distribution of FBOs according to activity	99
4.3	The number of FBOs registered with the Department of Cooperatives, 2008–12	103
4.4	Actors supporting FBOs	105
4.5	Reasons for the establishment of FBOs	106
4.6	Reasons for becoming an FBO member	107
4.7	Who initiated the establishment of FBOs?	110
4.8	FBO leaders and their educational level	114

4.9	FBOs' sources of income	116
4.10	Collective activities in FBOs	121
5.1	The process of organising extension meetings	132
5.2	Where extension delivery with FBO members takes place	134
5.3	Farmers' perspective of the most frequent extension services (topics taught) that they receive	138
5.4	Average AEA visits to smallholder farmers by districts in one farming season in 2012	146
5.5	Whether an FBO participated in an extension meeting, by type of member, in one farming season in 2012	149
6.1	Average national maize productivity, 1992–2010	174
6.2	A passbook for the purchase of fertiliser	176
6.3	Types of external support that FBOs received	181
6.4	Types of external support that FBO members received	182
6.5	The use of inputs among smallholders	184
6.6	Plants planted in rows and farmers planting in rows	202
6.7	Practicing row planting	203
7.1	Sources of agricultural credit	220

7.2	Smallholder farmers' sources of credit	222
7.3	Comparing sources of credit between FBO members and non-members	226
7.4	Comparing reasons why FBO members and non-members have not accessed credit	229
7.5	Total credit disbursement and repayment for FBOs	231
7.6	Total credit disbursement and repayment for FBOs by region	232
7.7	The expected and actual recovery of in-kind credit to FBOs in the Northern Region for the 2010 farming season	233
7.8	The total credit disbursed and recovered from FBOs in the 2010 farming season under Presbyterian Mile7 credit program	239
7.9	The total credit disbursed and recovered from FBOs in the 2008–11 farming seasons under SEND FiNGO credit program	241
8.1	Access to extension services, fertiliser and credit	250

LIST OF BOXES

Box		Page
5.1	The diverse roles of agricultural extension agents	161
7.1	Understanding internal credit arrangements in FBOs: the case of Sugru Vella Farmers Group	225

LIST OF APPENDICES

Appendix	End of thesis appendices	Page
1	List of interviewees (government and NGO officials)	291
2.1	Survey for leaders of FBOs	293
2.2	Survey for ordinary members of FBOs	304
2.3	Survey for non-members of FBOs	312
3.1	Semi-structured interviews: interview schedule for leaders of FBOs	320
3.2	Semi-structured interviews: interview schedule for ordinary FBO members	324
3.3	Semi-structured interviews: interview schedule for FBO non-members	328
3.4	Semi-structured interviews: interview schedule for government/NGO officials	330
4	Propensity score matching analysis	333
5	Coding framework for qualitative data collected	334
End of chapters appendices		
5.1	Correlation matrix for regression and descriptive statistics (overall sample, 226 observations)	169
5.2	Correlation matrix for regression and descriptive statistics (FBO non-members sample, 106 observations)	170

5.3	Correlation matrix for regression and descriptive statistics (FBO members sample, 120 observations)	171
6.1	Correlation matrix for regression and descriptive statistics (overall sample, 226 observations)	214
6.2	Correlation matrix for regression and descriptive statistics (FBO members sample, 120 observations)	214
6.3	Correlation matrix for regression and descriptive statistics (FBO non-members sample, 106 observations)	215

LIST OF ABBREVIATIONS AND ACRONYMS

ACDEP	Association of Church Development Projects
ADB	Agricultural Development Bank
AEAs	Agricultural Extension Agents
AGRA	Alliance for a Green Revolution in Africa
AgSSIP	Agricultural Services Subsector Investment Program
BFP	Block Farms Program
DADU	District Agricultural Development Unit
DAES	Directorate of Agricultural Extension Services
DOC	Department of Cooperatives
FAO	Food and Agriculture Organization of the United Nations
FASDEP	Food and Agriculture Sector Development Policy
FBOs	Farmer-Based Organisations
FFS	Farmer Field School
FiNGO	Financial Non-Governmental Organisation
FSP	Fertiliser Subsidy Program
FSRPOP	Food Security and Rice Producers Organisation Project
GAFSP	Global Agricultural and Food Security Programme
GLSS5	Ghana Living Standard Survey 5
GOG	Government of Ghana
GSS	Ghana Statistical Service
HIV/AIDs	Human Immunodeficiency Virus Infection and Acquired Immune Deficiency Syndrome
ICA	International Cooperative Alliance

IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
ISSER	Institute of Statistical, Social, and Economic Research
JICA	Japan International Cooperation Agency
MASLOC	Microfinance and Small Loan Centre
MCC	Millennium Challenge Corporation
MOFA	Ministry of Food and Agriculture
NGOs	Non-Governmental Organisations
NILRIFACU	Northern Region Intensive Lowland Rice Farmers' Cooperative Union
NPK	Nitrogen Phosphorous Potassium
OLS	Ordinary Least Squares
PAS	The Presbyterian Mile 7 Agricultural Stations
PPP	People's Participation Program
PSM	Propensity Score Matching
RADU	Regional Agricultural Development Unit
RGD	Ghana Statistical Service
SEEPAG	Seed Production Association of Ghana
SEND	Social Enterprise Development Foundation
SSA	sub-Saharan Africa
T&T	Travel and Transportation
T&V	Training and Visit
TIPCEE	Trade and Investment Program for a Competitive Export Economy
UES	Unified Extension System
URADEP	Upper Region Agricultural Development Program

ABSTRACT

Recent years have witnessed renewed interest in farmer-based organisations (FBOs) as important local institutions for promoting smallholder agriculture and improving rural livelihoods. Many believe that the establishment of FBOs would, amongst other things, strengthen the ability of smallholder farmers to access agricultural services such as extension services and inputs, as well as reduce their risks and transaction costs of accessing these services. This thesis examines the extent to which FBOs improve smallholder farmers' access to extension services, inputs and credit in Ghana. Central to this thesis is to understand whether, and to what extent, smallholder farmers' participation in FBOs improves their access to extension services, inputs and credit, with special attention to understanding the factors that shape their performance in this process.

The study employs a mixed-methods approach to data collection and analysis. The data collection involved structured questionnaires to 240 smallholder farmers; semi-structure interviews with 90 smallholder farmers, 12 government officials and four NGO officials. It also used a variety of secondary sources, such as documentation from FBOs, survey data, and project data from government agencies and NGOs. The data analysis utilised both quantitative and qualitative approaches, namely descriptive and inferential statistics, thematic analysis and descriptions.

The analysis in the thesis shows that while smallholder farmers' participation in FBOs improves their access to extension services, inputs and credit, their access to these services is on a limited basis. The thesis argues that the limited roles that FBOs play in improving smallholder farmers' access to extension services, inputs and credit relate largely to their governance and management structure and their internal collective capabilities, as well as the smallholder farmers' motivations for participating in the FBOs. The study argues that when external institutions (e.g. government and NGOs) do not invest in building FBOs' organisational structure and leadership capacities, the results are FBOs that are passive and have weak leadership with regard to mobilising their members for the purpose of accessing agricultural services. Contrary to the empirical and theoretical arguments that FBOs and related organisations with

homogenous and small memberships should have a positive collective outcome, this thesis argues that collective activities will remain limited in FBOs if their leaders do not have the experience and skills to mobilise their members for such activities. Developing sound organisational structures, such as suitable rules and regulations, would contribute to ensuring that FBOs invest time and resources into collective activities, such investment is a significant factor in their success.

CHAPTER ONE

INTRODUCTION

1.1 Setting the context: the research problem

Agricultural growth is recognised as crucial for fuelling economic growth, alleviating poverty and ensuring food security in many developing countries (World Bank 2007; Chang 2012; Hazell & Rahman 2014).¹ In particular, improvements in smallholder agricultural productivity continue to be indicated as a key driver of poverty reduction in developing countries (Hazell & Rahman 2014; Carletto, Jolliffe & Banerjee 2015).² This recognition is even more important for the majority of countries in sub-Saharan Africa (SSA), where smallholder agriculture is the main economic activity for the majority of the population.

This is the clear case for Ghana, where about 54% of the country's population is involved in agriculture (Ghana Statistical Service (GSS) 2013) and agriculture accounts for about 22% of national gross domestic product (Institute of Statistical Social and Economic Research (ISSER) 2013). Agriculture in Ghana is predominantly smallholder-based and rain-fed, with more than 60% of farm holders cultivating less than 1.2 hectares, 25% between 1.2 and 2 hectares, and only 15% cultivating more than 2 hectares (Owusu-Baah 2012). Another study estimates that about 90% of the farm holdings in the country are less than 2 hectares in size (World Bank and IFPRI 2010). Not surprisingly, smallholder farmers produce about 80% of Ghana's total agricultural

¹ For example, the 2008 World Development Report renewed policy attention with regard to the role of smallholder farmers as agents of poverty reduction when it stated that agricultural growth is 'vital for stimulating growth in other parts of the economy and smallholder farmers are at the center of this strategy' (World Bank 2007, p. xiii).

² Although there is no conceptually clear way to define smallholder agriculture, it often refers to the type of agriculture in which the farmers have limited physical resources – that is, the land or animals they manage – and operational resources; that is, the resources available to manage the land or animals (Tinsley 2004). Smallholder farmers operate with a low asset base, usually less than 2 hectares of cropland (World Bank 2003), and they have limited resource endowments, relative to other farmers in the sector (Dixon *et al.* 2004).

output (Ministry of Food and Agriculture (MOFA) 2011), such that their performance has crucial implications for overall agricultural development in the country.

This thesis focuses on smallholder farmers because of their dominance in Ghanaian agriculture and the belief that smallholder farmers are ‘game changers’ in the country’s agricultural sector (Government of Ghana (GOG) 2007; MOFA 2011).³ The current Food and Agriculture Sector Development Policy (FASDEP II) of the Government of Ghana, developed in 2007 to guide development and interventions in the agriculture sector, in fact also recognises that smallholder ‘agriculture is expected to lead the growth and structural transformation of the [Ghanaian] economy’ (GOG 2007, p. 21).

In spite of the significance of smallholder agriculture in overall agricultural development, two key related factors – that is, agricultural growth driven by land expansion and smallholder farmers’ inadequate access to essential agricultural services – limit its sustainability and compromise the overall development opportunities that agriculture holds for Ghana’s economy. The first relates to the fact that, as in many countries in SSA, agricultural growth in Ghana over the years has been mainly driven by land expansion rather than improvements in the productivity of current smallholder farming land (Breisinger *et al.* 2012). Between 1994 and 2006, for example, total cultivated land expanded by 60%; that is, from 4.5 million hectares in 1994 to 7.2 million hectares in 2006 (Breisinger *et al.* 2012). As a consequence of prioritising expansion over productivity, the yields of most crops are still far below their potentials, largely because the adoption of modern technology such as fertiliser and high-yielding planting materials in agricultural production in the country is still extremely low (Breisinger *et al.* 2012). Fertiliser usage in the country, for example, averaged about 34,000 metric tonnes per annum between 1994 and 2004 (Asuming-Brempong, Sarpong & Asante 2005) with a current national average rate of 8 kilograms per hectare (kg/ha), which is one of the lowest in SSA (Benin *et al.* 2013).

³ To accommodate a variety of smallholder farmers, this study included farmers with up to 5 hectares of land under cultivation as smallholder farmers.

It is also problematic when land expansion drives agricultural growth because this may not be environmentally sustainable. Indeed, the available evidence already indicates that due to population growth and urbanisation, agricultural growth through land expansion has slowed down in recent years, particularly in Southern Ghana, where agricultural land is becoming relatively scarce (Breisinger *et al.* 2012).⁴ A more sustainable approach to the development of smallholder agriculture is productivity-led growth; that is, increasing yields of existing agricultural land using appropriate agricultural technologies such as improved seeds, fertilisers and agrochemicals.⁵ Fundamental to improving productivity-led smallholder agricultural growth, however, is the existence of effective agricultural extension services that facilitate smallholder farmers' access to, and use of, technologies as well as farm inputs such as new crop varieties and fertiliser (Norton 2004; Chang 2012; Diao *et al.* 2013).⁶

The linking of improved agricultural productivity with extension services is also identified by the Ghanaian government's agricultural policy. Here, the FASDEP II espouses two key strategies that support productivity-led growth rather than growth driven by land expansion: (1) enhancing smallholder farmers' access to extension services to improve their uptake of improved farming technologies; and (2) facilitating smallholder farmers' access to inputs such as improved seed varieties, fertiliser and agrochemicals, as well as credit (GOG 2007).

The need for effective agricultural extension services, inputs and credit, however, leads us to the second key limitation of smallholder agriculture in Ghana, which is that smallholder farmers experience limited access to support services such as inputs and extension services. Smallholder farmers are not only large in number but they are also

⁴ According the 2010 population census, Ghana's population grew from 18.9 million in 2000 to 24.6 million in 2010.

⁵ Of course, other factors, which are mostly beyond farmers' control, may determine agricultural productivity; for example, climate or weather.

⁶ In this study, agricultural extension services refer mainly to advice on improved and proven agricultural technologies and practices, and input is used to refer largely to improved seeds, fertiliser, agrochemicals and credit to smallholders

geographically dispersed and are therefore constrained in accessing extension services and inputs. Because of their scale of operations, governments and other development agencies with limited resources find it difficult to improve their access to extension services, inputs and credit. For instance, the Directorate of Agricultural Extension Services, the government agency directly responsible for the delivery of agricultural extension services, estimates that there are about 2,500 farmers per extension worker, a ratio considered very high for an extension worker to handle (Chang 2012). Yet, it is important to reach as many smallholder farmers as possible, because the challenges they face are growing more difficult (Collier & Dercon 2014).

To address the above challenges, FASDEP II identified the need to organise smallholder farmers into groups (referred to as farmer-based organisations (FBOs)) with the view that providers of extension services with limited resources can reach out to a large number of smallholder farmers; such groups will also equip smallholder farmers to demand extension services (GOG 2007).⁷ In addition, it notes that the provision of inputs by government, non-governmental organisations (NGOs) and private-sector organisations is easier when smallholder farmers are in organised groups (GOG 2007). Similarly, in regard to credit, FASDEP II recognised that individual smallholder farmers find it extremely difficult to access financial credit partly because of the risky nature of their farming and their lack of capital assets for collateral. To this end, FASDEP II noted that organising smallholder farmers into groups will serve as collateral for them to access credit and improve credit recovery through peer pressure (GOG 2007).

The recognition of FBOs as crucial for improving smallholder agriculture has recently received global attention and is not limited to just Ghana (Rondot & Collion 2001; Stockbridge, Dorward & Kydd 2003; World Bank 2007; Bernard *et al.* 2008; Hazell & Rahman 2014). Many have argued that when effectively established in a country, FBOs – particularly those that operate at the local level – will:

⁷ It uses FBO as an umbrella term to denote farmer groupings in all aspects of agricultural production, processing and marketing.

- increase the ability of smallholders, through a collective voice, to demand agricultural services from service providers as well as serving as channels for improving the delivery of rural and public services to smallholders (Stockbridge, Dorward & Kydd 2003; World Bank 2007);
- reduce smallholders' transaction costs of accessing inputs, market information, new technologies and the high-value market through collective actions (Hussein 2001; Shiferaw, Hellin & Muricho 2011; Gollin 2014);
- enable smallholders to gain a stronger voice to advance their interests in both policymaking and the market through collective action (Hussein 2001; World Bank 2007); and
- provide smallholders with collateral to access credit facilities and give them opportunities for income generation through microfinance schemes (World Bank 2007).

As a consequence, today, many governments, donors, NGOs and private individuals invest in the development of FBOs to provide goods and services to smallholder farmers more effectively, as well as to encourage collective activities among smallholder farmers (Bernard *et al.* 2008; Salifu, Francesconi & Kolavalli 2010).

Between 2000 and 2012, for instance, the Ghanaian government implemented two key agricultural projects that placed strong emphasis on the establishment and strengthening of FBOs to improve the smallholder agricultural sector. The first was the World Bank sponsored Agricultural Services Subsector Investment Program (AgSSIP, implemented between 2000 and 2007) that supported 'the development of FBOs to allow them to play a major role in shaping agricultural policy, providing services to farmers and in engaging in export activities' (AgSSIP 2007, p. 15). At the end of AgSSIP, the World Bank invested more than US\$9 million in the establishment of FBOs and supported them with leadership and technical training, farm implements, credit and agro-processing equipment, amongst other things (AgSSIP 2007).

The second project was the Millennium Challenge Account program, the United States' Millennium Challenge Corporation (MCC) sponsored program, implemented from 2007 to 2012.⁸ By the end of the Millennium Challenge Account program, approximately 1,200 FBOs had received support ranging from training in agricultural technologies, seeds and fertiliser to the provision of credit (ISSER 2012). Salifu and colleagues provide a list of more than a dozen projects implemented by government, donors and NGOs in pursuance of the development of FBOs and smallholder agriculture (Salifu, Francesconi & Kolavalli 2010).

In spite of the huge investments made to develop FBOs as important institutions for improving the productivity of smallholder agriculture in Ghana and many developing countries, it remains largely unclear whether FBOs make a significant difference to smallholder agriculture, especially with regard to the extent to which they improve smallholder farmers' access to extension services, inputs and credit. In the case of Ghana, the few available studies on FBOs focus on their characteristics and internal collective activities, such as joint production and joint marketing of farm produce (Amezah & Dormon 2004; Salifu, Francesconi & Kolavalli 2010; Francesconi & Wouterse 2011; Salifu *et al.* 2012). An overarching conclusion of these studies is that FBOs are largely inactive and have less capacity to mobilise their members for internal collective activities because the members perceive them largely as institutions to receive external support such as grants and credit (Amezah & Dormon 2004; Salifu, Francesconi & Kolavalli 2010; Francesconi & Wouterse 2011; Salifu *et al.* 2012). However, many of these studies fail to provide detailed diagnoses of their claims, as well as neglecting to consider the extent to which FBOs improve smallholder farmers' access to extension services, inputs and credit, which are critical for improved productivity.⁹ Yet, there is a

⁸ An amount of US\$547 million was approved for the Millennium Challenge Account program and about 39% of this amount was used to promote agricultural growth.

⁹ For example, it is not clear how Amezah and Dormon (2004) arrived at the conclusion that Ghanaian FBOs are inactive, as their paper failed to present a clear methodology. Salifu *et al.* (2010) based their conclusion on a review of the literature and interviews with 17 FBOs in Ghana.

growing need for evidence on the nature of successful FBOs in the development of smallholder agriculture as well as their shortcomings.

This thesis therefore sets out to deepen our understanding of the roles and capacities of FBOs in improving their members' access to extension services, inputs and credit, with Ghana as the focus. In particular, it highlights key factors that shape the roles of FBOs in improving their members' access to these essential agricultural services. The aim and research questions of this thesis are outlined in the section that follows. After identifying the research aim and questions, the next two sections provide a brief history of the development of FBOs in Ghana and a rapid review to situate the study in the broad literature.

1.2 The research aim and questions

Informed by the notion that improved knowledge of and access to agricultural technologies (extension services), inputs (e.g. seeds and fertiliser) and credit play important roles in improving the overall productivity of smallholder agriculture, this study is concerned with the role that FBOs play in this process and intends to subject FBOs to close critical scrutiny. To that end, using a collective action approach, the main aim of the research is as follows:

To explore the extent to which FBOs play a role in improving smallholder farmers' access to extension services (and in doing so improving their knowledge and application of agricultural technology), access to inputs (seeds, fertiliser and agrochemicals) and credit.

To achieve this aim, the following key questions are examined:

- Does membership of FBOs improve access to extension services, inputs and credit?
 - If so, what are the factors and/or features of FBOs that enable this?

- If not, what are the impediments and barriers (structural, cultural and institutional) faced by FBOs in enabling members to access extension services, inputs and credit?
- What could be done by the relevant stakeholders (e.g. government, farmers and NGOs) to resolve these impediments and remove barriers?

1.3 Farmer-based organisations in Ghana

The recognition of FBOs as important agents for agricultural development is not a recent phenomenon in Ghana. It dates back to the colonial period, particularly in the 1920s, when the colonial authority introduced agricultural cooperatives into the cocoa sector.¹⁰ The British colonial government introduced agricultural cooperatives as a mechanism for organising smallholder cocoa producers into clusters to facilitate the transfer of technology, credit and the marketing of the cocoa beans in the most cost-effective way (DeGraft-Johnson 1958; Hussi, Lindberg & Brennerman 1993). Although agricultural cooperatives were later expanded to the production of food crops in the pre-independence era (before 1957) as a ‘means of increasing productivity and improving the marketing of farm products’ (Miracle & Seidman 1968, p. 3), it is reported that their impact on productivity at the national scale was not significant (Miracle & Seidman 1968; (Department of Cooperatives (DOC) 1995).¹¹ While little research has been conducted to understand why agricultural cooperatives failed to make a significant impact on food crop productivity during the pre-independence period, a report by Miracle and Seidman (1968) on cooperatives in Ghana between 1951 and 1965 noted

¹⁰ According to the International Cooperative Alliance (ICA), a cooperative is a type of organisation owned and run by a group of individuals for their mutual benefit. The ICA has defined cooperatives as autonomous associations of persons getting together voluntarily to meet their common economic, social and cultural needs and aspirations through jointly owned and democratically controlled organisations. For details, see <http://ica.coop/en/whats-co-op/co-operative-identity-values-principles>

¹¹ The formation of such cooperatives was far more than just improving productivity. For example, a yam producer’s cooperative formed in Attabubu in Northern Ashanti in the early 1940s was primarily set up under a contract to market the surplus produce of members of the army during the Second World War; the cooperative disintegrated rapidly when the contracts terminated at the end of the war (Miracle & Seidman 1968).

that the cooperatives in general failed to expand the output of farmers more rapidly for the following reasons:

- the cooperatives established in Ghana were not ‘true cooperatives’, and standardised uniform methods of operation were completely absent;
- the officers responsible for the development of cooperatives appeared to be uninformed on proper farming methods and cooperative practices;
- cooperatives were often forced on farmers by the government, rather than being formed based on farmers’ own interests; and
- the farmers in the country were highly individualistic and did not like working together (Miracle & Seidman 1968).

Nevertheless, following Ghana’s independence in 1957, agricultural cooperatives continued to be promoted as preferential channels for the provision of credit, the distribution of agricultural inputs and the marketing of farm produce among farmers, especially those in the cocoa sector, as part of the wider agricultural policies of the new sovereign government. However, turbulent political changes appear to have affected the roles and performance of agricultural cooperatives in agriculture development during the post-independent period. For instance, the first sovereign government (led by President Kwame Nkrumah) supported agricultural cooperatives for a short period, but by 1961 it had dissolved all cooperatives because of distrust in their operations; their assets were confiscated and put under the control of a government agency (Young, Sherman & Rose 1981). This suggests that agricultural cooperatives started as a popular movement and ended up as parastatal instruments.

After the overthrow of the Nkrumah-led government in 1966, distortions in government due to frequent *coups d’états* between 1966 and 1981 also affected agricultural-sector policymaking, and as a result there were no clear policies promoting the role of agricultural cooperatives in agricultural development during this period. Nonetheless, the 1972–8 government (led by I.K. Acheampong) focused agricultural development

towards smallholder farmers, with some projects implemented through small informal farmer groups. For instance, in 1976, a World Bank–sponsored program, the Upper Region Agricultural Development Program (URADEP), helped smallholder farmers with credit, seeds and fertiliser through farmer service centres. The URADEP encountered difficulties and only gained momentum after smallholder farmers were put into groups to access those services (Jiggins 1979; Akoto 1987).

While Ghana had a stable government from 1981 to the late 1990s, the development of agricultural cooperatives and other FBOs did not feature strongly in any development policy of the Ghanaian government except for a few projects implemented by NGOs.¹² For example, the Food and Agriculture Organization (FAO) sponsored the People’s Participation Program (PPP), which supported the formation of small, informal and homogeneous groups that engaged in income-generating activities, and served as useful channels for the delivery of development inputs and services to farmers (Oakley 1991).

Structural adjustment reforms towards market liberalisation in the 1980s and 1990s in SSA led to the dissolution of most state-controlled agricultural cooperatives in many countries, including Ghana (Onumah *et al.* 2007), and there were calls for more independent and business-oriented FBOs (Hussi, Lindberg & Brennerman 1993; Onumah *et al.* 2007). By the end of the 1990s, many state-controlled agricultural cooperatives had become inactive and were not visible in agricultural activities in Ghana.

One can argue that due to the increased calls for independent and business-oriented FBOs in developing countries,¹³ Ghana witnessed the establishment of somewhat autonomous FBOs (their establishment is discussed in Chapter 4) at the beginning of the twenty-first century. In 2010, Salifu and colleagues estimated the number of FBOs in

¹² In this study, I used NGOs under the umbrella of Civil Society Organisations to refer to highly institutionalised non-profit organisations that operate at the local, national or international levels to provide a variety of services to farmers, including but not limited to extension services, inputs and credit.

¹³ These calls are still ongoing; the year 2012 was declared by the United Nations as the International Year of Cooperatives, recognising that cooperatives, in their various forms, promote the participation of people in economic and social development, which can contribute to poverty reduction, employment generation and social integration.

Ghana at around 10,000 (Salifu, Francesconi & Kolavalli 2010). As I will examine later in this thesis, these FBOs have emerged in Ghana in different forms: some have emerged under government initiatives; others have been set up through NGOs, donors and private individuals, as well as farmers themselves. FBOs also differ in scale (local, regional and national); that is, they are formed at the village, district, regional and national levels. It is useful to mention here that this thesis focuses on FBOs at the local or village level.

I now turn to providing a rapid review to situate this study in the broad extant literature, followed by a brief examination of the role of FBOs in agricultural development in developing countries, highlighting knowledge gaps and thereby providing a clear justification for this study in terms of both theory and practice.

1.4 Theoretical perspectives on the roles of FBOs in smallholder agriculture

The understanding of the roles and impact of FBOs on smallholder agriculture, such as the extent to which they improve their members' access to inputs and outputs markets,¹⁴ has been studied and interpreted through multiple but interrelated theoretical perspectives such as collective action, participatory development and transaction cost theories (Uphoff & Wijararatna 2000; Hellin, Lundy & Meijer 2009; Shiferaw, Hellin & Muricho 2011). While Chapter 2 of this thesis discusses in detail the main theoretical strands that inform and guide this study, a brief review of the collective action theory is important here to situate this study.

Collective action refers to any goal-directed activity engaged in jointly by two or more individuals (Snow, Soule & Kriesi 2004), or action taken by a group in pursuit of the members' perceived shared interests (Marshall 1998). The theory on collective action has evolved significantly over the past four decades, particularly since the publication of

¹⁴ The inputs market here denotes acquisition of extension services, credit and farm inputs such as fertiliser and seeds, while the outputs markets denotes the sale of farm produce.

Garret Hardin's *The Tragedy of the Commons* (Hardin 1968)¹⁵ and Mancur Olson's *The Logic of Collective Action* (Olson 1965). The evolution of the theory has emphasised three main elements as necessary for effective collective action: a group of people, a shared interest within the group and some kind of common action that works in pursuit of that shared interest (Meinzen-Dick, DiGregorio & McCarthy 2004).

In the development studies and development economics literature, collective action has been widely recognised as a force for rural development and has been applied to a wide range of fields of studies, such as agriculture and natural resource development, health, education and governance. In the field of natural resource management in particular, it has been applied to the study of common-pool resources such as forests, fisheries and irrigation schemes (Ostrom 2000; Meinzen-Dick *et al.* 2004). The central argument in this field has been that the overuse of common-pool resources such as forests and fisheries creates sustainability problems, which can be resolved only when users act collectively. Researchers in this field have therefore concentrated on understanding under what conditions collective action is effective in the sustainable management of common-pool resources. A dominant view has been that the success of collective action among users of common-pool resources depends on how their organisations (groups) are designed; that is, the way they build agreements and rules that control their use of the resources (Olson 1965; Hardin 1968; Taylor 1987; Ostrom 1990; Ostrom & Varughese 2001; Agrawal 2002).

Similarly, the role of collective action in agriculture production has also received some research attention (see, e.g., Stringfellow *et al.* 1997; Stockbridge, Dorward & Kydd 2003; World Bank 2007; Bernard *et al.* 2008). Here, the central theoretical assumption has been that collective action through FBOs provides farmers the opportunity to cooperate and/or invest in institution building to improve their access to the inputs and

¹⁵ Hardin (1968) referred to the "tragedy of the commons" as the problem that common-pool resources, such as oceans, lakes, forests, irrigation systems and grazing lands, can easily be overused or destroyed if property rights to these resources are not well defined.

outputs markets, such as collective marketing of agricultural goods, and increasing access to external credit and knowledge (Stockbridge, Dorward & Kydd 2003; Dorward *et al.* 2004; World Bank 2007). One main argument is that individual farmers' transaction costs¹⁶ of accessing inputs (e.g. seeds, fertiliser) and outputs (e.g. selling farm produce) markets are minimised as a result of economies of scale if they engage in collective action (Williamson & Masten 1995; Markelova *et al.* 2009). This line of theoretical argument has been analysed from two key perspectives.

First, when governments, donors and other NGOs deliver services to farmers in groups, they are likely to reduce their operational costs as well as ensure mutual transparency and accountability (Uphoff 1991; Uphoff & Wijararatna 2000; World Bank 2007). Second, the participation of smallholder farmers and the disadvantaged in collective activities empowers them to learn, take ownership of policies and build social capital to act collectively to their advantage (Chambers 1983; Pretty 1995; Mansuri & Rao 2004).

However, in both common-pool resource management and agricultural production, there are still ongoing debates among researchers about the suitability of collectively based approaches and the conditions under which they promote sustainable development. First, questions remain as to whether membership in groups necessarily serves the interests of their members, especially if they are externally driven. This is particularly the case when governments, donors and NGOs set up FBOs to meet their predetermined goals in projects (Hussi, Lindberg & Brenneman 1993; Rondot & Collion 2001). Such FBOs often do not survive beyond the projects' life span, particularly when they are set up hastily, with little reference to the underlying patterns of the social, cultural and economic conditions of the people (Stringfellow *et al.* 1997). FBOs that rely solely on external agents to act collectively are likely to cease operation once the flow of resources is discontinued (Uphoff 1991). Similarly, in their work on organisational life cycles, Cook and Chambers (2007) suggested that FBOs are likely to be short-lived,

¹⁶ Transaction costs are the observable and unobservable costs of market exchange at any given time (Williamson & Masten 1995).

especially when they are formed to pursue ‘defensive’ purposes rather than ‘offensive’ purposes. They explained that defensive organisations are those that rely largely on external support for their activities, while offensive organisations rely heavily on internal investment and resources for collective activities (Cook & Chambers 2007).

Second, the theoretical assumption that with a common interest, rational members will act to promote those interests has been challenged in the literature. Olson (1965) has been influential in the debate and, as he argued, individual rationality does not provide a sufficient basis for collective action in groups. The size of the group and the membership composition have also come up strongly as important factors that influence the performance of collective action in membership organisations (Olson 1965; Rondot & Collion 2001; Kaganzi *et al.* 2009). For instance, it has often been argued that collective action in groups is more effective if the number of individuals in a group is quite small, the group members are homogeneous and there is some level of coercion to make individuals act in their common interest (Olson 1965; Ostrom 1990). Regarding the relation between the group’s size and its performance, there is still little consensus on what constitutes a small or large group.

Third, successful collective action in groups such as FBOs has been associated with the managerial capacities and governance styles of the groups (Ostrom 1990; Ostrom & Varughese 2001; Bernard *et al.* 2008). The creation of ‘paper-based’ FBOs – in the name of employing participatory approaches in their projects – that do not have the capacity to act collectively has been documented (Cooke & Kothari 2001; Upton 2008). When little effort is put into building the skills, interests and capacity of local people, they may have no stake in maintaining organisational structures and activities beyond the point at which the flow of resources stops (Pretty 1995; Cooke & Kothari 2001; Upton 2008). The success of collective action in FBOs is therefore undermined when governments, donors and NGOs fail to recognise that smallholder farmers lack the skills and experience to work collectively to achieve common interests (Stockbridge, Dorward & Kydd 2003). For instance, external agencies must not impose rules about FBO

governance on local people; rather, they must help the local people to develop their own rules. In her extensive research on irrigation systems, for example, Ostrom found that rules crafted by farmers themselves are better understood and adapted more easily than those imposed by external agencies (Ostrom 1990, 1995). Participation in groups therefore thrives better if external agencies provide an enabling framework for collective activities to take place (Pretty 1995; Pretty & Ward 2001).

The main point worth noting in the above theoretical review is that the success of collective action in FBOs depends on a variety of factors. Key among these factors is the way in which FBOs are set up, especially the way rules and agreements are crafted and enforced to regulate collective activities. Their ability to interact with the external environment, such as government agencies, donors, NGOs and private individuals, has also been widely acknowledged in the theoretical literature. However, the theoretical debates are yet to agree on the definitive list of conditions that are conducive for effective collective action in FBOs. In particular, the literature is inconclusive about how FBOs improve smallholder farmers' ability to work together to access services that are critical for improving their productivity. In the case of Ghana and other countries in SSA, few studies (see, e.g., Bratton 1986a; Bernard *et al.* 2008; Fischer & Qaim 2011) have contributed to the theoretical literature on whether FBOs have the capacity to mobilise smallholder farmers to access agricultural services as well as examining the factors that influence the effectiveness of FBOs in improving smallholder farmers' access to these services.

The next section reviews the role of FBOs in the development of smallholder agriculture, with a focus on key knowledge and research gaps in the literature, to provide a further justification for this study.

1.5 The roles and impact of FBOs on smallholder agriculture: evidence and knowledge gaps

Several studies have contributed to our understanding of the existence, characteristics, performance and benefits of FBOs in SSA to their members (Bernard *et al.* 2008;

Bernard & Spielman 2009; Shiferaw, Hellin & Muricho 2011; Fischer & Qaim 2011). However, the majority of the available studies in SSA are limited in many respects. First, their main focus has been to understand the characteristics of FBOs and the extent to which they improve their members' access to the outputs market; that is, easy access to the market to sell their produce as well as higher prices for their produce (Bernard *et al.* 2008; Bernard & Spielman 2009; Fischer & Qaim 2011; Shiferaw, Hellin & Muricho 2011). Many of these studies do not pay particular attention to the performance of FBOs regarding how they improve their members' access to the inputs market, such as acquiring access to extension services, credit, fertiliser and improved seeds. While there are only a small number of studies that offer detailed analyses about the extent to which FBOs improve their members' access to the inputs markets (see, e.g., Bratton 1986a,b),¹⁷ the studies tend to ignore the factors that enable or impede FBOs in improving their members' access to the inputs market (Moustier *et al.* 2010). This study addresses this knowledge limitation by examining the performance of FBOs in improving smallholder farmers' access to the inputs market as well as the factors that shape their performance.

Second, except a few studies such as Bratton (1986a) and Francesconi and Wouterse (2011), many studies have largely focused on smallholder farmers who produce commodities with a particular set of characteristics – high-value, exportable, perishable crops – to the neglect of those producing staple crops or cereals (see, e.g., Fischer & Qaim 2011; Shiferaw, Hellin & Muricho 2011). Yet, the majority of FBOs in SSA appear to have their members cultivating cereals as both food staples and tradable commodities – crops that are critical to the livelihoods of the vast majority of smallholders in the developing world (Bernard *et al.* 2010). It is therefore the goal of this study to increase our understanding of the role of FBOs in the production of cereals and other staple crops. This new focus of research will widen our empirical and theoretical

¹⁷ Bratton (1986a), for instance, studied the role of FBOs in food productivity in Zimbabwe and found that membership of FBOs is a major factor explaining the high level of agricultural extension agents contacting farmers.

understanding of the effectiveness of FBOs across a wide range of crops. In particular, the study seeks to improve our understanding of the ways we should govern FBOs under different circumstances to make them effective local organisations for smallholder farmers.

Third, many of these studies are often limited to a single high-value crop or to FBOs that have participated in a project or program within a very limited geographical location; for example, the study of banana smallholder farmers in Kenya (Fischer & Qaim 2011). While restricting the scope of a study to a crop, project or location may provide detailed results, it undermines any comparison of the performance of similar FBOs in different circumstances. Research that examines FBOs that cultivate different crops and that have participated in several projects is important, and is the focus of study. This study, for example, examines the performance of FBOs depending on whether they were set up by government or NGOs (see Chapter 7).

Finally, studies evaluating the impact or performance of FBOs are often limited to members of the organisation (see, e.g., Bernard *et al.* 2008). This study employed a more useful approach for evaluating the impact or performance of FBOs on their members by comparing FBO members with FBO non-members (see Chapter 3), although the selection of FBO non-members without any bias could be a challenging task (Bernard, Taffesse & Gabre-Madhin 2008). By comparing members of FBOs to carefully selected non-members, it is easier and more reliable to determine if FBOs significantly improve their members' access to services. This study employed this strategy, which is discussed in Chapter 3.

In summary, the above review shows that while there is substantial progress in research regarding our understanding of the role of FBOs in agricultural development, gaps remain. The review provides a compelling case for further research to understand the roles of FBOs and the extent of their effectiveness in improving smallholder farmers' access to extension services, inputs and credit. While there may be the need for further

research in this field in many countries in SSA, Ghana offers a compelling case, where there has not only been a renewed interest in FBOs to improve smallholder agriculture but also available evidence on the roles that FBOs play in this process is very limited.

This study responds to the above knowledge gaps in the literature of collective action on rural agricultural development by employing a mixed-methods approach to explore the extent to which FBOs make a difference regarding smallholder farmers' access to extension services, inputs and credit. The study utilised a cross-sectional survey design by first administering structured questionnaires to smallholder farmers (both FBO members and non-members) to measure whether membership of FBOs improves access to extension services, inputs and credit. Second, it conducted semi-structured qualitative interviews with some smallholder farmers, officials from government agencies and NGOs to understand the factors that enable or impede FBOs in improving smallholder farmers to extension services, inputs and credit. In addition to the structured questionnaires and semi-structured qualitative interviews, the study conducted a thorough analysis of documents collected from FBOs, government agencies and NGOs.

1.6 The argument of the thesis and an outline

This thesis shows that FBO membership does improve smallholder farmers' access to extension services, inputs and credit, although on a limited basis. It presents three main arguments to explain this limited role of FBOs. First, it argues that governmental agencies and NGOs pay insufficient attention to building the governance and management structures of FBOs, leading to weak leadership in FBOs, which cannot mobilise their members to either acquire and/or demand services. Second, it maintains that the way in which external institutions such as government agencies and NGOs set up FBOs creates the perception among smallholder farmers that FBOs are largely local institutions to receive 'handouts' such as inputs, grants and credit. As a consequence, smallholder farmers rarely view FBOs as organisations that can provide them with the opportunity to engage in collective activities that will provide benefits for members. Finally, it argues that the majority of the external agencies involved in the development

of FBOs fail to nurture them into stronger organisations through regular supervision and monitoring of their activities. I discuss these key arguments in detail in the remainder of the thesis, which is organised as follows.

Chapter 2 builds on the theoretical context already outlined above. It reviews the role and effectiveness of FBOs in improving rural and agricultural development in developing countries, with a focus on SSA. It outlines and discusses the key concepts associated with the broad theory of collective action, especially how these concepts have been used to analyse the effectiveness of collective action in rural agricultural development. Finally, it provides a detailed account of the conceptual and theoretical framework that guides this study.

Chapter 3 outlines the research design and the methods of the study. It begins with a justification of why a mixed-methods approach is the appropriate strategy to answer the research aim and questions of the study, and then outlines the mixed-methods approach.

Chapter 4 is the first of the four main empirical chapters of the thesis. It provides a background on FBOs and sets the stage to examine the questions of whether, and the extent to which, FBOs improve smallholder farmers' access to extension services, inputs and credit. In particular, it discusses the formation of FBOs and their types, as well as their functions and activities in Ghana. The chapter also examines the factors associated with smallholder farmers' participation in FBOs. The chapter shows that a variety of FBOs exist in Ghana, and that their number continues to grow, as both government and NGOs prefer to use them to implement their programs. The chapter argues that smallholder farmers largely perceive FBOs as local institutions through which government and NGOs deliver support to farmers, rather than institutions through which farmers can engage in collective activities to improve their access to inputs and outputs markets.

Chapter 5 recognises the existence of agricultural extension services as critical for agricultural growth among smallholder farmers and examines the degree to which FBOs

improve smallholder farmers' access to extension services. The chapter discusses key extension services offered to smallholder farmers and provides a critical comparison between FBO members and non-members regarding their access to these services. In addition, it discusses the factors that influence the role of FBOs in improving smallholder farmers' access to extension services. The chapter shows that membership of FBOs has had a rather limited impact on improving smallholder farmers' access to extension services. The chapter argues that the limited role of FBOs in improving smallholder farmers' access to extension services is partly due to their weak capacity to demand extension services; their members' perception that FBOs are mainly institutions to access farm inputs and financial support; and the limited resources available to agricultural extension agents (AEAs) to organise regular extension meetings with FBOs.

Chapter 6 builds on the analysis in Chapter 5. It notes that smallholder farmers' access to extension services alone is not enough to ensure productivity-led agricultural growth. It argues that access to inputs such as fertiliser, seeds and herbicides are equally critical for the adoption of technology and smallholder farmers' productivity. The chapter therefore examines the extent to which FBOs are helping smallholder farmers to access these inputs. It also examines whether FBO membership improves the adoption of extension technologies by smallholder farmers. The analysis shows that the majority of FBOs do not have the capacity to purchase inputs collectively. Rather, they largely serve as targeted local institutions for external agencies to implement their projects and programs, through which they provide irregular and limited inputs to smallholder farmers. The chapter shows that the input intensity of smallholder farmers is below optimal levels largely due to their limited access to financial resources.

Chapter 7 recognises that the availability of financial resources is crucial for smallholder farmers to intensify their use of inputs such as fertiliser, seeds and herbicides. The chapter examines smallholder farmers' access to credit, particularly the extent to which FBO membership improves their access to credit. The chapter explores the extent to which FBOs improve such access, and examines the conditions under

which FBOs improve credit delivery among smallholder farmers. Among other things, the chapter argues that the formation of FBOs to deliver credit to smallholder farmers alone would not guarantee improved credit delivery and loan repayment. It demonstrates that when FBOs have weak leadership and little in the way of collective activities, loan recovery requires effective participation of the loan providers in educating the FBO members, ensuring timely delivery of loans, supervising and monitoring loan use, and undertaking loan recovery itself.

Chapter 8 concludes the thesis. First, it synthesises the findings on the main research question of whether, and to what extent, FBOs improve smallholder farmers' access to extension services, inputs and credit. It also provides a summary of the implications of the findings to the broad theory of collective action in agriculture as well as policy – the best ways to govern FBOs in Ghana and many developing countries in SSA. It then concludes with possible directions for future research.

CHAPTER TWO

RURAL COLLECTIVE ACTION AND ITS ROLE IN AGRICULTURAL DEVELOPMENT

2.1 Introduction

Chapter 1 underscored the need for research to examine the extent to which farmer-based organisations (FBOs) improve smallholder farmers' access to extension services, inputs and credit as well as the overall development of smallholder agriculture in developing countries. It also highlighted briefly the theoretical context in which this study is conducted. This chapter builds on the theoretical context already outlined in Chapter 1. It begins with a review of key debates about the need to support smallholder agriculture for improved economic growth, poverty reduction and food security in developing countries. It then focuses on the variety of approaches that have been debated as important for improving smallholder agriculture. Here, the focus is on one approach that merits much greater consideration for the purpose of this study – the role of rural collective action through FBOs in improving smallholder agriculture. The chapter then discusses the main theoretical elements associated with the theory of collective action in the context of agricultural development.

In the second section, the chapter reviews current debates on the role of rural collective action in agricultural development in developing countries. Specifically, it examines empirical and theoretical arguments on the importance of rural collective action through FBOs in smallholder agricultural development. In this regard, it critically examines the conditions that facilitate or hinder rural collective action in FBOs, drawing on the literature of agriculture, natural resources management and community development. Finally, the chapter outlines a conceptual framework that guides the discussions and analyses in the remainder of the study.

2.2 Improving smallholder agriculture: some theoretical debates

As noted in Chapter 1, smallholder agriculture in developing countries, especially in sub-Saharan Africa (SSA) is increasingly recognised as critical for economic growth, poverty reduction and food security, as the majority of the people in these countries still depend on agriculture for their livelihood (World Bank 2007; International Fund for Agricultural Development (IFAD) 2010; Chang 2012; Hazell & Rahman 2014). There are arguments that smallholder agriculture may have to play a much greater role than it does today when it comes to feeding an estimated global population of over 9 billion by 2050 (Food and Agriculture Organization (FAO) 2009; Collier & Dercon 2014). This is particularly the case as much of this increase in population is expected to take place in developing countries (FAO 2009). As a consequence, recent global meetings have supported a need to improve smallholder agriculture in developing countries.¹⁸ The strong commitment to develop smallholder agriculture is often inspired by the fact that poverty is concentrated largely in rural areas among smallholder farmers, as well as the argument that growth among smallholder farmers has higher growth linkages in other sectors of an economy (Collier & Dercon 2014).

It is important to note that long before the global call to support smallholder agriculture, Karl Kautsky, in his work *The Agrarian Question*, published over a century ago, raised a question that is still debated in today's agricultural development in developing countries: is there a need and justification for agricultural policies that specifically support smallholder agriculture (Kautsky 1988 [1899])? In response to Kautsky, there have been recurring predictions in the literature that small farms, and by extension smallholder agriculture, are about to disappear (von Braun 2005). Some have viewed small farms as

¹⁸ For example, in 2008, the United Nations High-Level Task Force on Global Food Security Crisis produced the Comprehensive Framework for Action, which among other things recommended support to smallholder farmers in order to build resilient food systems among the poor (United Nations 2008). In addition, the 2009 G8 L'Aquila Food Security Initiative and the subsequent Global Agriculture and Food Security Programme emphasize improving smallholder agriculture in developing countries as part of the solution to feeding a growing global population. Again, in the May 2012 Camp David G8 Summit on Food Security, smallholder agriculture was at the centre of discussions and a number of pledges were made to support smallholder farmers in Africa through the World Bank's Global Agriculture and Food Security Programme (GAFSP) (Campbell, Watkins & Malumo 2012).

inefficient and an impediment to development, and have expressed a naive belief that large-scale mechanised farming necessarily means greater efficiency and productivity, which has led some policymakers to seek to merge small farms through land seizures (Hazell & Rahman 2014).

However, there are empirical arguments in favour of smallholder agriculture over large-scale production. A common one is the inverse productivity relationship argument; that is, yields or output per hectare are higher on smaller farms, compared with large farms (Collier & Dercon 2014). In addition, those who argue that smallholder farms are inefficient and will disappear fail to consider the enormous diversity of small-farm situations around the world today and the potential they have for overall agricultural development in developing countries (Hazell & Rahman 2014). Those arguing in favour of large-scale farms also do not suggest how a rapid exit from small farms could be managed without leading to a much larger number of smallholder farmers becoming trapped in abject poverty (Hazell & Rahman 2014).

In spite of the arguments against small farms, smallholder agriculture continues to dominate in many developing countries; and policies and investment designed to promote poverty reduction, economic growth and food security must be cognisant of the vast majority of smallholder farmers in developing countries (World Bank 2007; Hazell & Rahman 2014). Consequently, researchers, donors and policymakers are proposing a variety of strategies to improve smallholder agriculture in developing countries. Before I discuss some of these key strategies, though, it is important to first understand the principal challenges confronting the smallholder sector.

2.2.1 The principal challenges confronting smallholder agriculture

It is a well-known fact that the majority of the smallholder farmers in developing countries are poor and have limited capital (both cash and credit), and that their productivity levels are far below the optimum (Tinsley 2004; IFAD 2010). Several factors are associated with the poor performance of smallholder agriculture in many developing countries, including physical limitations, inappropriate policy and

institutional frameworks, technological constraints, unpredictable weather and climate change (World Bank 2007; Chang 2012).

First, smallholder farmers have limited access to physical assets and infrastructure such as land, irrigation systems, roads and communication networks (Stockbridge, Dorward & Kydd 2003). In relation to land, for example, there is a growing competition for land among smallholder farmers in many developing countries (IFAD 2010). Compared to other developing regions, SSA is largely regarded as a region with ample land, although smallholder farmers in SSA are often confronted with poor tenancy laws and land lease legislation (Stockbridge, Dorward & Kydd 2003; Jayne, Mather & Mghenyi 2010).

Second, smallholder farmers, especially those in remote areas, often have limited access to improved technologies and inputs (Narayanan & Gulati 2002; Norton 2004), although these technologies and inputs are crucial if they have to improve their productivity. Similarly, the transaction costs of acquiring these technologies and inputs as well as selling their produce is often high, partly because their operations are below optimum scale and they live far away from the inputs and technologies markets (IFAD 2001; von Braun 2005; Poulton, Dorward & Kydd 2010). Furthermore, they are not only far away from markets where they can sell their produce, but also these markets are unstable and unreliable (IFAD 2010).

Another challenge confronting smallholders that has been discussed extensively in the literature is limited access to credit (IFAD 2001; Stockbridge, Dorward & Kydd 2003; von Braun 2005, Chang 2012). Credit provision to smallholders has been one of the most important challenges facing policymakers in developing economies (Chang 2012), partly because smallholder agriculture involves a high level of risk and smallholder farmers lack assets that can serve as collateral to acquire credit from financial institutions (Tinsley 2004).

Furthermore, smallholder farmers are exposed to uninsured risks such as price volatility, conflicts, natural disasters and unpredictable weather conditions (World Bank 2007;

IFAD 2010). In particular, it is important to note again that smallholder agriculture in most developing countries is highly dependent on rainfall, which is now becoming more unpredictable due to climate change and global warming.

While the above discussion does not claim to be a comprehensive review of the challenges with which smallholder sector is confronted, the literature abounds with the key strategies and sets of policies necessary for overcoming these challenges and constraints (see, e.g., Birner & Resnick 2010; Chang 2012; Collier & Dercon 2014). Key debates regarding these strategies and policies are discussed below.

2.2.2 Strategies for improving smallholder agriculture

Although the literature informs us about a wide range of strategies and sets of policies for overcoming constraints in the smallholder agricultural sector, one can broadly organise them into four broad categories:

- strategies and policies for improving the overall environment in rural areas, such as infrastructure, social and economic services (modern inputs, credit and market services) and governance;
- strategies and policies for investing and providing new technologies through agricultural research;
- strategies and policies for investing in the education of people, especially the poor, to develop the skills they need to take advantage of economic opportunities; and
- strategies and policies for strengthening the *collective capabilities of smallholder farmers*, especially through the use of *membership-based organisations such as FBOs* (World Bank 2007; Birner & Resnick 2010; IFAD 2010; Chang 2012).

Indeed, in the mid-1960s, the ‘early green revolution’ countries such as India, Indonesia and the Philippines implemented most of these strategies and policies, which led to increases in the productivity of small farms (World Bank 2007, 2010; Birner & Resnick

2010).¹⁹ A common thread that runs through all the four broad issues mentioned above is that smallholder farmers should be assisted in developing systems that are sustainable, resilient, productive and profitable. This is because strategies that support the economic development of smallholder farmers have proven to be successful route to industrialisation in today's developed countries and the fast-growing Asian economies (Birner & Resnick 2010; Chang 2012).

Among the four strategies and policies outlined above, this study focuses on the last one, and examines whether FBOs improve smallholder farmers' access to extension services, inputs and credit, which are all critical for improving their productivity. Before I subject this fourth aspect to theoretical and empirical scrutiny, it is important to briefly review the first three strategies and policies.

The first approach relates to improving the environment of smallholder farmers through an increase in the quality and quantity of both public-sector and private-sector investment (World Bank 2007; IFAD 2010; Chang 2012). In this sense, the environment means that efficient public spending is needed in critical areas such as electricity, roads, irrigation, farm inputs, markets to sell produce, and radio, mobile phones and the internet for easy communication among farmers. The options often considered are mechanisation of farm operations, the use of productivity-enhancing inputs²⁰ and the provision of irrigation schemes (Tinsley 2004; IFAD 2010), as well as linking smallholder farmers to market information systems (World Bank 2007). The need to strengthen and expand financial services to provide credit for smallholder farmers, particularly those in rural areas, has also been highlighted (World Bank 2007; Poulton, Dorward & Kydd 2010).

¹⁹ Among others, these countries invested in agricultural research, extension and irrigation infrastructure, subsidised access to inputs, agricultural credit, price guarantees, and establishing and building the capacities of rural organisations such as FBOs (World Bank 2007; Birner & Resnick 2010; World Bank 2010).

²⁰ For example, there is also a renewed interest in providing free inputs and/or subsidies for smallholder farmers so as to encourage them to apply modern inputs on their farms (IFAD 2001; World Bank 2007).

The second broad approach for improving smallholder agriculture relates to the provision of new technologies to smallholder farmers based on agricultural research. It is argued that investments in agricultural research to produce new technologies must be at the top of the policy agenda in smallholder countries (World Bank 2007). The available evidence shows positive results for countries that have invested in agricultural research and development (World Bank 2007). For instance, a recent study conducted to evaluate 700 research and development projects in developing countries concludes that the low level of investment in research and development in SSA has partly contributed to stagnant cereal yields in the region and a wide yield gap when compared to the rest of the world (World Bank 2007, p. 165).

Third, there is the need to invest in the production capabilities of smallholder farmers (Atkinson 2006; World Bank 2007; Jayne, Mather & Mghenyi 2010). The key argument with this approach is to improve extension service delivery to smallholder farmers through collaboration among governments, NGOs and the private sector (IFAD 2001, 2010).

As already indicated, the fourth approach of strengthening the collective capabilities of smallholders through membership-based organisations is the focus of this research (World Bank 2007; Shiferaw, Hellin & Muricho 2011; Chang 2012). What makes this approach even more important is that it is crucial for the implementation of the other three approaches to smallholder agricultural development. For instance, collective action through FBOs has the potential to reduce the transaction costs of dealing with smallholder farmers, increase farmers' access to markets, and increase their representation in national and international policy forums, among others (Bernard *et al.* 2008; Bernard & Spielman 2009; Shiferaw, Hellin & Muricho 2011). Similarly, when investment in agricultural research leads to the production of new technologies, there must be a whole range of institutions and rural organisations such as FBOs to facilitate the delivery of such new technologies. It is therefore not surprising that the need for the establishment of FBOs has been finding its way into national development policy

documents in many developing countries in recent times (Bernard *et al.* 2008; Salifu, Francesconi & Kolavalli 2010; Salifu *et al.* 2012).

In the next section, I situate this approach of strengthening the collective capabilities of smallholder farmers in the broad literature of collective action to provide the theoretical and empirical foundations that inform this study.

2.3 The theory of collective action

As indicated in Chapter 1, understanding the extent to which smallholder farmers' collective capabilities (e.g. FBOs) improve their productivity has been studied and interpreted through multiple but interrelated theoretical perspectives. These varied but closely linked theories include collective action, participatory development, social capital and transaction costs.

In this study, I review these theoretical strands under the umbrella of 'the theory of collective action'. Chapter 1 has already laid the foundation for how the theory of collective action is understood and approached in this study. In particular, it highlighted how this theory has been applied in studies on agricultural development, with a central theoretical assumption that collective action allows farmers to cooperate in institution building to improve their access to the inputs and outputs markets (Stockbridge, Dorward & Kydd 2003; Dorward *et al.* 2004; World Bank 2007).

In the field of agriculture, the theory of collective action is intertwined with other theories, such that it is hard to make much progress in a study that employs collective action theory if one fails to conceptualise it in the proper context. In this study, the theory of collective action is used within the framework of the interrelated theories such as transaction costs, social capital and participatory development. It is therefore important to briefly explain these theories and how they are interrelated within the broad theory of collective action.

First, it is important to note that collective action takes place either through structures (e.g. FBOs) or not (e.g. a spontaneous response in a village through a meeting). This

study focuses on collective action in structures or organisations. It is much easier to notice collective action when it happens through organisations with clearly defined boundaries (Ostrom 1990). However, many rural organisations exist on paper only, and do not lead to collective action (Meinzen-Dick, DiGregorio & McCarthy 2004). In addition, in the field of agriculture, collective action in organisations takes many forms, including mobilisation of resources (e.g. new technologies, agrochemicals) and management of resources, such as irrigation schemes (Poteete & Ostrom 2004). This study largely understands collective action in the context of mobilisation of resources among smallholder farmers.

In relation to social capital, it refers to the norms, institutions and networks that enable collective action to take place (North 1990b; Ostrom 1990).²¹ Social capital can take two main forms: cognitive and structural (Upton 2008). While smallholder farmers with cognitive social capital are more likely to engage in voluntary collective action to improve their livelihoods, structural social capital facilitates collective action through mobilisation (Upton 2008). For example, when structural social capital in FBOs is high, the members will have the confidence to invest in collective activities to address their common needs (Ostrom 1995; Uphoff & Wijararatna 2000; Upton 2008). Narayan & Pritchett (1999), in their analysis of the importance of social capital in Tanzania regarding FBOs, conclude that ‘greater associational activity may lead to less “imperfect information” and hence lower transaction costs and a greater range of market transactions in outputs, credit, land, and labour, leading to higher incomes’ (Narayan & Pritchett 1999, p. 873). In spite of the positive role of social capital in collective action, others have argued that that unbalanced investment or overinvestment in social capital can transform a potentially productive activity into a liability (Gabbay & Leenders 1999).

²¹ Social capital may also be described as the trust and solidarity that exist between people who work in groups and networks, and the use of reciprocity and exchange to build relationships in order to achieve collective and mutually beneficial outcomes (Upton 2008).

Studies examining social capital in FBOs fall into two broad categories. The first focuses on the sites of the social interaction such as FBOs and their members' characteristics. The second concerns the underlying conditions in which social capital ensures effectiveness in FBOs, such as rules, cultural norms and the policy environment. This study examines social capital in both categories to understand how it influences smallholder farmers' access to goods and services.

As noted already, the transaction cost theory is another theoretical strand that is embedded in collective action theory. It has been argued that the individual cost of transactions is minimised through collective action in organisations (Williamson & Masten 1995).²² It is argued that effective organisational governance brings out economies of scale, which result in a reduction in external transaction costs (North 1990a; Markelova *et al.* 2009). To minimise their cost of delivering goods and services to smallholder farmers therefore, governments, NGOs and private-sector organisations prefer to work through FBOs (World Bank 2007), although FBOs may not necessarily serve the interests of their members, especially if they are externally driven. Similarly, through collective action smallholder farmers may reduce their transaction costs of acquiring goods and services. While minimising transaction costs through groups is a preferred development option, it is important to examine whether this approach always operates to the benefit of smallholder farmers who participate in FBOs.

The last theoretical strand mentioned above is participatory development. It is a development approach founded on the principles of empowering the poor and disadvantaged to act collectively, as well as mobilising ordinary people and stakeholders to take ownership of policies and projects (Chambers 1983; Pretty 1995; Cooke & Kothari 2001).²³

²² Transaction costs are the observable and unobservable costs of market exchange at any given time (Williamson & Masten 1995).

²³ The *Oxford English Dictionary* defines participation as 'to have a share in' or 'to take part in', thereby emphasising the rights of individuals to take part in development initiatives.

One can therefore identify two broad participatory approaches. First, it is a means of promoting efficiency, as people are more likely to agree with and support new development if they are involved in its design and implementation (Chambers 1983; Pretty 1995; Mansuri & Rao 2004). Second, it aims at mobilising people for collective action, empowerment and institution building (Pretty 1995; Dorward *et al.* 2004), which is the focus of this study.

It is argued that the second approach to participatory development will build and strengthen the capacity of the poor for successful collective action (Chambers 1983; Pretty 1995). There is therefore a link between participatory development and capacity building of FBO members. However, if little effort is put into building the skills, capacity and interests of the people, they may have no stake in maintaining organisational structures and activities beyond the point at which external support ends (Pretty 1995; Cooke & Kothari 2001; Upton 2008).

Participatory development also seeks to ensure efficiency and more cost-effective service delivery, as well as transparency and accountability among people (Dongier *et al.* 2002; Mansuri & Rao 2004). This approach to development holds that the failures of development initiatives in many developing countries can be explained by their top-down approach, and thus emphasises the need for bottom-up approaches (Chambers 1983; Escobar 1995; Scott 1998). However, Mansuri and Rao (2004) argue that when participatory approaches are public and open-ended regarding the target groups and the types of activity, they are likely to have a political character and may be shaped by local relations of power, authority and gender. In spite of these arguments, questions remain regarding the extent to which mobilising people for collective action in FBOs improves their members' access to goods and services.

The above review has shown that social capital enables collective action to take place as well as determining the quality of collective actions, and the fact that participatory development can empower is critical in galvanising the collective capabilities of

smallholder farmers, which also has a great potential for minimising their transaction costs.

The review has also shown that the theory of collective action is applicable to this study from at least three perspectives. The first relates to how we understand the conditions under which FBOs provide smallholder farmers with the confidence to invest in collective activities. The second relates to identifying the characteristics of FBOs, especially the extent to which they build and strengthen the capacity of smallholder farmers to engage in active collective activities. The final perspective has to do with showing the performance of FBOs and identifying the context in which they are likely to succeed, as well as the extent of their impact.

In the section that follows, I now focus on FBOs and critically review their role in agricultural development in developing countries.

2.4 The role of FBOs in agricultural development

This section reviews the theoretical and empirical debates on the role of FBOs in smallholder agriculture in developing countries. This is necessary as improving the collective capabilities of smallholder farmers through FBOs has been highlighted strongly as a key strategy to improve smallholder agriculture (see Section 2.2). A review of the roles of FBOs in smallholder agriculture can be approached from at least two perspectives. The first relates to the kind of agricultural activity they undertake; that is, whether the FBOs and their members engage in agricultural production, agro-processing, the marketing of agricultural produce, the provision or distribution of agricultural technologies, the financing of agricultural activities, or advocating for improved agricultural policies (Stockbridge, Dorward & Kydd 2003). The second approach concerns the functions of the FBOs; that is, whether they are performing economic functions, advocacy and policy formulation functions, local development functions, or coordination and information-sharing functions (Rondot & Collion 2001; Bosc *et al.* 2002). As this study aims at understanding the performance of FBOs in improving smallholder farmers' access to extension services, inputs and credit, the

review here adapts the second perspective and is conducted according to four major themes:

- providing internal services to their members;
- improving their members' access to external services;
- representing the interests of farmers in policymaking and implementation; and
- providing services to the larger community.

2.4.1 Providing internal services to their members

FBOs and their members undertake a variety of internal activities, such as joint production, joint processing, joint marketing and joint purchase of farm inputs (Rondot & Collion 2001; Bosc *et al.* 2002; Narayan, Pritchett & Kapoor 2009; Salifu, Francesconi & Kolavalli 2010, Salifu *et al.* 2012). The underlying argument for such joint activities is to reduce transaction costs and improve productivity and the livelihood of their members (World Bank 2007; Bernard & Spielman 2009; Markelova *et al.* 2009).

The role of FBOs in improving the marketing of their members produce, for example, has received some research attention (Shiferaw, Obare & Muricho 2006; Roy & Thorat 2008; Markelova *et al.* 2009; Shiferaw *et al.* 2009; Moustier *et al.* 2010; Fischer & Qaim 2011). Research has shown that FBOs can help their members to achieve competitiveness, improve their market power and enhance their ability to negotiate for better prices in the market (Shiferaw, Obare & Muricho 2006; Roy & Thorat 2008; Fischer & Qaim 2011). For example, using data from a survey of 183 farmers in India, Roy and Thorat (2008) have shown that smallholder farmers who cultivated grape and belonged to FBOs reduced their transaction costs as well as improving their bargaining position for good prices, compared to smallholder farmers who were not members of FBOs. In Kenya, Fischer and Qaim (2011) also found that marketing through banana FBOs yielded a higher price than selling individually. In Ethiopia, Kenya and Zambia Okello *et al.* (2007) observed that green bean growers who belonged to FBOs were able to enter markets in Europe with their produce for competitive prices.

In addition, FBOs provide their members opportunities for income generation through joint production and processing (World Bank 2007); such income is sometimes offered to their members as loans for investment (Bosc *et al.* 2002; Salifu, Francesconi & Kolavalli 2010, Salifu *et al.* 2012). Furthermore, by working collectively in FBOs, smallholder farmers are likely to improve the quantity of inputs they use on their farms (Kirsten, Karaan & Dorward 2009). This is because when smallholder farmers purchase inputs in bulk, it reduces their transaction costs and as a result they benefit from economies of scale (Kirsten, Karaan & Dorward 2009; Shiferaw, Hellin & Muricho 2011). Indeed, some FBOs are established solely to provide inputs such as seeds and fertiliser more cheaply to their members (Shiferaw, Obare & Muricho 2006).

The role of FBOs in helping smallholder farmers to deal with peak labour demands is also highlighted in the literature (Bratton 1986a; Rondot & Collion 2001; Salifu, Francesconi & Kolavalli 2010; Salifu *et al.* 2012). For example, in Ghana, Salifu *et al.* (2012) note that FBO members pool labour to weed on every member's farm in turns, as a way of dealing with labour demands. Similarly, a recent World Bank study involving 15 developing countries suggests that FBOs also engage in the provision of social and welfare services for their members (Narayan, Pritchett & Kapoor 2009). In line with this, Tsekpo (2008) and Salifu *et al.* (2012) find in Ghana that several FBOs assist their members with monetary contributions in the event of funerals, weddings and ill-health.

2.4.2 Improving their members' access to external services

FBOs improve smallholder farmers' access to external services in two broad ways. First, it is believed that organised groups of smallholder farmers are likely to have greater credibility in seeking external support such as financial services and extension services than individual smallholder farmers (Penrose-Buckley 2007). When smallholder farmers participate in FBOs, it makes it much easier for service providers to recognise and work with them (Penrose-Buckley 2007). Thus FBOs are in a position to link smallholder farmers to service providers at the local, district, regional, national and global levels, to acquire or demand services (Bosc *et al.* 2002; Stockbridge, Dorward & Kydd 2003;

World Bank 2007). In Mozambique, for example, Penrose-Buckley (2007) reports that smallholder farmers were able to access input and extension services from exporters only when they participated in FBOs.

Second, many governments, donors, NGOs and private-sector organisations today use FBOs to provide a wide range of services to smallholder farmers, to lower the cost of providing such services. Here, one of the key arguments is that the high costs of service delivery to smallholder farmers limit the supply of and their access to inputs, credit and extension services, which are critical in improving their productivity (Chang 2012). Thus, smallholder farmers need to be organised into FBOs to reduce cost and achieve economies of scale in service delivery (Chirwa *et al.* 2005; Dorward *et al.* 2009). Those who are in favour of the ‘minimising the cost of services delivery’ argument appear to neglect the fact that, while FBOs may reduce the transaction costs of service providers, all kinds of new costs are created within FBOs, which their members must bear. For example, when a government or NGO delivers fertiliser to an FBO on credit, the leaders of the FBO must distribute the fertiliser and collect the money to pay the government or NGO. These internal arrangements undoubtedly involve cost that can have dire consequences, especially if there are delays in distributing the fertiliser to members and collecting the money for the government or NGO.

In addition to the minimising of cost of service delivery, donors and NGOs sometimes prefer to deal with farmers directly through FBOs, particularly if they feel there is institutional failure in the public or private sector (Rondot & Collion 2001). In Kenya, two NGOs, Africa Harvest and TechnoServe, have helped banana farmers to establish self-sustaining FBOs to facilitate their access to clean planting material, technical extension and outputs markets (Fischer & Qaim 2011).

In the same way, external development agents such as donors and NGOs also prefer to provide credit to smallholder farmers who participate in FBOs as a mechanism to

improve credit recovery through peer pressure (Stockbridge, Dorward & Kydd 2003; Gulati *et al.* 2007; World Bank 2007).

Similarly, some buyers of the produce of smallholder farmers prefer FBOs to individual farmers because FBOs are better able to provide reliable volumes and stable supplies of quality products (Stockbridge, Dorward & Kydd 2003; Gulati *et al.* 2007; Vorley *et al.* 2007; Shiferaw, Hellin & Muricho 2011). It is therefore reasonable that FBOs are becoming a dominant force in linking smallholder farmers to outputs market, especially farmers who produce high-value crops, such as cash crops (see Section 2.4.1).

However, because of the preference of governments, donors, NGOs and the private sector to support smallholder farmers through FBOs, participation in FBOs has now become the most important channel through which smallholder farmers can receive support (Tinsley 2004). Yet, when FBOs remain the only vehicle to deliver support to smallholder farmers, the tendency to concentrate support on a small group of smallholder farmers is very strong, especially if FBOs are not widespread in the area and do not have the ability to pass on the support to other smallholder farmers. Indeed, studies conducted in some developing countries have shown a wide range of disparities between smallholder farmers who participate in FBOs and those who do not. For example, in India, Matuschke and Qaim (2009) find a positive relationship between FBOs and the adoption of hybrid wheat. In Kenya, Fischer and Qaim (2011), in a study of banana farmers, found that farmers who were members of FBOs had expanded their plantations significantly more than non-members, which they largely attributed to improved access to technical extension information, clean planting material and other incentives offered through the FBOs. In spite of these studies, questions remain as to what extent the benefits of FBOs extend beyond their members, particularly in relation to inputs, extension services and credit.

2.4.3 Representing the interests of farmers in policymaking and implementation

FBOs also contribute to policy formulation and decision-making (Hussein 2001; World Bank 2007). Their role here takes three broad forms. First, FBOs and their members,

particularly those at the national and regional levels, sometimes come up with proposals to contribute to agricultural and other related policies (World Bank 2007; Markelova *et al.* 2009). For example, in Central America, a comparative study of three contrasting farm sectors in Costa Rica (coffee, milk and black beans), involving representatives of 21 FBOs, eight representatives of public authorities and ten private-sector firms, found that FBOs played a key role in influencing policy decisions that resulted in better access to agricultural markets (D'Hôtel & Bosc 2011). Second, FBOs are sometimes directly involved in the implementation of policies in the agricultural sector (World Bank 2007, p. 23).

Finally, FBOs give political voice to smallholder farmers 'to hold policymakers and implementing agencies accountable', such as participating in monitoring the budget (World Bank 2007, p. 23). The World Bank's 2008 Report on agriculture, however, noted that FBOs can only participate in high-level negotiations if they have the right technical and communication skills (World Bank 2007). The report suggested the need for FBOs to be equipped with communication skills, seek professional advice and recruit expertise to prepare their inputs into the policy dialogue (World Bank 2007).

2.4.4 Providing services to the larger community

Sometimes FBOs work in partnership with NGOs and government programs to improve rural infrastructure and livelihoods, such as building dams, health centres and schools (Rondot & Collion 2001; World Bank 2007). It has also been argued that FBOs have the potential to introduce more democratic forms of decision-making and self-governance, issues that are becoming increasingly important for development in rural communities (Rouse 2006). Because decisions in FBOs are governed by democratic principles, it is believed that when smallholder farmers participate in FBOs, it helps to strengthen local democracy.

2.4.5 Summary

The following key points have emerged from the above review. First, FBOs provide services to both their members and non-members, although services to non-members

appear limited. Second, while governments, donors and NGOs use FBOs to deliver services to smallholder farmers, FBOs also demand a wide range of services from them. Third, they contribute to policy formulation and implementation.

In addition, the review largely suggests that once FBOs are established, they have a positive impact on their members and the wellbeing of other smallholder farmers, but this is not always the case in the context of many developing countries. In the next section, therefore, I present the conditions that shape the performance of FBOs. As the review will show, studies have shown the conditions under which FBOs have improved or failed to improve the socio-economic conditions of their members and other smallholder farmers.

2.5 Factors that influence rural collective action in FBOs

There is little agreement as to why some FBOs are successful and improve the wellbeing of smallholder farmers while others remain unsuccessful. The literature remains inconclusive about the conditions required for effective collective action in FBOs. Debates about the factors that influence the effectiveness of collective action in FBOs have focused largely on the following:

- the purpose and how FBOs are formed;
- governance and the managerial capacities of FBOs;
- the membership characteristics of FBOs; and
- the interactions of FBOs with their external environment.

2.5.1 The purpose and how FBOs are formed

The success or effectiveness of FBOs first depends on who forms them and why they are formed. Research has shown that FBOs initiated and formed by smallholder farmers themselves tend to perform much better than those initiated by external organisations (Uphoff 1991; World Bank 2007). As Hussi, Lindberg and Brennerman (1993) argues, FBOs will be effective in their collective activities if there is a felt need for association such that FBOs have a business potential and make economic sense to the members.

The formation of FBOs at the initiative of outsiders, especially if they are used mainly to deliver goods and services to smallholder farmers, has generally been proven to be an unsustainable way of developing FBOs in rural communities (Hussi, Lindberg & Brennerman 1993). This is because when FBOs rely solely on external organisations to act collectively, they are more likely to cease operations once the flow of resources by the external organisation is discontinued (Uphoff 1991). If FBOs cannot live beyond external support, it would not be out of place to describe them as organisations formed to serve the interests of external organisations and not those of smallholder farmers. This line of thinking corroborates Shiferaw, Hellin and Muricho (2011) when they note that many FBOs in Africa suffer from inadequate operational resources because of the withdrawal of external support.

2.5.2 Governance and the managerial capacities of FBOs

The organisational arrangements that relate to structures or rules, and also leadership, constitute key determinants of the outcome of collective action in FBOs (Wanyama *et al.* 2014). Rules, which North (1990b) refers to as “institutions”, are necessary for any effective collective action to take place in an organisation. In FBOs, one can identify two interrelated set of rules. The first set of rules relates to how the FBO is formed and functions, while the second set of rules ensures that there is commitment on the part of all members to abide by the rules regarding the functioning of the FBO (Ostrom 1990; Stockbridge, Dorward & Kydd 2003).

The first set of rules includes how to become a member, how to undertake collective activities, how benefits are shared and how to exit (Stockbridge, Dorward & Kydd 2003; World Bank 2007). These rules shape the expectations of FBO members about the overall viability and gains they will get from a collective activity (Shiferaw, Hellin & Muricho 2011). The second set of rules relate to how members should conduct themselves as well as penalties for non-compliance (Ostrom 1990; Stockbridge, Dorward & Kydd 2003). Irrespective of either of the two sets of rules, many studies have suggested that rules crafted by members of local organisations themselves are

better understood and adapted more easily than those imposed by external organisations (Ostrom 1990, 1995). For example, in her extensive research on common-pool resources such as irrigation systems, fisheries and forestry, Ostrom argues that local people have better information about the subtle nuances of their environment than do outsiders, which is why they are often best placed to ensure congruence between rules and local conditions (Ostrom 1990, 1995).

While FBOs are likely to accept rules emanating from outsiders for their immediate benefit (e.g. accessing credit or fertiliser), enforcing rules that are alien to them would be challenging. FBOs and their members may be successful in enforcing the outsiders' rules as long there is a continuous flow of support, but once that support ends, they are likely to reject them. Rules originating from FBO members themselves that are easy to understand are more likely to be adopted and followed (Wanyama *et al.* 2014). Without good rules and enforcement, FBOs are likely to perform poorly. As field research confirms, the temptation for group members not to cooperate and free-ride is high when rule enforcement is weak (Ostrom 2000).

In addition to rules, the leadership of FBOs plays a key role in determining their performance. The preferred style of leadership often introduced in many FBOs in developing countries is one that adheres to democratic principles (Stockbridge, Dorward & Kydd 2003; World Bank 2007).²⁴ As expected, democratic styles of governance will not always be in congruence with the traditional leadership style in rural communities of developing countries. Thus, Meinzen-Dick *et al.* (2002) argue that in the management of FBOs in rural communities, there should be a balance between traditional leadership and modern leadership styles. Handy (1999) also advocates a “best-fit” approach to leadership style in organisations, in which leaders adopt a style that accords both with the style preferences of those they lead and with the nature of the activity being led.

²⁴ Other forms of leadership styles include hierarchical, relatively autocratic or structured.

Notwithstanding the different forms of leadership styles, leaders of FBOs should provide technical expertise, drive and managerial skills (World Bank 2007). They should be trusted, able to motivate their members and have necessary skills for the collective enterprise, as well as able to engage with outsiders (Markelova *et al.* 2009).

One can categorise the roles of leaders in FBOs into two broad activities. The first involves interactions between leaders and members of the FBO, to achieve desired outcomes. Here, if leaders are not motivated and fail to interact effectively with their members, it will be difficult to achieve the desired outcomes of the FBO. As Day and Schyns (2010) note, high-quality exchanges, relationships and agreements between the leaders and their members are crucial to achieving set organisational outcomes. Second, the leaders should be able to interact with outsiders such as government agencies, donors and NGOs. This is important because weak leaders will find it difficult to interact with the external environment. Yet, government, donors and NGOs wishing to improve the socio-economic conditions of farmers by implementing projects and programs through FBOs fail to recognise that these farmers lack the leadership skills and experience to work collectively and interact with their external environment (Stockbridge, Dorward & Kydd 2003).

The capacity of an FBO to pursue highly beneficial activities may therefore be impaired if the majority of its leaders are inexperienced, with little or no skill (Bernard *et al.* 2008). In SSA, case studies have shown that weak leadership has had adverse effects on the performance of FBOs (see, e.g., Bernard *et al.* 2008). In their study of the role of village organisations such as FBOs in rural development in Burkina Faso and Senegal, Bernard *et al.* (2008) observe that village organisations have weak managerial capacity because their leaders largely comprise village elders and chiefs, and the majority of them do not have basic formal education. A recent study in Tanzania also suggests that the level of formal education for both FBO leaders and members of FBOs influences their performance (Barham & Chitemi 2009). They found that FBOs whose leaders and members had more years of schooling were more likely to improve their market

situation than those with fewer years of schooling (Barham & Chitemi 2009). Nonetheless, FBO leaders with no or little formal education can still perform better if they receive adequate training in the initial stages of the establishment of the FBO (Poulton, Dorward & Kydd 2010).

Similarly, Chirwa *et al.* (2005) argue that leaders' misappropriation of funds, corruption and lack of accountability to members continue to undermine the performance of FBOs in SSA. This is particularly the case in FBOs whose members entrust leaders with considerable power to make decisions on their behalf (Stockbridge, Dorward & Kydd 2003).

In spite of the above, there is still much to learn about the effectiveness of leadership in FBOs; in particular, we need to deepen our understanding about the conditions under which effective leadership will evolve.

2.5.3 The membership characteristics of FBOs

The major theoretical and empirical arguments about how the characteristics of FBOs influence their performance focus on two issues (see, e.g., Barham & Chitemi 2009; Markelova *et al.* 2009):

- the membership size of the group; and
- the composition of the members, often referred to as the heterogeneity of the group.

The group size argument

The group size argument became popular in the collective action literature after Olson (1965, p. 2) argued that, 'unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests'. It is widely accepted that the cost of coordinating collective action increases with an increase in the size of the group (Olson 1965; Ostrom 1990,

2000; Coulter *et al.* 1999; Markelova *et al.* 2009; Wanyama *et al.* 2014). The main conclusion is that small groups are more successful in collective action than large groups because they find it easier to organise for collective action than large groups (Coulter *et al.* 1999; Wanyama *et al.* 2014). In other words, researchers argue that homogeneity of FBO members is necessary for effective collective action, and it is presumed that FBOs with a small membership will have more homogenous members.

Ostrom (1990, 2000) in particular, in her extensive work on irrigation schemes, fisheries and forests, has shown that collective action will be more effective if the group is small, homogeneous in membership, exists for a long period and the members have associated with each other for a longer period. It has also been argued that, with small groups, the transaction costs of organising members are not only lower but also there is less temptation for some members to ‘free-ride’ on the group’s efforts (Stockbridge, Dorward & Kydd 2003): larger group sizes may increase coordination costs and create management inefficiencies (Wanyama *et al.* 2014). The enforcement of rules is also often easier in small groups than large ones because small groups have higher internal cohesion, as it is easier to know and monitor all of the members (Coulter *et al.* 1999).

In spite of the apparent consensus among researchers about the relationship between the size of a group and its performance, they have failed to agree what constitutes a small group. When scholars have debated the importance of group size in the performance of FBOs, they have often failed to indicate the numerical ranges of small groups. For example, is a group of about 50 members small or large? If 100 members is considered a large group, what about a group with 1,000 members? Nevertheless, evidence concerning successful collective action in agricultural marketing suggests that a group size of 20–40 members is most suitable for effective collective action (Wanyama *et al.* 2014).

The heterogeneity argument

FBO members may also differ along a diversity of dimensions, including their sociocultural background (e.g. ethnicity, values or norms), endowments (e.g. economic inequality in income or assets), interests, knowledge, skills and locations. This diversity is often referred to as heterogeneity (Ostrom & Varughese 2001; Meinzen-Dick *et al.* 2002; Barham & Chitemi 2009; Markelova *et al.* 2009; Wanyama *et al.* 2014). Similar to membership size, there is ongoing debate about the heterogeneity of members in FBOs and their performance (see, e.g., Ostrom & Varughese 2001).

For instance, mixed evidence exists as to whether heterogeneity in ethnicity or family relations, wealth, age and the location of FBO members influence the outcome of collective action. In a study of four irrigation systems in India, for example, Meinzen-Dick and colleagues observe that social heterogeneity makes communication, cooperation and the enforcement of rules more difficult (Meinzen-Dick, Raju & Gulati 2002). They observed that the enforcement of rules is easier for organisations whose membership comes from the same neighbourhood or other social sphere (Meinzen-Dick, Raju & Gulati 2002). In sharp contrast with this observation by Meinzen-Dick *et al.* (2002), a study on small-scale agriculture in Chile found that close social relations prevented FBO members from enforcing rules for fear of alienating friends and neighbours (Berdegúe 2002). Similarly, in their study of 18 forest-user groups in Nepal, Ostrom and Varughese (2001) show that heterogeneity is not a strong predictor of the level of collective activity. Rather, they argue that heterogeneity is a challenge that can be overcome by good institutional design, such as investing time and effort to craft better rules about the collective action involved (Ostrom & Varughese 2001). They further argue that groups that have wealthier members and members who have strong ties with outsiders are important in stimulating and supporting collective action (Ostrom & Varughese 2001).

2.5.4 The interactions of FBOs with their external environment

The external environment also influences the outcome of collective action in FBOs. Here, the external environment includes the legislative framework within which FBOs operate as well as major stakeholders such as governments, donors, NGOs and private-sector organisations.

In relation to the legislative framework, it has been argued that developing countries should have legislations that enable FBOs to function as business enterprises (Hussi, Lindberg & Brennerman 1993; Stockbridge, Dorward & Kydd 2003). Legislative frameworks that encourage FBOs to function as business-oriented enterprises and limit the role of governments mainly to the provision of the enabling policy environments are considered useful for the success of FBOs (Hussi, Lindberg & Brennerman 1993; Pretty 1995; Pretty & Ward 2001; Stockbridge, Dorward & Kydd 2003). Research has shown that the performance of FBOs is hindered when existing legislation ties FBOs to the centralised government and makes them into government institutions rather than independent enterprises (Onumah *et al.* 2007). In addition, the effectiveness of FBOs is frequently constrained when governments, donors, NGOs and private-sector organisations fail to recognise FBOs as full partners in smallholder agriculture development, but only as channels through which they deliver services to smallholder farmers (World Bank 2007).

A similar factor that has recently received some attention in the literature is the politicisation of FBOs and their members (see, e.g., Birner & Resnick 2010). The outcome of collective action in FBOs is affected if political leaders support smallholder farmers who are participating in them in exchange for votes during elections (Birner & Resnick 2010; World Bank 2010). Here, it is argued that governments and political leaders should focus on providing an enabling environment for FBOs through an effective legislative framework rather than politicising the activities of the FBOs (Pretty 1995; Pretty & Ward 2001).

2.5.5 Summary

The review has shown that unresolved theoretical and empirical issues still exist about the definite set of conditions that improve the outcome of collective action among smallholder farmers in developing countries. In particular, debates about the definite set of conditions that improve the outcome of collective action in FBOs have not been addressed adequately. Issues such as the managerial and governance capacities, the homogeneity or heterogeneity of members and the membership size still require research attention.

The remainder of this thesis develops and applies the theory discussed here to address the research questions of this study, set out in Chapter 1. However, before embarking on this effort, it is necessary to develop a conceptual framework to guide the analysis in this study. The framework draws on theoretical debates and agreements regarding the role of FBOs in improving smallholder agriculture, the challenges associated with their establishment and the operations of FBOs, as well as the conditions under which collective action in FBOs is effective.

2.6 A conceptual framework for understanding collective action among smallholder farmers

This section sets out a conceptual framework for understanding collective action in FBOs among smallholder farmers. As much as it is necessary to conceptualise collective action in a study that utilises the theory of collective action, it is also important to develop an analytical conceptual framework for studying collective action. The framework discussed here identifies key elements that one needs to consider when analysing the role of FBOs in improving smallholder farmers' access to agricultural goods and services, such as extension services, inputs and credit. It thus provides an analytical context in which to understand the performance of FBOs.

As shown in Figure 2.1, the framework has four main elements: the environment (oval A), FBOs and their attributes (oval B), key actors and their attributes (oval C) and outcomes (oval D). The logic of this framework is that one has to consider the

environmental factors (oval A) that influence how FBOs are organised, structured and supported, as well as how they function and perform (ovals B and C). The framework recognises that the environment (oval A) influences how key actors such as government agencies, donors, NGOs and the private sector interact with FBOs (oval C). The interaction of FBOs (oval B) and the key actors (oval C) lead to outcomes, which then feed back to the environment (oval A). I shall now describe the elements in the framework in more detail, as follows.

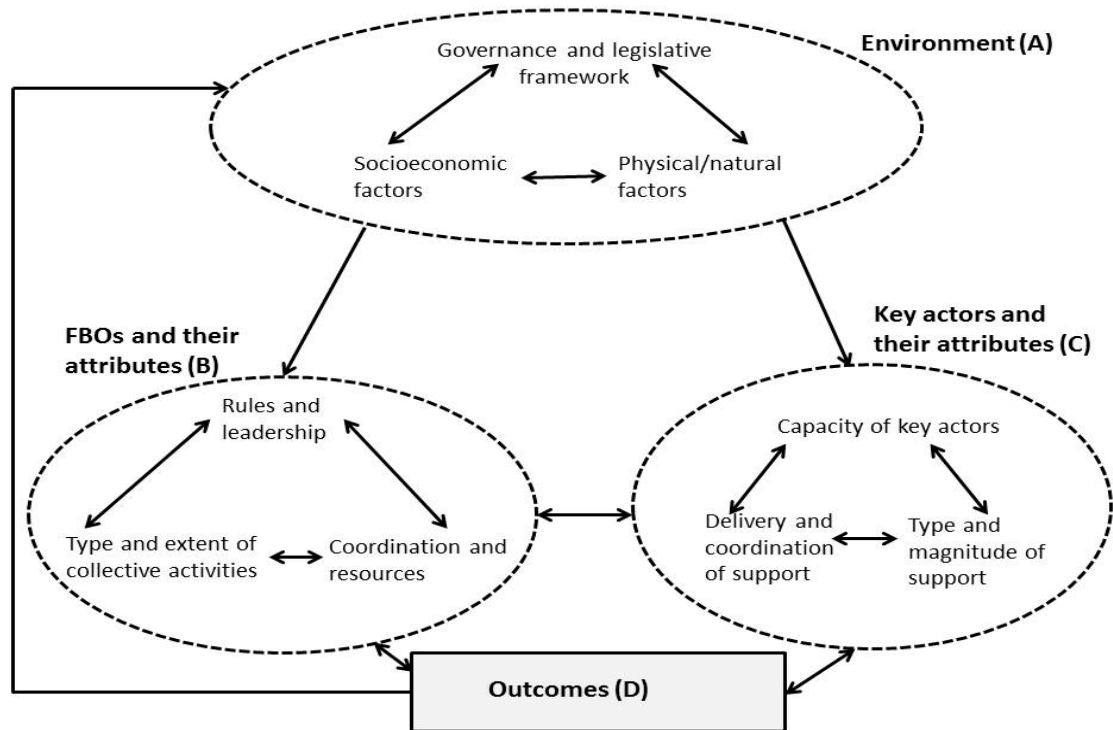


Figure 2.1. A conceptual framework for understanding collective action in FBOs

Source: Adapted from Kirsten, Karaan and Dorward (2009)

2.6.1 The environment

The environment in this framework includes a set of exogenous factors or variables that influence the structure, behaviour and performance of FBOs and the key actors. The key set of variables that constitute the environment include the governance and legislative framework, socio-economic factors and the available physical resources.

Here, the governance and legislative framework variable concerns the strategy as well as the legal ground rules that establish the basis for FBOs and their operations. In other words, it refers to the kind of strategies available for the development of FBOs as well as the legal framework within which those strategies operate. In this regard, the performance of FBOs will depend on whether the state or the private sector is spearheading the development of strategies and legislations to guide and regulate the activities of FBOs in a country. For example, if the state is at the forefront of the development of policies, a political change may lead to a change in policy intervention, which will also affect the performance of FBOs and the key actors.

In relation to the socio-economic variable under this element, I am referring to factors such as traditions, customs and the cultural and economic underpinnings of societies. Differences in culture, traditions and customary practices may affect the nature, scope and outcomes of collective among smallholder farmers. We need to recognise that culture, traditions and customs shape the values and behaviour of people (Kirsten, Karaan & Dorward 2009). This is more important given that people in developing countries and smallholder communities tend to hold their beliefs and habits deeply and outsiders sometimes find it difficult to change them (Kirsten, Karaan & Dorward 2009). Thus, when smallholder communities have a high level of social capital (which can take the form of strong social networks, trust and sharing of norms), the outcome of collective action in FBOs is likely to be high. Similarly, the macroeconomic and market conditions of the environment not only influence the set of variables present in oval A, but also affect ovals B and C of the framework.

Physical/natural factors constitute the last set of variables under the environment element. The availability of physical resources such as roads, farm inputs, credit, land and irrigation are also critical for agricultural development and therefore the performance of FBOs. The governance strategies and the socio-economic environment provide the settings for the physical resources to express themselves. For instance, there must be governance strategies in place that encourage investment in resources such as

roads, irrigation and improved technologies. A common form of state intervention in recent years is subsidies on prices of key inputs such as fertiliser and seeds (Banful 2011; Benin *et al.* 2013). In addition, unintended effects of the environment, such as degradation of natural resources and climate change, will affect the behaviour of the variables in ovals A and B.

In sum, the wider environment, which is considered in three parts – the governance and legislative framework, socio-economic factors and physical/natural factors – affects the behaviour and performance of FBOs and the key actors that directly interact with FBOs. The success of FBOs will therefore depend on their ability to deal with a sometimes unfavourable external environment.

2.6.2 FBOs and their attributes

One of the elements that constitute the heart of the framework is ‘FBOs and their attributes’ (oval B). This element has the following key endogenous variables: rules and leadership in FBOs, the types and extent of the activities of FBOs, and the level of coordination and resources in FBOs.

First, the existence of rules and the form they take are critical for the performance of FBOs. Rules on how to become a member or leader and how to exit, as well as those that determine the costs and benefits associated with particular actions and outcomes, influence collective action in FBOs. There must be a mechanism to ensure the enforcement of rules such as motivations or incentives. As the review in this chapter showed, the ways in which rules are designed influence the performance of FBOs. The framework also takes into consideration the leadership capacity of FBOs. The skills and experience of leaders are important variables that determine the kind of activities FBOs undertake. For example, for FBOs to demand extension services, they need leaders with management skills and knowledge of procedures, such as the ability to interact with extension workers and other stakeholders. The leaders should also be able to deal with heterogeneous members and resolve conflicts among them.

Second, in FBOs, the existence of rules and effective leadership alone is not enough for positive collective action; FBOs also need resources to execute their functions. In particular, the financial resources that are available to FBOs are particularly important in boosting their capacity. FBOs that are able to generate internal income through contributions or collective activities, for example, are more likely to function well.

Similarly, effective coordination is very critical in FBOs. If FBOs have a high level of coordination in collective activities, they are likely to have positive outcomes in their collective efforts. Coordination in this sense is a process of encouraging FBO members to take common actions necessary to achieve their individual goals. Analysis should therefore consider how FBOs search for goods and services as well as negotiate for and monitor their use in the interests of all their members.

Finally, and related to the above, is the types of collective activities that FBOs undertake. The type and complexity of collective activities should influence the performance of the FBOs. The collective capacities of FBOs and the extent to which members participate in collective activities are also important factors. In summary, internal factors in FBOs, such as rules, responsive management approaches and the availability of resources, are all important factors that influence the collective outcomes.

2.6.3 Key actors and their attributes

The set of variables in this element (oval C) are largely exogenous to FBOs' performance. As Figure 2.1 shows, one cannot examine the performance of FBOs in isolation: their interaction with key players such as government agencies, NGOs and private-sector organisations (oval C) is important. These key actors, together with the FBOs, constitute the heart of the conceptual framework. The capacity of the key players involved in supporting or working with FBOs is an important factor. If the capacity of government and its agencies is relatively high in terms of staff, resources and skills, FBOs that rely on them are likely to perform well. For example, the proportion of the agriculture budget that a government would spend on staff resources and skills targeted at smallholder farmers and the development of FBOs will influence the performance of

those FBOs. Likewise, NGOs and private-sector organisations with the capacity to build the collective capabilities of FBOs, and not just considering FBOs as channels through which to implement their programs, are likely to improve the performance of FBOs.

The capacity of these key players in turn influences the type and magnitude of support that they provide to FBOs. Support to FBOs comes in a variety of forms, including credit, subsidised inputs, grants, training in new agricultural practices and training in FBO governance and management. Regardless of the type of support, its magnitude, consistency and delivery mechanism are crucial for a positive outcome in an FBO. For instance, performance in FBOs may vary depending on whether support is provided to the FBO as whole or to individual members within the FBO. The performance in FBOs is also likely to be influenced by the support timeframe; that is, whether it is a short or a long period.

Consequently, the ways in which the key actors deliver and coordinate support to FBOs is central. Their performance will be influenced by whether delivery and coordination of that support is based on participatory approaches – that is, the involvement of FBO members in planning and solving their problems (bottom-up) – or top-down; and whether they are interested in improving the wellbeing of smallholder farmers (farmer-centred) or simply interested in meeting their project objectives (project-centred). There should be range of tools to harmonise the way in which government, NGOs and private-sector organisations work to support FBOs. Similarly, the ability of these key players to facilitate support for FBOs, including planning, monitoring and evaluation of their activities, is central in their performance.

2.6.4 Outcome

As shown in Figure 2.1, the interactions among the environment, the FBOs and the key actors will lead to outcomes in FBOs and perhaps smallholder farmers. These outcomes may include improved access to extension services, inputs, credit and change in farming practices, as well as access to improved markets. A major criterion for assessing the performance of FBOs will be their collective action outcomes (oval D). However,

measuring collective outcomes in FBOs may be challenging for researchers. An alternative approach will be to measure the benefits to individual FBO members. Nonetheless, studies seeking to understand the role, performance and impact of FBOs would also need to undertake data collection at the FBO level.

As Figure 2.1 shows, there is a feedback link to the environment. Collective action outcomes in FBOs may therefore reinforce or lead to changes in the environment as well as in FBOs and their key actors.

2.6.5 Summary

The conceptual framework presented here provides the key concepts and variables that are crucial for analysing the performance of FBOs. The framework shows that one needs to recognise that the efficiency and effectiveness of FBOs will vary based on the kind of interactions they have with the environment on the one hand, and the key actors (government, NGOs and private-sector organisations) that deal directly with them on the other. Studies seeking to understand the performance of FBOs in developing countries may therefore find it necessary to collect information on the interaction among the four main elements (ovals A, B, C and D) discussed in Figure 2.1.

The framework presented may be used for analysis that goes beyond understanding the performance of FBOs, to include understanding the performance of key stakeholders in the development of FBOs in developing countries, as well as identifying reform options for the development of FBOs. This is because the framework specifies set of exogenous and endogenous factors that information may have to be collected to understand the performance of FBOs.

2.7 Conclusion

This chapter has first reviewed the theoretical and empirical debates about the development of smallholder agriculture in developing countries, with a focus on the role that rural collective action in FBOs plays in this process. It has also outlined collective action theoretical approach as the main perspective through which this study is

conducted. This review has demonstrated how the theory of collective action, which underscores the diversity of conditions under which people organise to satisfy their economic and social interests, is applicable in this study. The chapter argues that the theory of collective action is applicable in this research, as the study focuses on the extent to which FBOs build and strengthen the capacity of smallholder farmers to engage in active collective activities.

Next, the review has outlined the variety of roles that FBOs play in improving smallholder agriculture, including facilitating smallholder farmers' access to inputs, extension services, credit, policy formulation and implementation. In this respect, the review has shown the conditions under which FBOs improve or fail to improve the socio-economic conditions of their members and smallholder farmers. A key point that emerges from such a review is that unresolved theoretical and empirical issues exist about the definite set of conditions that improve the outcome of collective action among smallholder farmers in developing countries. Among other things, researchers have not successfully addressed the extent to which the management and governance capacities, heterogeneity and group size of FBOs affect their performance in providing services to their members and other smallholder farmers. The review therefore further suggests a need for more research to deepen our understanding of the performance of FBOs and the set of conditions necessary for FBOs to thrive and improve smallholder agriculture in developing countries.

Finally, the chapter has developed a conceptual framework to guide the study's main aim of exploring the extent to which FBOs improve smallholder farmers' access to extension services, inputs and credit. The framework has identified key variables that are important for analysing the performance of FBOs. In particular, it recognised that the efficiency and effectiveness of FBOs depends on their interactions with their external environment, on the one hand, and the key actors (government, NGOs and private-sector organisations) that deal directly with them on the other.

The next chapter outlines the methodology and methods employed to answer the research questions in this study.

CHAPTER THREE

THE RESEARCH METHODOLOGY AND METHODS

3.1 Introduction

Chapters 1 and 2 set out the research problem, aim and questions as well as the theoretical framework through which this study is undertaken. This chapter outlines the research methodology and methods employed to address the research aim and questions. The choice of methodology is often driven by a researcher's epistemological and theoretical framework, as well as the nature of the research questions (Hall 2003; Bryman 2008). As this study aims to understand the outcomes of collective action among smallholder farmers – examining, in particular, the question of whether, and to what extent, FBOs improve smallholder farmers' access to agricultural services – the survey research methodology is employed. One of the key features of the survey research methodology is its ability to measure the relationship between variables and test theory. This methodology was applicable for this research as it largely sought to measure the performance of FBOs. As Silverman and Marvasti (2008) argue, in choosing a research methodology, the emphasis should be on what we are trying to find out.

It is also important to note that this research went beyond measuring the performance of FBOs in relation to smallholder farmers' access to extension services, inputs and credit to also understanding the factors that account for the performance of FBOs. While the survey research methodology is often used interchangeably with surveys/questionnaires, it is important to note that this methodology also has the ability to accommodate other data collection methods (e.g. interviews) that enable researchers to find answers to 'why questions'. Thus, a researcher using a survey research methodology can design the research to accommodate a variety of methods for data collection (e.g. a questionnaire and interviews) to be able to answer 'what' and 'why' questions in the research.

The remainder of the chapter is structured in four main sections. First, it introduces the research design, which provides the structure, principles and logic of the survey research methodology in relation to the research questions. The second section outlines the sampling procedure adopted to select the study participants. In the third section, the chapter examines the methods used for data collection. The final section then discusses the methods used to analyse the data.

3.2 The research design

Many scholars have identified a variety of research designs, including experimental, case study, comparative, longitudinal and cross-sectional designs (Vaus 2001; Bryman & Teevan 2005; Bryman 2008, 2012).²⁵ While there is no standardised format in each of these research designs, the choice of a particular design is influenced by whether the research seeks to understand causal connections between variables, understand behaviour and meaning making, or wants to generalise from a study sample, as well as the time available to conduct the research (Bryman 2012). In other words, the choice of a research design depends on how the researcher understands social reality as well as the philosophical position of the researcher regarding the production of knowledge in relation to the research questions (Limb & Dwyer 2001). Thus, it is important to note that researchers employing the same research methodology may have different research designs.

Among the different research designs mentioned above, the cross-sectional design is perhaps the most popular in the social sciences, partly because it enables researchers to collect data from a sample at a particular point in time, thereby enabling researchers to obtain results quickly (Vaus 2001; Jupp 2006). For instance, unlike experimental and longitudinal designs that often require researchers to wait for various interventions before data collection and analysis, cross-sectional designs do not entail repeated data collection, tracking respondents or experimental interventions over a long period (Vaus 2001; Jupp 2006).

²⁵ For a detailed explanation of the different types research designs, see Bryman (2012).

This research employed the cross-sectional design not because of its popularity, but because it ensures the collection of data at a given point in time and enables systematic comparisons between cases, or groups of cases (Vaus 2001; Jupp 2006). In addition, governing the choice was the need for a design that allows the use of both qualitative and quantitative approaches to data collection and analysis. While the cross-sectional design allows a researcher to use both approaches, surveys or structured questionnaires are the methods that are often equated to this design (Walliman 2006). As Vaus (2001) argues, the logic of cross-sectional design does not require the use of only quantitative or qualitative data, but it does require that data are systematic, such that there is information on cases or groups. It does not matter whether the data are in the form of numerical or coded data, or whether they are quotes from interviews, extracts from diaries or observations (Vaus 2001).

This study employed a mixed-methods approach,²⁶ which involves either simultaneous or sequential procedures whereby a researcher combines both quantitative and qualitative methods of data collection and analysis to provide a comprehensive analysis of a research problem – to address the research questions outlined in Chapter 1 (Creswell 2003; Greene *et al.* 2005). The employment of a mixed-methods approach enhances confidence in the validity of findings (Greene *et al.* 2005), as such an approach enables researchers to address various dimensions of a research question or address different research questions in a given study (Bryman & Burgess 1994b; Limb & Dwyer 2001; Lieberman 2005).

The mixed-methods approach was important in this study for three main reasons. First, as one of the key research questions set out (see Chapter 1) was to determine the extent to which FBOs improve smallholder farmers' access to extension services, inputs and credit, a quantitative approach to data collection through a structured questionnaire was

²⁶ The roots of mixed methods in social research are found partly in the concept of triangulation, which involves the use of multiple methods to assess a given phenomenon in order to validate the findings; that is, to check different findings against each (Greene, Kreider & Mayer 2005).

necessary to understand this. With a quantitative approach, one would be able to make a systematic comparison in order to account for the variance in the phenomenon; that is, whether FBOs improve their members' access to extension services, for example (Silverman & Marvasti 2008). Second, the study set out to understand not only whether FBOs improve smallholder farmers' access to extension services, inputs and credit, but the features of FBOs and other factors that enable or impede the ability of FBOs to improve smallholder farmers' access to such services. To understand this, the study employed a qualitative approach through oral interviews and participant observation. Finally, the study sought to understand the different ways in which relevant stakeholders can resolve the impediments of FBOs to make them more effective local institutions for improving smallholder farmers' access to the services. Here, qualitative strategies such as oral interviews are used.

Indeed, the use of mixed methods in social research is gaining popularity for two important reasons. First, debates about the superiority of some methods over others have given way to an appreciation of trade-offs and complementarities in using different methods for data collection and analysis to maximise the understanding of research problems (Valentine 2001; Poteete, Janssen & Ostrom 2010). As Gray *et al.* (2007) argue, rigorous research that combines complementary methods will be superior to research that relies on any single method. Second, mixed methods enable the understanding of research problems more defensibly, with stronger validity or credibility and less known bias, as well as the development of more complete portraits of a social phenomenon through the use of multiple perspectives (Greene, Kreider & Mayer 2005).

In spite of the benefits of the mixed-methods approach, the use of multiple methods can be challenging. For instance, integrating or linking data from different methods of data collection, especially where the integration is between numbers and text, can be challenging if researchers do not have the requisite technical competences to deal with such data, given that the methods have different logical principles, techniques of analysis and interpretation of results (Mason 1994). In addition, there are concerns that

with mixed methods, researchers are likely to mix epistemological and ontological viewpoints such as positivism or objectivism, constructionism and subjectivism (Greene, Kreider & Mayer 2005). However, Patton (2002) argues that epistemological assumptions are useful conceptual tools in social research, but that they should not drive practical decisions such as methods. Patton (2002) further argues that practical decisions concerning the research design and methods used should be driven by the research problem being studied.

The discussion in this section has outlined the research design and demonstrated why a mixed-methods approach was important for the study. The analysis has emphasised that mixed methods become handy when a researcher wants to understand the ‘what’ and ‘why’ of a research problem.

Before I provide detailed discussions on how the data in the study was collected and analysed, it is important to examine the study sample.

3.3 The study sample

The study population was diverse, including smallholder farmers with membership of FBOs (referred to as FBO members in this study) and those with no membership (referred to as FBO non-members in this study), government and NGO officials who work with FBOs. As in most studies, sampling was important because it was not practical to study all the members of the study population. In quantitative studies, researchers are often concerned with selecting a sample that is representative of their study population, which is often not the case for qualitative studies (Bryman 2012). It is important to indicate that the sample for the quantitative approach of this study, discussed below, may not be representative for Ghana as a whole, but may be representative for the administrative regions and districts in which the study took place. Researchers adopting a quantitative approach are often reminded that the bigger the sample size, the greater is the possibility that it will represent all the different characteristics of the population being studied, and that conclusions drawn from a study of a large sample are more convincing than those from a small one (Vaus 2001;

Walliman 2006). If a researcher's objective is to make a claim about how much, how well or how closely the finding from a sample applies to the entire population, then the utmost care should be taken to select a representative sample (Vanderstoep & Johnston 2009). However, in many studies, including this one, which include a quantitative approach, the sample size is often balanced against the practicalities of the research resources, including funds, time, access to potential participants, and planned methods of data collection and analysis (Vaus 2001; Walliman 2006).

Concerning the qualitative approach to this study, the sampling strategy was guided by the desire to generate in-depth knowledge about the benefits of FBOs to smallholder farmers, their operational performance and the factors that influence their performance. As noted already, the principle of representativeness of the sample with respect to the qualitative approach was taken to be less important.

The next two subsections outline how I selected the smallholder farmers and officials who participated in the study, as well as explaining why I included the different categories of people in the sample.

3.3.1 The sample of smallholder farmers

The study employed multi-stage sampling procedure to select 240 smallholder farmers (120 FBO members and 120 FBO non-members). As outlined in Table 3.1 and discussed below, the sampling procedure involved the selection of large primary sampling units such as administrative regions, and then districts, towns/villages, FBOs and finally smallholder farmers.

The first of the sampling procedures involved the selection of administrative regions. Ghana has ten administrative regions (see Figure 3.1). This research focused on two regions: the Northern and the Eastern. One region each was selected purposely from the Northern and the Southern to enable a comparative analysis of the effectiveness of FBOs

when necessary.²⁷ The governing of the choice of the Eastern and Northern regions Southern and Northern Ghana was based on the fact that each region in their respective zones (i.e. Northern and Southern Ghana) had the establishment of the majority of FBO projects as well as the FBOs established (Salifu, Francesconi & Kolavalli 2010).

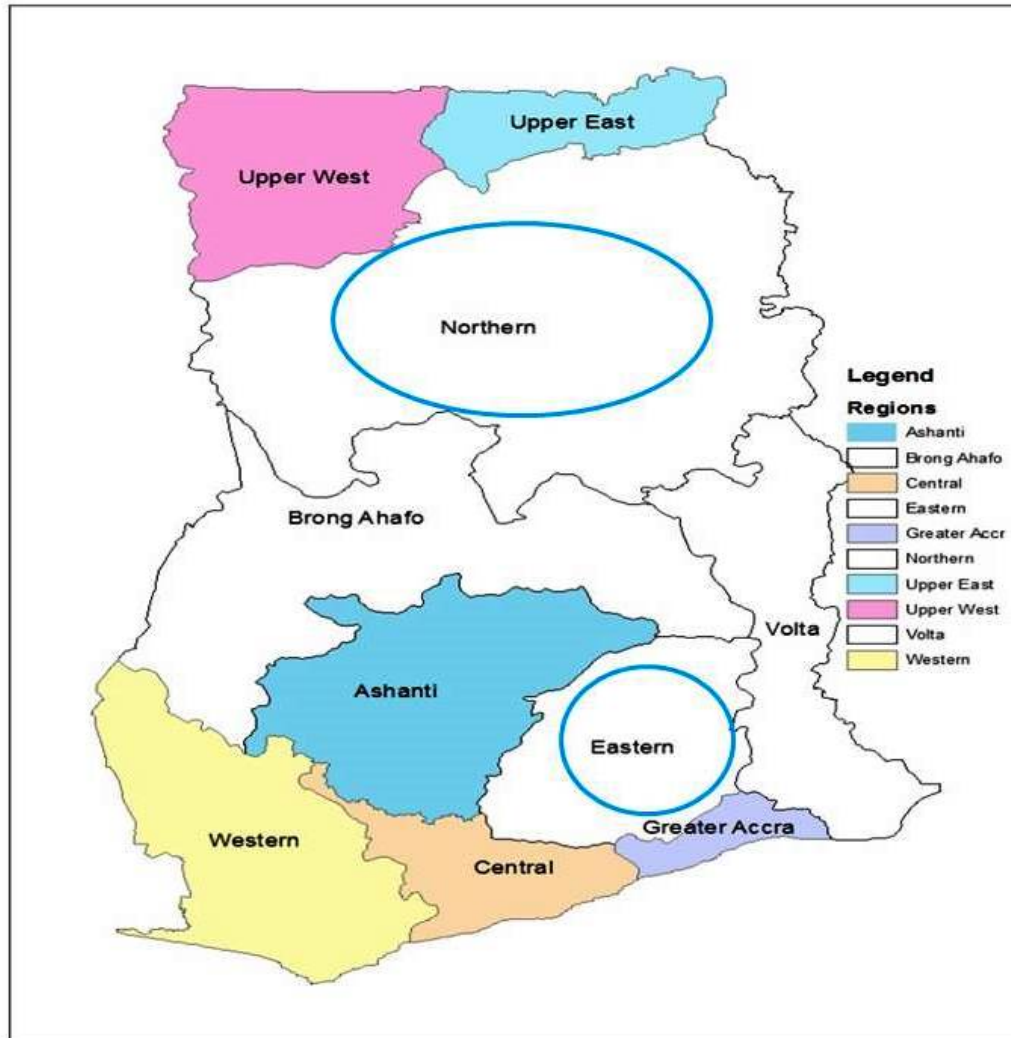


Figure 3.1. The two study regions, out of the ten administrative regions of Ghana

²⁷ The administrative regions that constitute Northern Ghana are Upper East, Upper West, Northern and Brong Ahafo, while those that constitute Southern Ghana are Ashanti, Central, Western, Eastern, Volta and Greater Accra.

The second stage of the sampling procedure involved the selection of districts from the two regions. Using a random sampling approach, eight districts, four from each region,²⁸ were selected as outlined in Figure 3.2.

Table 3.1

The sample for smallholder farmers, using a multi-stage sampling procedure

Regions	No. of Districts	No. of FBOs	Villages with FBOs	Villages without FBOs	No. of FBO members	No. of FBO non-members
Northern	4	20	20	4	60	60
Eastern	4	20	20	4	60	60
Total	8	40	40	8	120	120

Note: In the subsequent discussion, I refer to villages with FBOs as ‘FBO communities’ and villages without FBOs as ‘Non-FBO communities’.

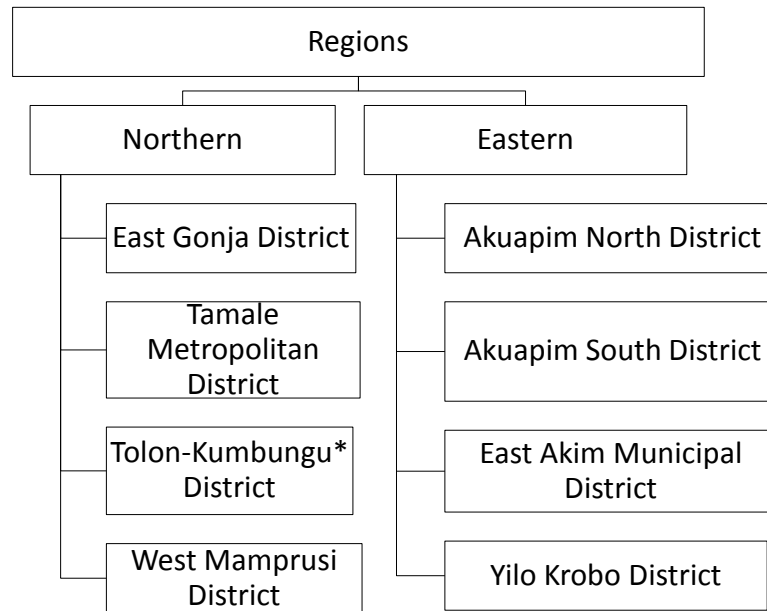


Figure 3.2. The districts selected for the study

Note: The asterisk (*) denotes that due to administrative demarcation in 2012, the district has been divided into two.

²⁸ The Northern Region of Ghana contains 26 districts, while the Eastern Region contains 26 districts.

In the third stage, I selected six communities (towns/villages) from each district. Five of these communities in each district had FBOs set up within them, while one community had no FBOs (see Table 3.1). I therefore studied five FBOs in each district with only one FBO studied in a village/town. In total, 40 FBOs from 40 communities were studied. Eight villages/towns with no FBO presence were also studied. Figure 3.3 depicts the areas that I studied.

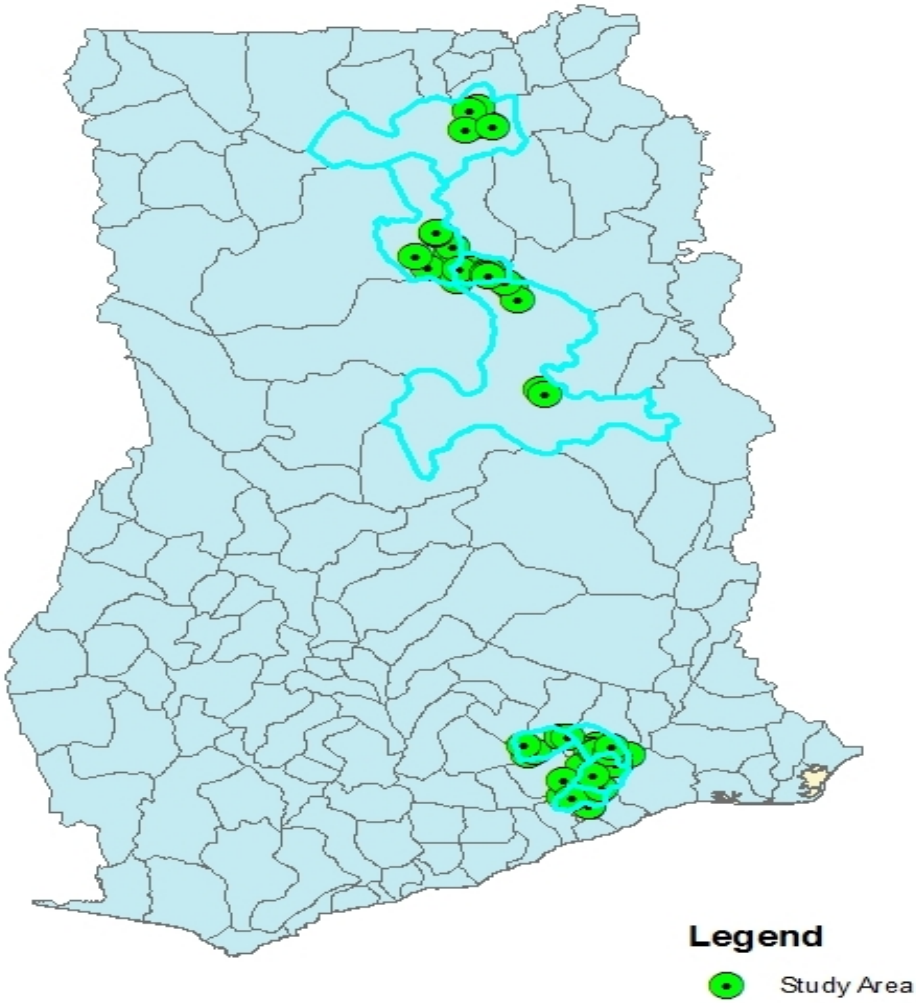


Figure 3.3. A map of Ghana showing the studied communities

The fourth stage of the sampling procedure involved the selection of smallholder farmers (both FBO members and non-members). In those communities that have an FBO, three members from the FBO were selected, consisting of one leader and two randomly selected ordinary members (see Figure 3.4). The surveying of both leaders and ordinary members is important, as Bernard *et al.* (2008) have suggested that some leaders are corrupt and tend to capture benefits that are meant for the entire group for their own benefit. Additionally, leaders are likely to have more information about the FBO than do ordinary members, due to leaders' likely and frequent interaction with stakeholders (e.g. providers of extension services). In addition to the three FBO members selected in each community with an FBO present, I randomly selected two smallholder farmers who were not FBO members. The selection of FBO non-members was aimed at having a comparison group in order to determine the extent to which membership of FBOs improves smallholder farmers' access to extension services, inputs and credit by comparing FBO members to FBO non-members. To add further robustness to the comparison group of FBO non-members, in each district five farmers who are not FBO members and who live in a community with no FBO presence were selected at random. The justification for this is that FBO non-members who are located in a community with FBOs may be exposed to the benefits and experiences of FBO members and potentially be affected by spillover effects (Bernard & Spielman 2009). Figure 3.4 summarises the way in which I selected the communities, the FBOs and their members, and the FBO non-members in each district.

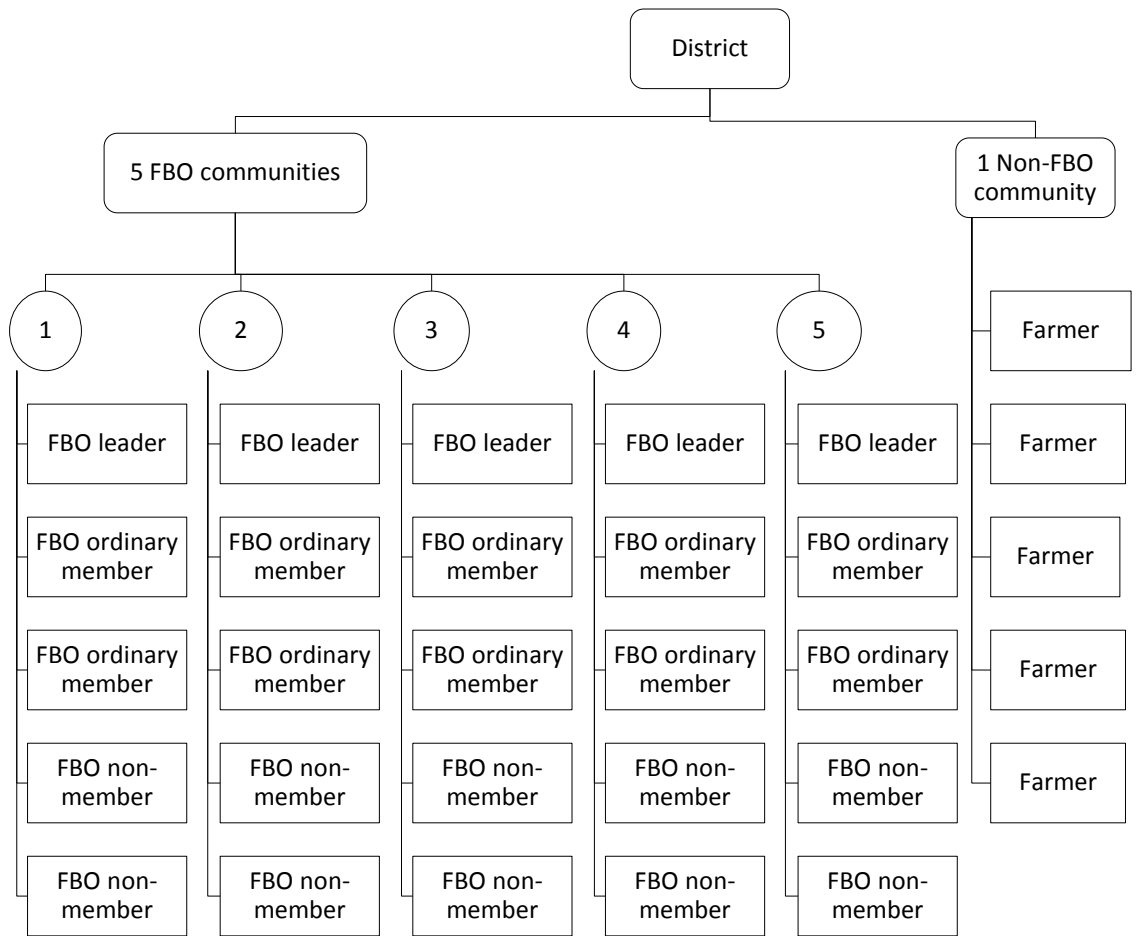


Figure 3.4. The sampling strategy in each district

The four-stage sampling procedure discussed above resulted in the selection of a total of 240 smallholder farmers, of which 120 were FBO members and 120 FBO non-members (see Table 3.2). Approximately 66% of the 240 smallholder farmers were males and 44% females. Of the 120 FBO members, 40 were leaders and 80 ordinary members. Similarly, of the 120 FBO non-members, 80 were selected from communities with the presence of an FBO and 40 with no FBO presence (see Table 3.2).

As I have noted already, the inclusion of both FBO members and non-members in the sample was important in answering the question of whether, and to what extent, FBOs improve smallholder farmers' to agricultural services. For instance, by comparing the extension services that FBO members received from extension workers in a farming season to those received by FBO non-members, one may be able to determine the roles that FBOs play in this process.

Table 3.2

The sample of smallholder farmers

Type of village	Type of participant			Total
	FBO leaders	FBO members	FBO non-members	
FBO community	40	80	80	200
Non-FBO community	0	0	40	40
Total	40	80	120	240

3.3.2 The sample of government and NGO officials

The study also employed a purposive sampling strategy to select 16 officials from NGOs and government agencies that work with FBOs. In other words, I deliberately included these officials in the study to help me address my research questions set out in Chapter 1 (a list of the officials included can be found in Appendix 1). The basis of this sampling framework was to understand, from officials who deal directly with FBOs, how they set up FBOs and the kinds of support they provide to them, as well as how the support is provided. These officials were also deemed important to provide information about the performance of the FBOs and the factors that influence their performance, as well as what can be done to improve the effectiveness of FBOs.

Of the 16 officials selected, 12 belonged to government departments or agencies, including eight agricultural extension agents (AEAs), two senior staff at the Directorate

of Agricultural Extension Services (DAES) and two senior staff at the Northern Regional Agricultural Development Unit (RADU). With regard to the AEAAs, I selected one AEA from each of the eight districts studied. It was important to include AEAAs in the study because they are governmental officials who interact directly with FBOs at the village/town level, and they are likely to know the activities, performance and challenges of the FBOs. Indeed, the AEAAs play key roles in the establishment of FBOs and in providing support such as extension services, inputs and credit to FBOs. The two senior staff at the DAES, located in the national capital, were included in the study in order to understand the broad policies and strategies that drive FBO development, as well as the relevance of FBOs to smallholder agriculture. Finally, two senior government officials, who are located away from the national capital, were included in order to understand the development and performance of FBOs at the regional level.

Similarly, four persons who work for NGOs that provide support to FBOs were included. This was necessary because the way in which the government establishes and supports FBOs may differ from that of the NGOs.

Table 3.3

The sample of government and NGO officials

Type of official	No. of officials
AEAs	8
DAES staff	2
RADU staff	2
NGO officials	4
Total	16

Note: AEAs denotes Agricultural Extension Agents; DAES denotes the Directorate of Agricultural Extension Services; and RADU stands for the Regional Agricultural Development Unit.

In the section that follows, I discuss how data were collected from the sample of smallholder farmers and from the officials from NGOs and government agencies.

3.4 Methods of data collection

This section provides a systematic account of how and what form of data I collected from the different categories of people in the sample discussed above. Again, in deciding the methods for data collection, this research benefited from Silverman and Marvasti's (2008) argument that the choice of methods for data collection should not be predetermined but, rather, should be based on the appropriateness of the methods to gather data that can answer the research questions.

This research employed three main methods to collect data: surveys/questionnaires, oral interviews and participant observation. Before I discuss how and why I used these methods to collect data, it is important to position myself as the researcher and discuss some practical issues that I encountered during my fieldwork in Ghana. This is because, as a researcher, it is sometimes useful to reflect on your identity, especially in relation to how it may influence or shape the interaction you have with your study participants. This self-reflection is often referred in the academic literature as the 'positionality' or 'reflexivity' of the researcher (Limb & Dwyer 2001; Smith 2001).

First, prior to undertaking this research, I worked with the International Food Policy Research Institute (IFPRI)²⁹ from February 2009 to February 2012 as a Research Officer. In that capacity, I participated in a wide range of research projects, including one that involved FBOs. During my work at IFPRI, particularly under its FBO project, I undertook fieldwork to understand the characteristics and activities of FBOs and this contributed significantly to my heightened interest in this research project. In addition, owing to my work at IFPRI, I had access to a database of FBOs, which facilitated my selection of the FBO sample discussed above.

²⁹ The International Food Policy Research Institute (IFPRI) is an international research centre that seeks sustainable solutions for ending hunger and poverty.

Second, as a native of Ghana, I benefited from my knowledge of the local context during data collection, particularly in relation to community entry and recognising local institutions, as well as interpreting cultural observations. The majority of the smallholder farmers in Ghana cannot speak English. A researcher's ability to speak the dominant local languages in the study areas was essential, as the use of translators may result in errors and biases during translation. In Northern Ghana, I did not use translators because I understand the main local languages in the study areas. Although I used translators in Southern Ghana, this involved only ten out of the 120 smallholder farmers I surveyed. Although I could not collect data from those ten participants in their local language without using translators, my basic understanding of the local language helped me to accommodate bias in translation. For instance, it was possible for me to tell when a translator was not asking questions correctly and to make clarifications.

Finally, dealing with smallholder farmers can be complicated, as the majority of them considered me a potential provider of grants, credits and inputs. Owing to farmers' suspicion that I could provide direct support to them, one needs tactics and strategies to unearth the truth. I took considerable time to explain to the smallholder farmers that I was not going to provide direct support to them, but that the outcome of my research could improve how they manage FBOs to access essential services. While providing such explanations to the farmers, I was mindful of Barbour and Schostak's (2005) argument that the perceptions of the research participants about the researcher, as well as the presumed power, social status and knowledge of the researcher, may have a significant influence on the outcome of an interview. Therefore, in dealing with my participants, I was constantly reminded that participants could be messy, complicated and not necessarily unidirectional.

Consequently, as the researcher is responsible for the way in which the research participants' (especially the smallholder farmers) views are presented in this research, this meant ensuring ethical responsibility; that is, ensuring that the participants had consented to participate and maintaining their privacy and confidentiality, as well as

ensuring that participation did not cause them any harm. Indeed, this research went through a formal ethics approval process and was approved by the Human Research Ethics Committee of my university (the Western Sydney University).³⁰ As part of the ethics approval process, I provided a detailed account of how the research participants would be selected and how they would be approached, as well as the methods to be used in data collection (questionnaire/surveys, interviews and participant observation) to the ethics committee. In particular, the ethics committee reviews copies of the questionnaires and interview guides.

I shall now discuss the individual methods used for data collection.

3.4.1 Questionnaires/surveys

To answer the research question of whether smallholder farmers' membership of FBOs improves their access to extension services, inputs and credit (see Chapter 1), the study used questionnaires – often referred to as surveys – to collect data from the 240 smallholder farmers. With questionnaires, one is able to collect measurable data and undertake statistical analysis. In addition, questionnaires ensure standardisation of both the asking of questions and the recording of answers, thereby providing grounds for comparison (Bryman & Teevan 2005; Bryman 2008). As Bryman (2008) argues, structured questionnaires eliminate the problem of whether the interviewer can write down everything that the respondent says or misinterpret the reply given.

While the above arguments are relevant for this study, questionnaires were particularly considered as important in collecting data that can measure, evaluate, compare and describe the extent to which FBOs improve smallholder farmers' access to extension services, inputs and credit. With the use of questionnaires, it was possible to collect information to find out the differences between FBO members and non-members about their access to the services.

The study used three different but closely related types of questionnaires:

³⁰ The ethics approval reference number for this research is *H9907*.

- questionnaires for smallholder farmer who are leaders of FBOs (Appendix 2.1);
- questionnaires for smallholder farmers who are ordinary members of FBOs (Appendix 2.2); and
- questionnaires for smallholder farmers who are not members of FBOs (Appendix 2.3).

The difference between the questionnaires for FBOs leaders and ordinary members of FBOs is that the former included a section that focused on understanding how FBOs were established, their purpose and their collective activities. Both questionnaires included sections that sought to collect information about reasons why smallholder farmer participate in FBOs and the level of their participation, their access to extension services and inputs (such as fertiliser, seeds and agrochemicals) and their adoption of technologies, as well as their access to grants and credit. Similarly, the questionnaire for smallholder farmers who were not members of FBOs included sections about farmers' access to extension services, inputs, grants and credit as well as their adoption of technology. All three types of questionnaire included 'Yes/No' questions, multiple-choice questions, ticking multiple indicators and open questions that required writing.

Owing to the fact that the majority cannot read, the questionnaires were administered through a face-to-face approach. The face-to-face approach offered many benefits. First, there was a 100% response rate, as all of the consenting smallholder farmers participated. Second, I had greater control over who completed the questionnaires, as some research participants may delegate someone who is not a study target to complete the questionnaires if the approach is not face-to-face. Finally, it provided me the opportunity to deal with questions in the questionnaires that respondents might have misunderstood.

Notwithstanding the discussions that support the use of questionnaires in the study, the questionnaires were not appropriate in answering the important research questions that

sought to dig deeper into understanding the factors that influence the operational performance of FBOs, as well as how to improve their performance. Indeed, structured questionnaires have often been criticised for not being able to capture research participants' perceptions, as the questions are mostly designed by researchers and give the respondents or participants little chance to express themselves (Creswell 2003; Silverman & Marvasti 2008). Bryman (2008) also supports this when he argues that with structured questionnaires, research respondents may not be able to come up with interesting replies that are not covered by the fixed answers provided in the questionnaire.

In view of the above limitations of the questionnaires and the need to address the other research questions, semi-structured interviews were conducted with officials from government agencies and NGOs that work with FBOs. The interviews were also conducted with selected smallholder farmers, as discussed in the section below.

3.4.2 Semi-structured interviews

The study conducted a series of in-depth, semi-structured, tape-recorded interviews with some selected smallholder farmers, and officials from government agencies and NGOs (see Table 3.4), in order to understand the processes underlying the activities and performance of FBOs. The advantage of using semi-structured interviews is that the data collection is not limited to a particular set of questions or variables (Silverman & Marvasti 2008). Semi-structured interviews often have a series of general questions, but also allow a researcher to ask additional questions in response to what are seen as significant replies (Bryman 2008). These types of interviews can therefore generate a lot of information, as they enable the researcher to cover a wide variety of topics, clarify issues raised by the participants and follow up unanticipated themes that arise (Valentine 2001; Bryman & Teevan 2005).

The semi-structured interviews were important in this study first to understand the features of FBOs that make them succeed or, on the other hand, fail to improve smallholder farmers' access to extension services, inputs and credit. In particular, it was

important to understand the processes involved in establishing FBOs and their management and activities, as well as the different ways in which they receive support from external actors. Second, these interviews were necessary in order to understand how FBOs can be developed into important local institutions that improve smallholder agriculture.

Table 3.4

The participants for the semi-structured interviews

Type of participant	No. of participants
AEAs	8
DAES staff	2
RADU staff	2
NGO officials	4
FBO leaders	30
FBO ordinary members	25
FBO non-members	35
Total	106

Note: AEAs denotes Agricultural Extension Agents; DAES denotes the Directorate of Agricultural Extension Services; and RADU stands for Regional Agricultural Development Unit.

As shown in Table 3.4, 90 smallholder farmers were interviewed (including 30 leaders of FBOs, 25 ordinary members and 35 FBO non-members). It is important to note that these 90 smallholder farmers were randomly selected for interviewing from 240 smallholder farmers who responded to the questionnaires (see Section 3.4.1). There are many reasons that underscore the need to interview the three categories of smallholder farmers. First, while one could elicit information about how FBOs are being managed from the leaders, ordinary members are in a better position to explain how the leaders

are managing them. Similarly, smallholder farmers who are not members of FBOs can offer their views about the performance of FBOs as outsiders. Second, asking the same questions that were applicable to the three categories of smallholder farmers served to cross-check answers and thus improved the validity of the findings. Finally, one needed all the three categories of smallholder farmers to understand specific issues in each category (for the interview guides for each category, see Appendices 3.1, 3.2 and 3.3). For example, FBO non-members could best explain the question of why some smallholder farmers are not members of FBOs.

The semi-structured interviews with the AEAs and officials from NGOs were geared towards understanding what kinds of services they provide to FBOs and how they provide those services, as well as the factors that influence the way they provide services to FBOs (for the interview guide for officials, see Appendix 3.4). The interviews also elicited the AEAs' views on the performance of FBOs, as well as the factors that influence the performance of FBOs.

While the interviews with the DEAS staff were aimed at understanding broad policies and strategies driving the development and performance of FBOs at the national level, the interviews with the RADU staff were aimed at understanding these policies and strategies at the regional level (for the interview guide, see Appendix 3.4).

In sum, the semi-structured interviews with the various stakeholders discussed above helped in understanding the evolution of FBOs, the policies and strategies under which they are established, the activities of FBOs and their performance, as well as the factors that influence their performance. The interviews also unearthed the institutional arrangements of government agencies and NGOs with regard to FBOs, as well as the performance and challenges that the government agencies and NGOs face.

3.4.3 Participant observation

The analysis in this study also benefited from my own observations during my 6 months of fieldwork (from December 2012 to June 2013) on the activities of FBOs and their

members, as well as other smallholder farmers. Limb and Dwyer (2001) remind us that participant observation is a good strategy to explore some of the complexities of everyday life in order to gain deeper insight into the processes shaping our social worlds.

While observations can take different forms (e.g. unstructured, semi-structured and structured), the observations in this study were unstructured. During the fieldwork, I participated in three FBO meetings, mainly as an observer. During such meetings, I recorded some issues FBOs discuss in meetings, the interactions between the FBO leaders and the members, and the decisions that the FBOs and their members arrived at in the meetings. It is also important to note again that this research involved visiting 48 communities to interact with the 240 smallholder farmers (see Table 3.1). During my visit to these communities, I observed and took notes on a wide range of discussions that ensued among smallholder farmers and FBO members, particularly their discussions on why they participate in FBOs and the support that smallholder farmers receive for being FBO members, as well as the performance and challenges that FBOs face.

While studies that depend largely on participant observation are often criticised for a considerable amount of subjectivity, as the researchers decide what to observe and what to record based on their own impressions and perceptions (Jones & Somekh 2005; Silverman & Marvasti 2008), the data collected through this strategy was used to complement the data collected through the questionnaires and semi-structured interviews.

3.4.4 Secondary sources

In addition to data from the questionnaires, semi-structured interviews and participant observation, the study relied on secondary data from FBOs, government agencies, NGOs and a research organisation (IFPRI).

A variety of documents was collected from about 20 out of the 40 FBOs studied. These documents included FBOs' registration certificates, constitutions and by-laws, attendance books, minutes and records of their financial contributions. Collecting such

documents was necessary, as they provide insights about the governance and internal activities in FBOs.

In relation to government sources, the study collected secondary data on credit disbursement and recovery in FBOs under two government programs (discussed in Chapter 7). These data were used to understand the performance of FBOs in relation to credit access and repayment. Similar credit data were collected from two NGOs (also discussed in Chapter 7) to compare FBOs' credit access and repayment under government and NGO projects. Furthermore, 'grey' literature such as FBO projects' progress and completion reports was collected, which provided important background and contextual material and offered insights for further analysis.

Finally, the research also used secondary data that IFPRI collected on 501 FBOs in 2010, in the course of conducting a survey in order to understand the characteristics and activities of FBOs in Ghana. The sample for the IFPRI survey was drawn from a database of FBOs compiled by Ghana's Ministry of Food and Agriculture (MOFA) through a nationwide voluntary registration process. The sample of 501 FBOs was drawn from 40 districts in six regions: Northern, Brong Ahafo, Central, Eastern, Greater Accra and Volta. The IFPRI survey data were used largely to provide background and offer insight for further analysis (see Chapter 4).

3.5 Data analysis

The discussions in the previous section show that the study collected a variety of data through the questionnaires, semi-structured interviews, participant observation and secondary sources. The section also shows that the research data were collected from five categories of participants, including FBO leaders, FBO ordinary members, FBO non-members, officials from government agencies and NGOs. Guided by the different research participants and the research aim and questions (Chapter 1), the analysis in the study took two broad forms: quantitative and qualitative approaches. Although the discussion here is structured according to quantitative and qualitative approaches, it is

important to note that both approaches are integrated in the empirical chapters (Chapters 4–7).

3.5.1 Quantitative analysis

The quantitative analysis was based on the data collected from FBO members and non-members through the questionnaires, the secondary sources from IFPRI on 501 FBOs, and the credit disbursement and recovery data from the government agencies and NGOs. In quantitative analysis, the emphasis is always on numbers and statistics (Bryman 2008). The quantitative analysis was geared towards describing, exploring, measuring and establishing effects on the extent to which FBOs improve smallholder farmers' access to extension services, inputs and credit. In particular, the analysis compares as much as possible the extent to which FBO members and non-members access and use extension services, inputs and credit.

With the help of the IBM SPSS Statistics computer software package, a wide range of statistical techniques – such as percentages, frequencies, chi-square (χ^2) values, cross-tabulation, means and *t*-test results – were employed to provide descriptions across FBOs, their members and FBO non-members. For instance, while frequencies, percentages and means were used to determine differences and relationships between FBO members and non-members with regard to their access to extension services, inputs and credit, the χ^2 and *t*-test techniques were used to ascertain the statistical significance of the relationships and differences. In addition, the study employed standard multiple regression (Ordinary Least Squares, OLS) to understand the factors that determine and influence FBO members' and non-members' access to and use of extension services and inputs (Chapters 5 and 6).

As discussed in Section 3.3.1, the study largely used a random sampling approach to selecting both the FBO members and non-members. However, one cannot claim that it was a completely randomised design, a technique usually associated with experimentation. Undoubtedly, researchers cannot always employ randomisation in all studies in order to understand treatment effects (that is, the impact of an intervention),

partly because of cost- and time-related issues (Khandker, Koolwal & Samad 2010). In the case of this study, it was not possible to adopt randomisation (experimentation) to determine the extent to which FBOs improve smallholder farmers' access to extension services, inputs and credit. The ideal situation would have been to compare how the same smallholder farmers would access extension services with or without FBOs. This was impossible to do because farmers cannot have two simultaneous forms of existence; that is, a farmer cannot be an FBO member and an FBO non-member at the same time. In other words, one could not observe how the outcome (e.g. access to extension services), would have looked without membership of FBOs (the counterfactual). Therefore, there was a problem of missing data on the counterfactual. For this, it was necessary to identify a suitable group (a control group) among the smallholder farmers who were not members of FBOs, to represent the counterfactual (Khandker, Koolwal & Samad 2010). As noted, through a probability sampling approach, this study identified a comparison group (FBO non-members) that had characteristics similar to those of the FBO members.

However, in comparing these two groups through statistical analysis, one risks criticism regarding non-randomisation. A major criticism could be that since the recruitment of farmers into FBOs was not random (for a discussion on the recruitment of farmers into FBOs, see Chapter 4)³¹, it is not appropriate to compare how FBO members and non-members access extension services, because the FBO non-members could be a misleading counterfactual. In order to proceed with a comparison along these lines, one has to account for FBO membership selection bias. For instance, a key potential source of bias will be that FBO members may differ from FBO non-members regarding observed personal characteristics such as age, education and landholding sizes, as well as unobserved characteristics. In recent years, many researchers (see, e.g., Jalan & Ravallion 2003; Bernard *et al.* 2008; Fischer & Qaim 2011) use propensity score

³¹ Section 4.4, for example, mentions that the selection of farmers to participate in FBOs could be through external agencies or family ties.

matching techniques,³² a technique that was pioneered by Rosenbaum and Rubin (1983), to control for selection bias.

Propensity score matching analysis

The propensity score matching (PSM) approach is a statistical technique that mimics randomisation and controls for selection bias in a non-experimental setting, using a set of independent variables. The main objective of the PSM approach is to construct suitable comparison groups using observed characteristics (variables) of the respondents in the research (Caliendo & Kopeinig 2008). The most common variables for estimating the propensity scores are participants' characteristics (pre-participation characteristics in FBOs). The PSM technique therefore assumes that selection bias is based only on observed characteristics of respondents in the study. Using the variables on participants' characteristics, the PSM technique will assign pairs of FBO members and non-members based on their propensity scores or probabilities (Rosenbaum & Rubin 1983; Khandker, Koolwal & Samad 2010). In the case of this study, the PSM technique will give further robustness for a comparison between FBO members and non-members with similar propensity scores.

In this study, the PSM technique used a logistic regression technique to estimate the scores based on the relevant characteristics of the respondents, including their age, gender, education level, farming experience, ability to read, ability to write, ownership of a cell phone and landholding sizes. The analysis relied on the 240 smallholder farmers being evenly split between FBO members and non-members. The PSM technique then matched FBO members and non-members with similar scores using a nearest-neighbour matching approach.³³ In recognition of the relatively small sample of this study and to

³² Other techniques include difference-in-difference, instrumental variable and regression discontinuity (Khandker, Koolwal & Samad 2010).

³³ It is important to note that there are other matching approaches such as kernel matching, caliper and radius matching, stratification and interval matching, and local linear matching.

avoid the risk of bad matches, a tolerance level on the propensity score distance of 0.2 was adopted (Caliendo & Kopeinig 2008).

The PSM is expressed as:

$$e(x) = P(Z = 1|X)$$

where $e(x)$ represents the propensity score, P is the probability of being an FBO member or FBO non-member, and $Z = 1$ is an indicator of FBO membership (the value is 0 for FBO non-members and 1 for FBO members). The symbol ‘|’ stands for ‘conditional on’ and X represents the set of observed characteristics (covariates).

Table 3.5

Matched FBO members and non-members by Region and District

Region	District	FBO members	FBO non-members	Total
Eastern	Akuapim North	15	10	25
	Akuapim South	15	15	30
	East Akim	15	8	23
	Yilo Krobo	15	13	28
Northern	East Gonja	15	15	30
	Tamale Metropolitan	15	15	30
	Tonlon-Kumbungu	15	15	30
	West Mamprusi	15	15	30
Total		120	106	226

In the PSM analysis, all of the FBO members found appropriate matches. However, the analysis eliminated 14 FBO non-members who did not get appropriate matches. As a result, the original sample of 240 smallholder farmers was reduced to 226 and Chapters 5–7, which compare FBO members and non-members, rely on this reduced sample (the results of the PSM analysis are shown in Appendix 4).

Table 3.5 shows the matched FBO members and non-members according to regions and districts. The table shows that the PSM analysis did not drop any FBO non-member in the Northern Region; the 14 FBO non-members were dropped from three of the four districts in the Eastern Region.

It is important to emphasise the PSM technique used in the study was not intended to compare paired individual farmers outcomes but rather to ensure comparison between FBO members and non-members. In other words, the PSM technique was used mainly to ensure that the sampling approach used in the study in selecting the two groups (FBO members and non-members) was robust which will allow for comparison between the two groups on their access to extension services, inputs and credit.

Table 3.6 provides some descriptive statistics about the reduced sample to be used for analysis in the chapters that follow. This is important as it provides key characteristics of the smallholder farmers being investigated. These characteristics are also presented according to FBO members and non-members so as to appreciate some key differences between the two groups of smallholder farmers. The table shows that FBO members and non-members do not differ significantly in relation to four main characteristics, namely, their years in education, years of farming experience, total land holding size and the actual landholding under cultivation, which further supports the view that the two groups can be compared. However, Table 3.6 shows that FBO members differ significantly from their non-members counterparts in relation to age, English proficiency, access to radio and TV, ownership of cell phones.

Table 3.6

Descriptive statistics of key variables for smallholder farmers in the reduced sample according to FBO members and non-members

Variable	FBOmembers		Non-members	Min	Max
	All (n=226)	(n=120)	(n=106)		
Gender (dummy, 1 = male)	0.67 (0.47)	0.72 (0.45)	0.61 (0.49)	0	1
Age (in years)	45.89(11.28)	48.27 (10.14)	43.21 (11.94)**	24	74
Education (in years)	4.62 (5.32)	5.92 (5.73)	3.15 (4.40)	0	17
Whether farmer can speak English (dummy, 1 = yes)	0.34 (0.48)	0.45 (0.5)	0.22 (0.41)**	0	1
Whether farmer can write English (dummy, 1 = yes)	0.21 (0.41)	0.3 (0.46)	0.1 (0.31)**	0	1
Whether farmer can read English (dummy, 1 = yes)	0.22 (0.41)	0.32 (0.47)	0.1 (0.31)**	0	1
Whether farmer has access to radio (dummy, 1 = yes)	0.78 (0.42)	0.9 (0.301)	0.64 (0.48)**	0	1
Whether farmer owns a cell phone (dummy, 1 = yes)	0.74 (0.44)	0.8 (0.40)	0.67 (0.47)*	0	1
Whether farmer has access to TV (dummy, 1 = yes)	0.26 (0.44)	0.36 (0.48)	0.15 (0.36)**	0	1
Years of farming experience	17.91 (11.07)	19.07 (10.49)	16.59 (11.60)	1	45
Total landholding size (in acres)	10.35 (11.57)	10.76 (10.57)	9.89 (12.65)	1	63
Landholding size under cultivation (in acres)	5.4 (3.411)	5.65 (3.37)	5.12 (3.45)	1	13
The existence of extension center in the community	0.06 (0.23)	0.08 (0.26)	0.04 (0.19)	0	1
Whether the village is assigned an AEA (dummy, 1 = yes)	0.68 (0.47)	0.96 (0.20)	0.36 (0.48)**	0	1
The distance from the closest extension centre (in miles)	14.78 (16.71)	13.87 (15.50)	15.81 (18.01)*	0	61
Distance to the closest agri-market	5.8 (6.99)	4.78 (6.31)	6.96 (7.54)*	0	25
Whether there is a bank in the community	0.14 (0.35)	0.18 (0.38)	0.09 (0.294)	0	1
Whether farmer has a bank account	0.4 (0.49)	0.55 (0.50)	0.24 (0.43)	0	1
Whether there is FBO in the village (dummy, 1 = yes)	0.85 (0.35)	1.00 (0.00)	0.69 (0.47)	0	1

Source: Author's calculation from fieldwork data

Note: Figures in parentheses are standard deviations of means. * and ** show that mean differences between FBO members and non-members are significant at the 5% and 1% confidence levels.

3.5.2 Qualitative analysis

The qualitative analysis was based on the data collected through the semi-structured interviews from FBO members, FBO non-members, and the officials from government agencies and NGOs. The analysis also utilised my fieldwork notes, which were largely based on the participant observation. It also utilised secondary documents that I collected from FBOs, government agencies and NGOs. Unlike the quantitative analysis, the emphasis here was on in-depth understanding of processes. In other words, the qualitative analysis was geared towards understanding processes that underlie the establishment of FBOs, their activities, their performance and their challenges, as well as understating how their performance can be improved.

The first step in the qualitative analysis in relation to the tape-recorded, semi-structured was to transcribe them. The transcripts were then imported to Nvivo 10,³⁴ a computer software package that facilitates qualitative analysis. With the help of NVivo 10, I developed a coding system based on the research questions and coded the transcripts (for details of the coding framework, see Appendix 5). Coding is described as the process of categorising and sorting data, while the codes are summarised, synthesised and sorted data (Bryman & Burgess 1994a). Coding provides the link between data and the conceptualisation (i.e. the generation of concepts) (Bryman & Burgess 1994a). It must be noted that the NVivo software was mainly used as a tool to code as well as help in the retrieval and exploration of the qualitative data. I recognised that the NVivo software could not perform the creative and intellectual task of devising categories and deciding which categories were relevant to answer my research questions. I believe that the NVivo software freed me from the paper management of data, which can be time-consuming, to enable me to concentrate on the interpretation of the data.

The coding was a key step in the analysis as it enabled me to organise the qualitative data into themes. With help of Nvivo, I was able to search for themes in the imported

³⁴ NVivo is a qualitative data analysis computer software package produced by [QSR International](#). It has been designed for qualitative researchers working with very rich text-based and/or multimedia information, where deep levels of analysis on small or large volumes of data are required.

interview transcripts and develop analytical categories, while being mindful of surprises (again, for details, see Appendix 5). As Hammersley and Atkinson (2007) remind us, in undertaking qualitative analysis, researchers should immerse themselves in the data and then search for patterns, identify possibly surprising phenomena and be sensitive to inconsistencies such as divergent views offered by different individuals.

Finally, I also examined the primary documents collected from FBOs, government agencies and NGOs. The analytical approach with these was to review and use their contents to provide background or context, as well as to use quotes from them to support further analysis.

3.6 Conclusion

The methodology and methods used in this study were informed by the need to understand the extent to which FBOs improve smallholder farmers' access to extension services, inputs and credit as well as identify the factors that influence the performance of FBOs. The study used a mixed-methods approach of participant observation, secondary data from government agencies and NGOs, questionnaires to collect data from 240 smallholder farmers (including FBO members and non-members), and semi-structured interviews to collect data from 90 smallholder farmers, 12 government officials and four officials from NGOs. The study also utilised primary documents from FBOs, government agencies and NGOs. While data from the questionnaire were used largely to answer the 'to what extent' question of the research, the data from the other sources were used to provide background and contextual information and, more importantly, to address the 'why to that extent' question of the research.

The next chapter begins to present the results and discussions of the data. It focuses on explaining the formation of Ghanaian FBOs, their types and their activities. In particular, it discusses the governance and management of FBOs in relation to their collective activities.

CHAPTER FOUR

UNDERSTANDING THE FORMATION, TYPES AND ACTIVITIES OF FBOs IN GHANA

4.1 Introduction

In the previous chapter, I discussed the methodology and methods adopted to understand the extent to which farmer-based organisations (FBOs) make a difference among smallholder farmers. As outlined in Chapter 1, this study aims to understand whether, and to what extent, FBOs improve smallholder farmers' access to extension services, inputs and credit. Before one begins to address this directly, it is important to understand first the nature, functions and activities of FBOs in Ghana.

This chapter therefore delves deeper into understanding the types of FBOs and how they are formed, as well as their activities. This chapter is divided into three main parts. First, it defines and classifies the different types of FBOs that have emerged in Ghana during the past two and half decades, a period marked by a global call for developing countries to establish independent and business-oriented farmer organisations, as many farmer organisations were under state control (Rondot & Collion 2001).³⁵ Second, it examines the rationale for FBO development as well as smallholder farmers' motivations for participating in FBOs. Finally, the chapter considers the extent of participation and collective action among Ghanaian FBOs; in particular, identifying the factors that influence smallholder farmers' participation in FBO activities.

4.2 Defining the farmer-based organisation

In Ghana, the term FBO first appeared in the World Bank's sponsored Agricultural Services Sub-sector Investment Project (AgSSIP) document in 2000.³⁶ The document used the term to denote all forms of associations or cooperation that involve farmers at

³⁵ The United Nations, for instance, declared the year 2012 as the International Year for Cooperatives (cooperatives can be categorized as one form of farmer-based organisation).

³⁶ AgSSIP started in 2000 and completed in 2006. AgSSIP aimed at increasing the growth of agricultural productivity, reducing rural poverty and improving food security.

all levels of society. The AgSSIP project also used the term to embrace all associations of agriculture-related activities that have the potential to promote agricultural development. Following this conceptualisation, people who engage in agricultural production, processing and marketing (including crops, livestock, agro-forestry, and fisheries) can form an FBO. Therefore, 'FBO' is used as a generic term that embraces farmer cooperatives, groups, associations, unions, societies, organisations and federations.

Owing to the wide range of terminologies used to denote FBOs, different authors have used these terminologies to describe collective action in agriculture without necessarily defining their scope or boundaries. For example, Bratton (1986a), Uphoff (1988), Chirwa *et al.* (2005) and Hellin *et al.* (2009) used 'farmer organisations' in their studies on agricultural collective action, while Oxby (1983), Parks and Tinnermeier (1983) and Barham and Chitemi (2009) preferred to use the term 'farmer groups'. Similarly, in their study on agricultural collective marketing, Bernard and Spielman (2009) referred to FBOs as 'producer organisations'. One key disadvantage of using these different terminologies in research is that it makes the comparison of findings from different studies challenging, especially if researchers fail to define the terminologies properly.

Despite the above conceptual issues, in Ghana, there is some consensus on what the roles of FBOs should be (Salifu, Francesconi & Kolavalli 2010). They are voluntary membership groupings created for the social and economic benefits of their members, such as promoting access to agricultural extension services, farm inputs and credit; marketing of agricultural production; and undertaking collective processing of agricultural production and its marketing (MOFA 2009).

The above paragraph already suggests that in the Ghanaian context, the term FBO embraces agricultural collective action that takes place at different levels of society. However, as the emphasis of this study is on smallholder farmers who mainly reside in rural areas, it also focuses on the types of collective action that takes place at the village

level. In particular, this research examines FBOs that engage in crop production at the village level. Despite this relatively narrow focus here, however, it is imperative to have a broader understanding of the different types of FBOs that exist in Ghana.

4.3 Typologies of farmer-based organisations

Farmer-based organisations take different forms in Ghana ranging from informal to formal FBOs, village-level to national-level FBOs, production to multipurpose FBOs and those organisations initiated by farmers themselves to those established by external agencies. Although efforts to classify farmer FBOs have been based largely on the kind of activities they undertake (MOFA 2009), they can also be categorised using some other criteria, including the scale at which they operate (locational coverage) and their legal status (whether they are registered with a statutory agency).

4.3.1 Types of FBOs based on location

The evolution of FBOs in Ghana according to the scale at which they operate appears to be in line with the country's decentralisation system, which has a four-tier structure of governance comprising the central government, regional coordinating councils, district assemblies and sub-district structures. The Ministry of Food and Agriculture (MOFA) also operates in a similar fashion, with National-level offices, Regional Agricultural Development Units (RADUs) and District Agricultural Development Units (DADUs), with their substructures.

Although Ghana currently has no clear policy on the development of FBOs (Tsekpo 2008), the typical approach to FBO development is that they are first developed at the village level and are then expected to network through a hierarchy of district and regional groupings to a national apex (GOG 2007). The available evidence, however, does not support the existence of strong network of FBOs from the village to the national level. As it will be shown later in this section based on fieldwork evidence, one can best describe the FBO networks as loosely structured networks of convenience. Tsekpo (2008, p. 185) makes a similar observation in his study of the cooperative

movement in Ghana when he notes that, ‘... primary societies [agricultural cooperatives] have little interaction with the district/regional unions’.

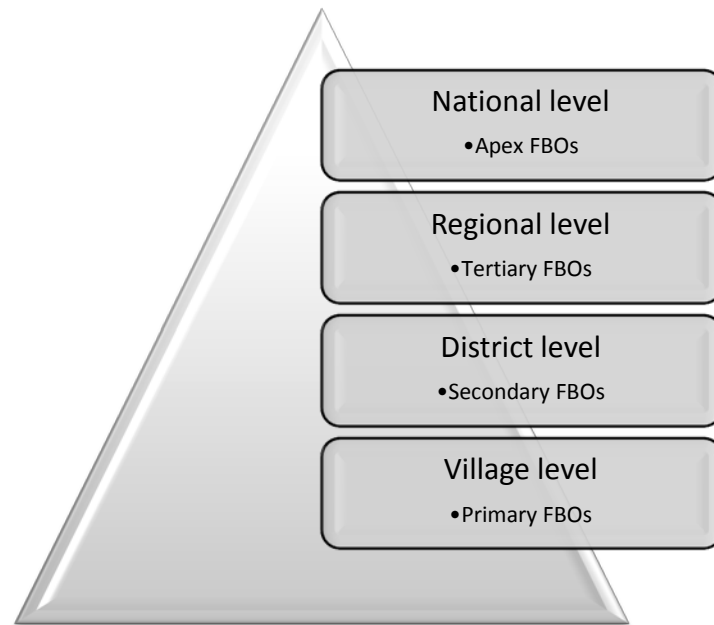


Figure 4.1. Types of FBOs according to geographical scope

In spite of this seemingly weak link between village-level and national-level FBOs, one can identify four types of FBOs based on the jurisdiction within which they operate; namely, village-, district-, regional- and national-level FBOs (Figure 4.1). The rest of this section focuses on a brief examination of these four types of FBOs before paying more detailed attention to those organisations that are of interest in this study, the village-level FBOs.

At the base of the pyramid (Figure 4.1) are village-level FBOs, sometimes referred to as primary FBOs, which constitute the majority of FBOs in Ghana.³⁷ The majority of village-level FBOs are set up by external agencies such as government agencies and NGOs to facilitate the implementation of their projects (Salifu, Francesconi & Kolavalli

³⁷ An example of an NGO that refers to village-level FBOs as primary FBOs is the Association of Church Development Projects (ACDEP), based in Northern Ghana.

2010; Salifu *et al.* 2012). At the village level, FBOs facilitate smallholder farmers' access to various services such as credit, extension services and inputs from NGOs, government and private-sector companies. While some village-level FBOs mediate the relationship between their members and political and economic actors outside the village (Bernard *et al.* 2008), others operate mainly within the village. FBOs whose operations go beyond the village level sometimes result in the formation of district-level FBOs, also known as secondary FBOs.

District-level FBOs constitute the second tier in the four-tier structure presented in Figure 4.1. The membership of this category of FBOs usually includes executives (leaders) of the village-level FBOs. As in the case of the formation of village-level FBOs, external agencies (particularly NGOs) initiate the establishment of district-level FBOs, rather than initiatives emanating from village-level FBOs themselves. As a result, the existence of district-level FBO depends on the presence and activities of NGOs or other development agencies in a given district. For example, within the scope of my studies, one of the districts in the Eastern Region, the East Akim District, did not have a district-level FBO, while the Tolon-Kumbungu district in the Northern Region had at least two district-level FBOs, both set up under different NGO projects. Primarily, it is expected that the district-level FBOs will coordinate the activities of village-level FBOs, such as arranging for credit and organising farm produce for marketing, as well as representing and lobbying for farmers at different fora. In addition, the setting up of district-level FBOs is a sustainable approach to FBO development. In particular, establishing such FBOs is an exit strategy for some NGOs. An NGO official in the Northern Region rightly echoed this when he noted that

... the idea of the secondary FBOs is to put in place a management system so that FBOs [up to the village level] can manage their [own] affairs after the end of the program. ... [S]o we involve the secondary FBOs in almost all the processes of the program. For example, we let them [district-level FBOs] engage in the

interaction with banks, inputs dealers ... (Interview with NGO official in Northern Region, 12/06/2013)

Partly because NGOs set up district-level FBOs along project lines, not all village-level FBOs in the districts become members, making it difficult to build a united FBO front at the district level. The implication of this could be that there will be weak district-level FBOs to promote the development of village-level FBOs and their members. In spite of these apparently weak district-level FBOs, some NGOs have taken further steps to establish regional-level FBOs, whose main function is to interact with the village-level FBOs through the district-level counterparts.³⁸

As shown in Figure 4.1, regional-level FBOs are at the third level in the four-tier structure. The regional-level FBOs, also called tertiary FBOs, are expected to draw their membership from the district-level FBOs. The primary responsibility of FBOs at this level is more one of negotiating, lobbying and advocating for support on behalf of FBOs at the lower levels. As in the case of district-level FBOs, NGOs mainly initiate the formation of FBOs at the regional level. In the Northern Region, for example, under a Food Security and Rice Producers Organisation Project (FSRPOP), a Northern Region Intensive Lowland Rice Farmers' Cooperative Union (NILRIFACU) was set up at the regional level to mediate among input suppliers, tractor owners, banks and rice processors on the one hand, and district- and village-level FBOs on the other (Wilhemina *et al.* 2010).³⁹ It is reasonable to argue that development organisations (e.g. NGOs) are only interested in the establishment of FBOs in line with the country's governance structure or a predetermined structure, regardless of whether FBOs at the village level have the skills or capacity to organise at the higher level. This line of reasoning becomes more evident as some FBOs are already evolving at the national level.

³⁸ The Association of Church Development Projects (ACDEP), based in Northern Ghana, is an example of such NGOs.

³⁹ The Association of Church Development Projects (ACDEP) in implementing its 'farmer agricultural production and marketing project' has also set up a regional-level FBO (Alebikiya 2011).

National-level FBOs represent the final tier of the structure identified in Figure 4.1. These FBOs are located in the national capital. Although national-level FBOs claim to draw their membership from the lower-level FBOs, particularly those at the regional level (Tsekpo 2008), it is not clear how they recruit their members. As a senior official at the Directorate of Agricultural Extension services (DAES) of MOFA in the national capital observed, ‘... the apex FBOs in Accra do not even know their so-called grassroots FBOs’ (interview with official at DAES, 08/05/2013). It is reasonable to mention that the majority of the FBOs at the lower level may never become true members of the national-level FBOs throughout their lifespans. While in some African countries there exists a single apex body at the national level (Develtere, Pollet & Wanyama 2008), in Ghana one can identify several national-level FBOs. Some are formed on a commodity basis, as with the Vegetable Producers and Export Association of Ghana and the Citrus Growers Association of Ghana. Others are formed with no regard to specific commodities by embracing a wide range of FBOs. Such forms of FBOs include the Apex Farmers’ Organisation of Ghana, the Farmers’ Organisation Network in Ghana and the Ghana National Association of Farmers and Fishermen. Similar to the regional-level FBOs, the primary responsibilities of national-level FBOs are to collaborate and negotiate with relevant stakeholders to support lower-level FBOs, as well as to lobby and advocate for good policies for farmers, among others. It is however, unclear whether national-level FBOs are able to influence policymaking to the benefit of regional, district, and village-level FBOs; and this goes beyond the scope of this study.

In summary, the discussion in this section has identified four types of FBOs according to the scale or administrative unit within which they operate; that is, from the village to the national level. The analysis has also suggested that district- and regional-level FBOs are initiated through various projects as sustainability strategies, but it is not clear if these FBOs survive beyond the lifespan of the projects. While the discussion shows efforts by relevant stakeholders in adopting bottom-up approaches (vertical integration) to

developing FBOs in Ghana, it also indicates the existence of a weak link among the different types of FBOs. In other words, the analysis suggests that FBOs that span spatial scales and governance responsibilities do not have adequate skills and capacities to discharge their duties.

4.3.2 Types of FBOs based on legal status

Based on whether village-level FBOs register with 'statutory' government departments, one can identify two types of FBOs: formal and informal. I classify all FBOs that have no registration with any government department as informal and those with registration as formal. It is important to note that this classification does not suggest that formal FBOs are more efficient and effective, compared to their informal counterparts. Rather, such a classification is undertaken for two important reasons: first, to demonstrate the weak legal framework governing the registration and operation of village-level FBOs; and, second, to show the significance of FBOs' registration to farmers at the village level.

Informal FBOs

The available evidence indicates the existence of informal FBOs in Ghana long before the advent of colonialism (DeGraft-Johnson 1958; Onumah *et al.* 2007). While still present in today's rural Ghana, the pre-colonial informal FBOs took the form of *ad hoc* farmer-initiated groupings to provide reciprocal labour support for farm work (DeGraft-Johnson 1958). However, the current wave of informal FBOs takes at least two different forms. The first category is those FBOs formed to provide mutual labour support in the fields, with the anticipation that such informal groupings will attract agricultural assistance from government and NGOs. With regard to the second category of informal FBOs, government, private individuals and NGOs set them up to implement their projects. Because there are no clear policies in Ghana governing the way in which FBOs should be set up, particularly at the village level, government, NGOs and private individuals take advantage and form informal FBOs just to implement their projects, without helping them to register with the relevant institutions. However, when FBOs are

not registered, they are likely to disappear after the lifespan of the projects, because such FBOs will not have their contact details logged with the relevant government agencies such that external actors who want to work with or support FBOs can contact them.

Formal FBOs

Similar to the informal FBOs, farmers, government, private individuals and NGOs can set up formal FBOs. As indicated, what distinguishes formal FBOs from the informal ones is their registration with government departments or agencies, or both. Field evidence suggests a high rate of registration among Ghanaian FBOs. For instance, fieldwork data for this thesis (sample size of 40 FBOs) and the 2010 IFPRI survey (sample size of 501 FBOs) show about 78% and 79% of registered FBOs, respectively. As the majority of FBOs are registered, it is important to understand the registration processes of FBOs, especially exploring the reasons why they register.

It is important that we first understand where FBOs register. In Ghana, the law mandates two statutory departments to register a variety of organisations including FBOs. These are the Department of Cooperatives (DOC)⁴⁰ and the Registrar General's Department (RGD).⁴¹ However, in addition to these two statutory bodies, many FBOs register with District Assemblies and MOFA offices at the district level. Table 4.1 shows the pattern of FBO registration among the four institutions identified. While the proportions of FBOs that registered with the institutions are similar for both the 2010 IFPRI survey and this study's survey, it is important to note that these surveys may not be comparable in terms of their sample size (see Table 4.1).

⁴⁰ The Department of Cooperatives (DOC) is a government agency under the Ministry of Employment and Social Welfare, whose operation stems from the Cooperative Societies Decree NLCD 252 of 1968. The key functions of the DOC include the registration, audit and inspection of cooperative societies. The 1968 decree allows the head of the DOC to retain considerable control over cooperative organizations, to the detriment of members' decision rights.

⁴¹ The Registrar General's Department (RGD) is a government department of the Ministry of Justice and Attorney General, with one of its key mandates being the registration of businesses, industrial property, marriages, administration of estates and public trustees.

Table 4.1

FBO registration by different institutions

Institution	Year	
	2010	2013
	Frequency (%)	Frequency (%)
Department of Cooperatives	159 (40.8)	18 (58.1)
District Assembly	109 (27.9)	7 (22.6)
Ministry of Food and Agriculture	92 (23.6)	3 (9.7)
Registrar General's Department	27 (6.9)	3 (9.7)
Total registered FBOs	387 (100)	31 (100)

Source: Author's calculation from fieldwork data and the 2010 IFPRI survey

Note: Year 2010 represents data from the 2010 IFPRI survey, while year 2013 represents the author's fieldwork data.

Table 4.1 suggests that the majority of FBOs register with the DOC – and this is not surprising, as the DOC has the direct mandate on the registration of FBOs. What is important to note is that about one third of FBOs register with District Assemblies, which do not have clear mandates to register FBOs. There may be several reasons for this. One is that these institutions are more accessible to farmers than the DOC and RGD, which are not present in every District of the country. Another likely reason is that registration with District Assemblies tends to be quicker, as the Assemblies issue certificates of registration at the district level, as compared to issuing certificates at the national capital through to the district level when FBOs register with the DOC and RGD.

Based on interviews with FBO members, several reasons were identified that explain why farmers find it necessary to register their FBOs. These range from a requirement for

setting up FBOs to strategies adapted to making these organisations legally recognised by relevant stakeholders. For instance, of the 31 out of 40 FBOs in this study that were registered (Table 4.1), about 80% mentioned that the main reason for registration was to make them known to relevant stakeholders in order to attract agricultural assistance such as extension services, credit, fertilisers and agrochemicals. Approximately 13% of the FBOs also indicated that they registered as part of the requirement for accessing support from government and NGOs.

Three key issues are worthy of note in the discussion here. First, Ghana does not have clear policies governing the registration of FBOs. A 1968 Cooperative Societies Decree, which is not only outdated but also gives the Registrar at the DOC substantial powers, impedes the development of autonomous FBOs (Salifu, Francesconi & Kolavalli 2010). Although a new Cooperative Bill was drafted in 2001 and submitted to the Ghanaian government for onward submission to the Ghanaian parliament, this bill is yet to be passed after 10 years.⁴² It is reported that the draft Cooperative Bill offers significant improvements over the 1968 Cooperative Societies Decree and has the potential to enhance the registration and development of FBOs (Tsekpo 2008). It is still not clear when the draft bill is likely to pass into law, as there seems to be a lack of political will to push the bill through in parliament.⁴³ Second, although the majority of FBOs may have registered, many of them have registered with government agencies that do not have a clear mandate to register them, which may pose some problems in compiling a national database of registered FBOs. Finally, it is important to note that most FBOs see registration as a means of formalising their organisations with the hope of attracting support from government, NGOs and private individuals. The section that follows discusses types of FBOs based on the activities they undertake.

⁴² There are recent concerns about the need to pass the Cooperative Bill; see <http://vibeghana.com/2013/03/15/parliament-urged-to-speed-up-passage-of-new-co-operative-law/> (accessed 30/06/2013).

⁴³ It is difficult to find reasons why successive Ghanaian governments have not found it attractive to submit the draft Cooperative Bill to Parliament for consideration, rather than speculate that the bill is not a priority for the various governments.

4.3.3 Types of FBOs based on activity

MOFA identifies four types of FBOs based on the economic activities they undertake: production, processing, marketing and multipurpose FBOs (MOFA 2009). Among the four types, the most common form is the production FBOs (see Figure 4.2), which, as noted earlier, are the focus of this this research project. Nevertheless, this section briefly discusses all four types.

Production FBOs

Production FBOs are those FBOs whose members engage in the production of crops and livestock. The majority of the production FBOs are set up to promote crop production. It is important to note that most production FBOs are not commodity-based. In other words, the memberships of such FBOs do not specialise in a single commodity but, rather, produce different types of crops. This is because the majority of the smallholder farmers in Ghana cultivate more than one crop. For instance, all the 120 FBO members surveyed for this study cultivate at least three commodities, with some producing as many as eight crops. However, the names of production FBOs (for example, ‘maize farmers group’) will suggest that their members specialise in a single commodity. The naming of FBOs as if their members engage in specific commodities may be attributed to MOFA’s vision of organising FBOs ‘... that are commodity specific, business oriented, operate as viable economic entities and provide relevant services to their members on a sustainable basis’ (MOFA 2010a, p. 5). Nevertheless, government and NGO projects do tend to support FBO members to produce a specific crop, especially if the support to members takes the form of credit, fertiliser, seeds or agrochemicals.

Another area to wrongly assess what the production FBOs are about is to rationalise them as organisations whose members embark on joint production. Although about 51% of the total sample of 40 FBOs have group farms where they undertake joint production, the farms are relatively small, with an average size of about 3 acres (1.2 hectares). Agricultural extension agents (AEAs) sometimes use the group farms as demonstration plots; that is, plots where they teach farmers best agricultural practice. Members

therefore do not regard group farming as profit-making activities (Salifu *et al.* 2012) and may decide whether to do a group farm depending on the resources available to the FBO. In many production FBOs, therefore, members have their individual farms but participate in FBOs to take advantage of mutual farm labour exchange, collective input acquisition and collective marketing of farm produce, among other things. Farmers also believe that participating in FBOs will lead to capturing assistance such as inputs, improved agricultural technologies and credit from development agencies. It is important to note that production FBOs in the Ghanaian context are more akin to community-oriented organisations, which Bernard *et al.* (2008) describe, in their study on rural organisations in West Africa, as organisations that provide only club or local public goods, such as casual labour exchange, cultivation of collective fields and participation in social activities.

Processing FBOs

Processing FBOs, unlike production FBOs, may be described as market-oriented organisations (Bernard *et al.* 2008); that is, they support income-generating activities as well as being effective in linking their members to the market (Francesconi & Heerink 2010). They constitute about 7% of FBOs (see Figure 4.2). The main function of processing FBOs is to transform or add value to agricultural produce; for example, the processing of cassava into *gari*.⁴⁴ This category of FBO tends to use common equipment for processing. This equipment is often provided by government and NGOs (Salifu *et al.* 2012). Members of such FBOs have a greater opportunity for a ready market for their produce as well as higher market prices, partly due to the high quality of their produce (Salifu *et al.* 2012).

⁴⁴ *Gari* is a popular starchy Ghanaian food made from cassava tubers through the process of peeling the tuber, washing, crushing, fermenting, sieving and roasting.

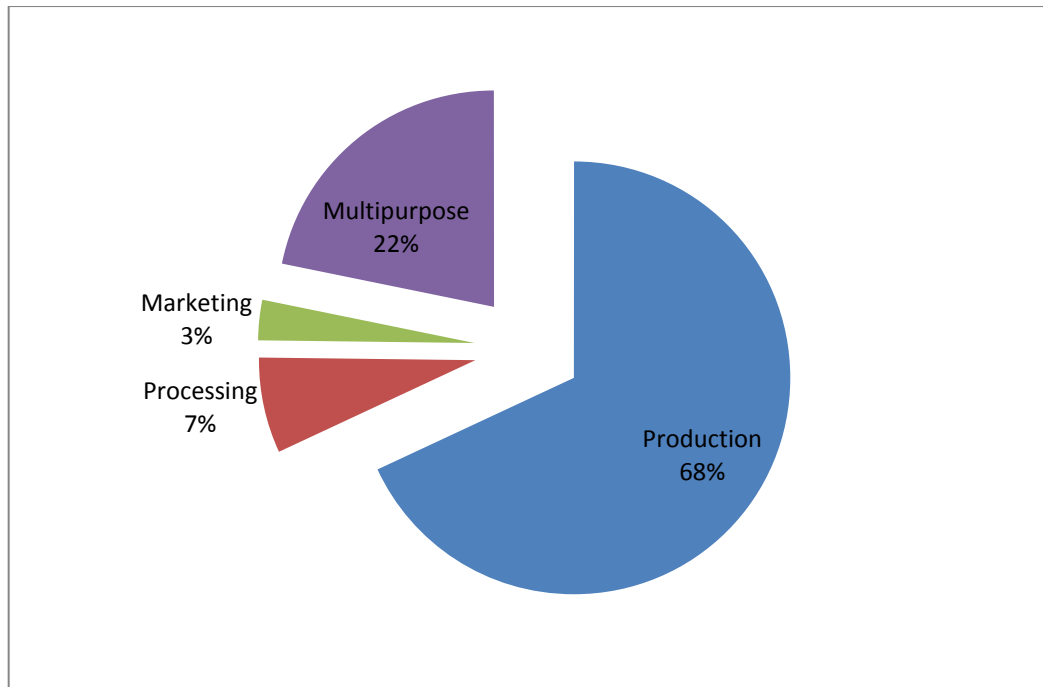


Figure 4.2. The distribution of FBOs according to activity

Source: Author's calculation based on Salifu, Francesconi and Kolavalli (2010)

Note: The calculation was based on 3,052 FBOs that have registered with MOFA as of 2010.

Marketing FBOs

As shown in Figure 4.2, there is less involvement of farmers in marketing FBOs: only 3% of the FBOs fall into this category. The main function of marketing FBOs is to help members to sell their produce, and they are common among farmers who cultivate fruits and vegetables such as pepper, cabbage, pineapple, mango and pawpaw. However, it is important to note that some production and processing FBOs sometimes market their produce collectively. This leads us to the final type of FBOs, namely those that transcend one single aspect along the agricultural value chain.

Multipurpose FBOs

Multipurpose FBOs are those FBOs that engage in more than one of the three main activities; that is, production, processing and marketing. Figure 4.2 suggests that about one third of FBOs are multipurpose in character. While it is difficult to identify a multipurpose FBO by its name, in a few cases it is possible to know from their names. For example, the name ‘cashew producers, processing and marketing association’ suggests that the members come together to support production and at the same time process and market their cashew for the market (MOFA 2009).

In addition to discussing the different types of FBOs that have evolved over the past two and half decades, it is important to understand the growth and distribution of FBOs in Ghana.

4.4 The prevalence of village-level FBOs

Evidence from the Ghana Living Standard Survey 5 (GLSS5) of 2005/2006⁴⁵ – the most recent nationwide household survey data – suggests that there is an FBO in one out of every three villages in Ghana. In other words, a descriptive analysis of a question in the GLSS5 data that sought to investigate the existence of FBOs in rural communities revealed that there was at least one FBO present in about 27% of the rural communities surveyed. However, Ghana is yet to have a comprehensive database that reports the total population and distribution of FBOs across the country.

There are three main plausible reasons why the country lacks a comprehensive database on FBOs. First, there is currently no clear policy regulating the registration of FBOs. The result of this, as noted earlier (Section 4.3.2), is the registration of FBOs with institutions that do not have a clear mandate to register them. Second, the existence of different registration institutions also compounds the problem because there is virtually

⁴⁵ The Ghana Living Standard Survey 6 (GLSS6) was released towards the end of 2014, but I have not been successful in acquiring the up-to-date dataset.

no coordination among the institutions. Finally, there is no a single institution in Ghana with a clear mandate to coordinate the activities and development of FBOs.

In spite of the lack of a comprehensive database of FBOs, one can rely on three main sources to provide rough estimates of the growing importance of FBOs in the country. The first source is a website that MOFA set up, which claims to present a single platform with relevant and current data on FBOs across the country.⁴⁶ My analysis of the content of this website shows there are about 3,328 FBOs across the country (for the distribution according to regions, see Table 4.2). A major shortfall of the website is that MOFA created it through voluntary registration of FBOs and, undoubtedly, the total figure does not represent an accurate estimate of the population of FBOs in the country, as this process was unlikely to capture many of the informal, unregistered ones. The website's under-representation of the total number of FBOs becomes obvious when one explores the second source; that is, FBO statistics reported in MOFA's two annual workshops in 2007 and 2008.

While MOFA has a direct link to the second source, it appears that MOFA did not take this source (the first source discussed above) into consideration in constructing its website. With the second source, my estimation depends on presentations from the two workshops MOFA organised in 2007 and 2008, to review the performance of its departments, agencies and regional units for 2006 and 2007, respectively. During these two workshops, the country's ten Regional Agricultural Development Units (RADUs) presented on their activities and performance. The ten RADU presentations contain estimates of the number of FBOs in the regions and these were extracted. As depicted in Table 4.2, based on the RADU estimates, there were 7,999 and 9,358 FBOs in 2006 and 2007, respectively, which suggests a 17% increase in the FBO population in a period of just over a year.

⁴⁶ The website is www.fboghana.org (accessed February 2012).

Table 4.2

The regional distribution of FBOs according to two MOFA sources

Region	MOFA annual review workshop		MOFA database
	2006	2009	2009
Ashanti	1,017	1,017	260
Brong Ahafo	1,368	892*	257
Central	78*	216*	322
Eastern	203*	896*	719
Greater Accra	82*	370	173
Northern	1,588	1,520	454
Upper East	812	916	316
Upper West	17*	596	107
Volta	1,966	2,067	477
Western	868	868	243
Total	7,999	9,358	3328

Sources: Author's compilations of figures from MOFA's 2006 and 2007 performance annual review workshops; Salifu, Francesconi and Kolavalli (2010)

Note: The asterisks (*) indicate that the figures represent only new FBOs formed during the year and not necessarily the total number of FBOs in the regions.

The final source is the DOC. As noted earlier, the DOC has a primary responsibility for the registration of cooperatives, of which agricultural cooperatives (referred to as FBOs in this study) are one type. At the end of 2012, the DOC had registered about 5,383 FBOs (see Figure 4.3). What is important to observe in the figure is the continuous growth in the number of FBOs (agricultural cooperatives) registered with the DOC.

Unfortunately, however, the figures from the DOC also underestimate the number of FBOs in the country because, as discussed already (Section 4.3.2), many FBOs register with MOFA, District Assemblies and the Registrar General's Department rather than the DOC.

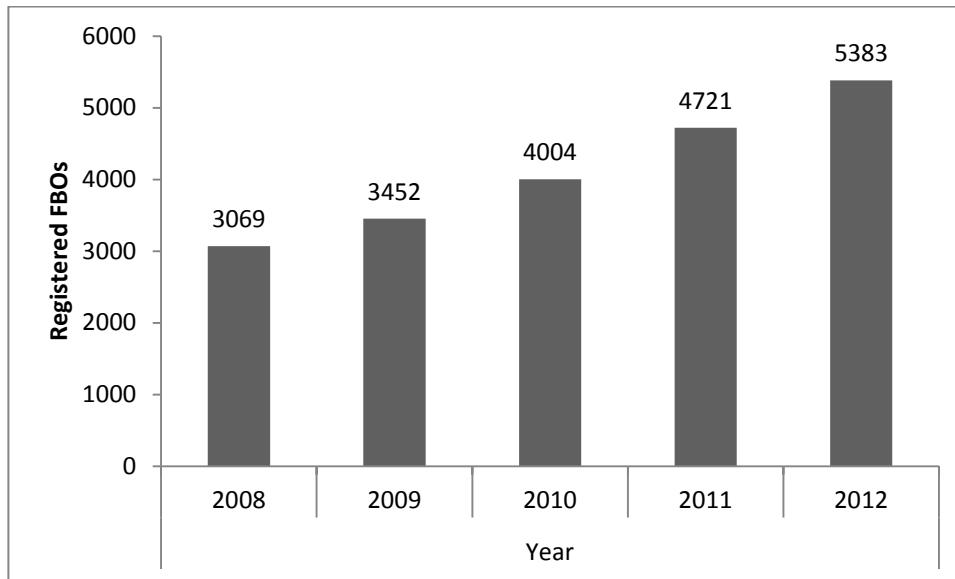


Figure 4.3. The number of FBOs registered with the Department of Cooperatives, 2008–12

Source: Author's compilation of statistics from Ghana's Department of Cooperatives

In summary, while it is difficult to present an accurate figure of the number of FBOs in Ghana, it is evident that their number is growing. This is especially evident in the figures from the DOC, which point to a 75% increase in registered FBOs from 2008 to 2012. Similarly, the two review workshops also indicate about a 17% increase from 2006 to 2007. This raises the important question as to what accounts for the continual growth of FBOs in Ghana, which is discussed in the next section.

We should also note that the majority of the FBOs are less than 7 years old. Data from the 2010 IFPRI survey showed that about 60% of the surveyed FBOs were formed after 2003. Similarly, nearly 70% of the FBOs that I studied were established after 2003. The

implication of this is that many FBOs have short lifespans, as government and NGOs establish the majority of FBOs to implement their projects but most of these FBOs do not live beyond the lifespan of the projects (I shall discuss this in detail in Section 4.5).

4.4.1 Understanding the growth of FBOs in Ghana

Three main factors seem to explain the continuous rise in the number of FBOs in the country: (a) the preference of government and NGOs to implement agricultural and its related projects and programs through FBOs; (b) MOFA's policy of delivering extension services through FBOs; and (c) farmers' perceived benefits of being members of FBOs.

First, Salifu, Francesconi and Kolavalli (2010) report an increase in government and NGO projects supporting the development of FBOs in Ghana (Figure 4.4 summarises the main external actors dealing with FBOs). The rationale for many of these projects is to facilitate farmers' access to credit, farm inputs, extension services and markets for their produce (World Bank 2007). Taking stock of over a dozen major projects implemented from the late 1990s and throughout the 2000s, they estimated that almost 8,000 FBOs were formed or supported through the projects (Salifu, Francesconi & Kolavalli 2010). Through these projects, smallholder farmers have received a wide variety of support, ranging from farm inputs to transfers of technologies. For instance, between 2007 and 2012, the Millennium Challenge Account program, with sponsorship from the USA's Millennium Challenge Corporation (as mentioned in Chapter 1), alone supported approximately 1,200 FBOs with training in agricultural technologies, seeds, fertiliser and credit (ISSER 2012). In addition, as recently as 2013, the Australian government committed to providing AU\$1.4 million to build the capacities of selected FBOs, among other things.⁴⁷

⁴⁷ See <http://mofa.gov.gh/site/?p=12386> accessed 14/08/14

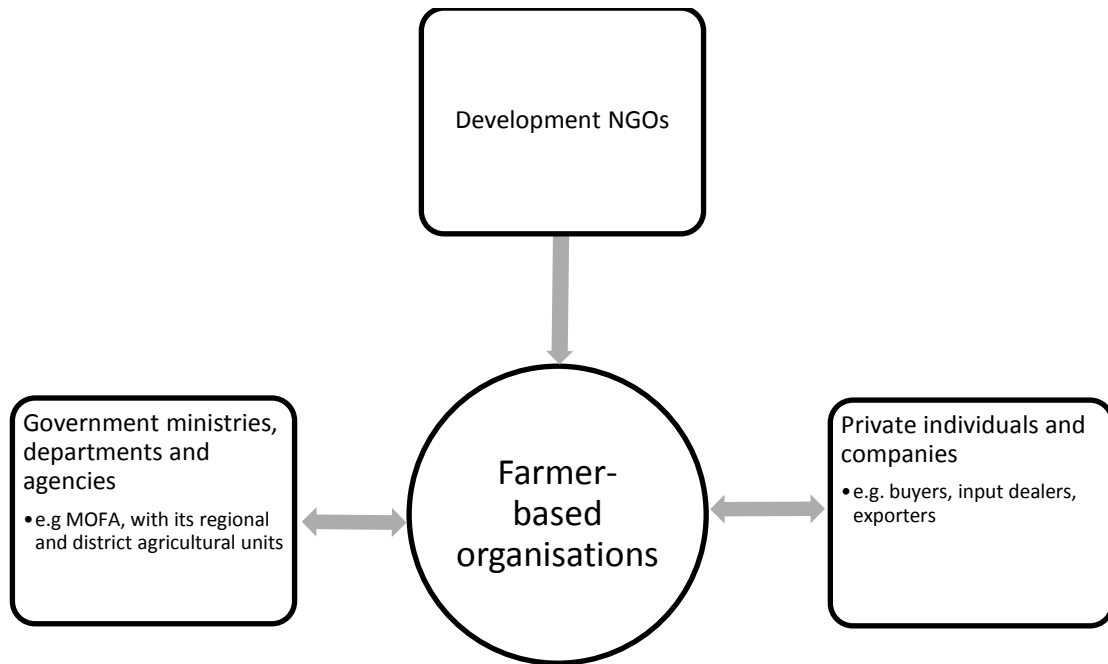


Figure 4.4. Actors supporting FBOs

Second, the current policy, contained in the Food and Agriculture Sector Development Policy (FASDEP II), of using FBOs to deliver extension services to farmers partly explains the rise in the population of FBOs. It is to be hoped that such a policy will allow public extension agents to reach out to larger numbers of farmers, as the current extension agent to farmers ratio is about 1:2,500 (Owusu-Baah 2012).

Finally, the available evidence suggests that about one third of FBOs are set up through the initiatives of farmers themselves, in the hope of receiving free goods and services from development programs. For instance, of the 40 FBOs surveyed, about 35% claimed that their own members initiated their establishment to benefit from the perceived ‘goodies’ of belonging to FBOs. According to the 2010 IFPRI survey, about 42% of the FBOs out of a total sample size of 501 made similar claims.

With the above analyses on the growth of FBOs, it is also important to understand smallholder farmers' perspectives regarding the perceived benefits of being FBO members.

4.4.2 Farmers' perceived benefits of membership of FBOs

Figure 4.5 presents analysis of a multiple response question that sought to understand the main reasons why the FBOs were established. The majority of the surveyed FBOs identified access to credit and grants as the main reasons for their establishment (see Figure 4.5). While the responses were not ranked, the figure suggests that access to grants and credit are the primary reasons why the FBOs were established.

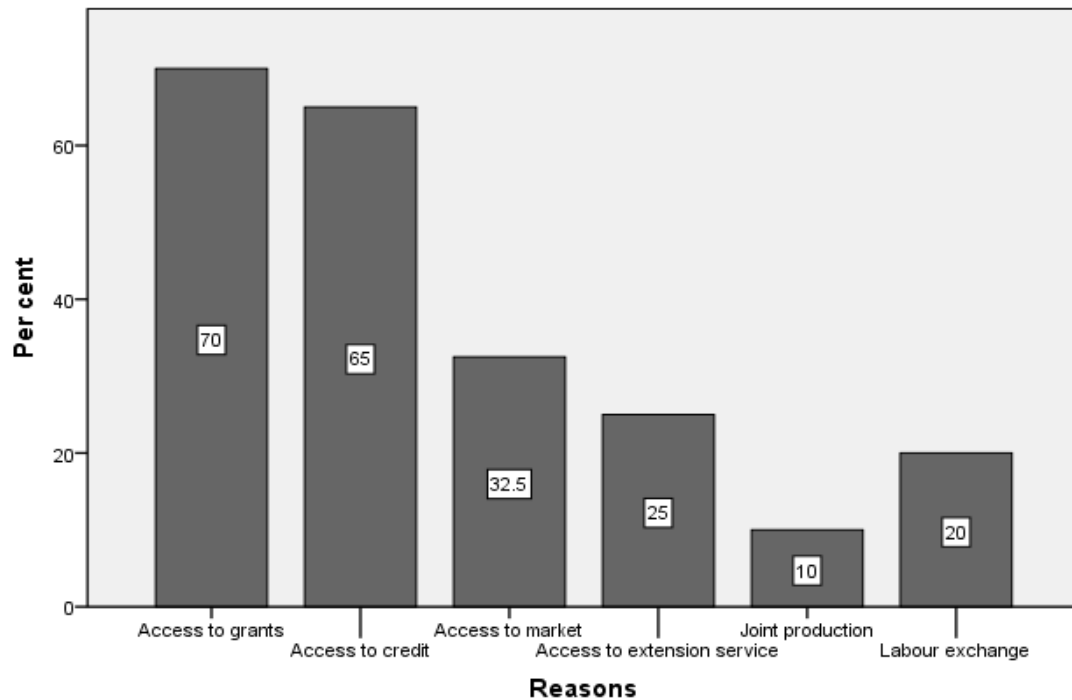


Figure 4.5. Reasons for the establishment of FBOs

Source: Author's calculation from fieldwork data

This finding is consistent with the claim that group formation is rapidly becoming a prerequisite for farmers to access credit and grants (World Bank 2007, 2010; Shiferaw, Hellin & Muricho 2011). However, Figure 4.5 shows that only 25% of the FBOs indicated that they were set up to access extension services, even though one of the primary objectives of Ghana’s current food and agriculture policy document (FASDEP II) is to set up FBOs to facilitate and promote smallholder farmers’ access to extension services.

Similarly, according to the majority of FBO members surveyed, the primary motivation for membership to FBOs is to access financial support, which takes the form of grant or credit (see Figure 4.6). Here too, the responses to the question were multiple and not ranked.

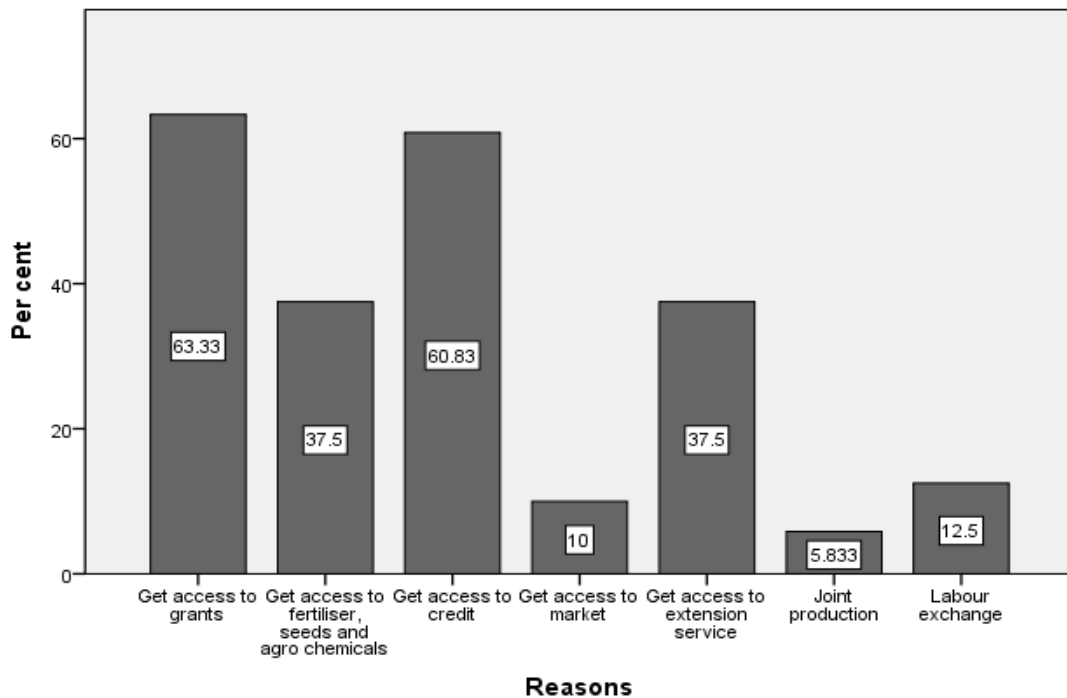


Figure 4.6 Reasons for becoming an FBO member

Source: Author’s calculation from fieldwork data

An examination of Figures 4.5 and 4.6 shows that not only do FBOs give access to extension services a low rating as a reason for their establishment, but a majority of their members also consider grants and credit as important motivation for membership in FBOs compared to extension services. The story becomes curious when one examines the support that FBO members have actually received – it is extension services that the majority of the members have received, compared to credit and grants. For example, of the 120 FBO members surveyed, about 38% perceived access to extension services as the reason for membership (see Figure 4.6), while about 96% of members had accessed extension services. In contrast, of the 120 FBO members surveyed, about 65% and 70% mentioned access to credit and grants, respectively, as the reasons for joining an FBO (see Figure 4.5), while only 40% and 29%, respectively, actually received credit and grants. This suggests that extensions services compared to grants and credit are more accessible to FBO members.

Figure 4.6 also suggests that the perceived role of FBOs in facilitating access to the outputs market is low among smallholder farmers, as only 10% of the surveyed FBO members indicated access to marketing as the reason for joining an FBO. This is perhaps partly because there are fewer FBOs that focus on marketing (see Figure 4.2). In Central and Eastern Africa, the majority of FBOs are often considered as institutions that facilitate the marketing of smallholders' farm produce (see, e.g., Fischer & Qaim 2011; Shiferaw, Hellin & Muricho 2011).

The key point to note here is that while the primary motivation for most smallholder farmers who participate in FBOs is to enhance their ability to access financial support, the most common support that they get is extension services. Chapter 5 will delve deeper into understanding the extent to which FBOs facilitate smallholder farmers' access to extension services. In the meantime, it is important to understand how FBOs are set up, the characteristics of their members and the extent of their collective activities.

4.5 Participation and collective action in FBOs

The objective of this section is two-fold. The first subsection critically examines how FBOs are set up, with a focus on who initiates them and how their members are recruited. It also examines FBOs governance and management. The second subsection scrutinises the extent of collective activities in FBOs.

4.5.1 Participating in FBOs

Although the number of FBOs in Ghana has grown significantly over the years, it is important to note that the majority of smallholder farmers in the country still do not have the opportunity to participate in FBOs, as is evident in the GLSS5 data. This is because farmers themselves initiate less than half of the FBOs, with outsiders such as government and NGOs initiating the majority of them (Figure 4.7).

The implication of outsiders initiating the establishment of majority of FBOs is that it limits the opportunities for the majority of smallholder farmers to participate in FBOs. Meanwhile, as noted earlier in Chapter 2, studies have shown that FBOs initiated by farmers themselves tend to perform much better than those initiated by outsiders (Uphoff 1991; World Bank 2007), as outsiders tend to use FBOs mainly to deliver services to smallholder farmers.

Nonetheless, one needs to understand how smallholder farmers are recruited to participate in FBOs. As expected, the way in which smallholder farmers are recruited into FBOs depends on whether the FBOs are ‘self-started’ or ‘outsider started’.

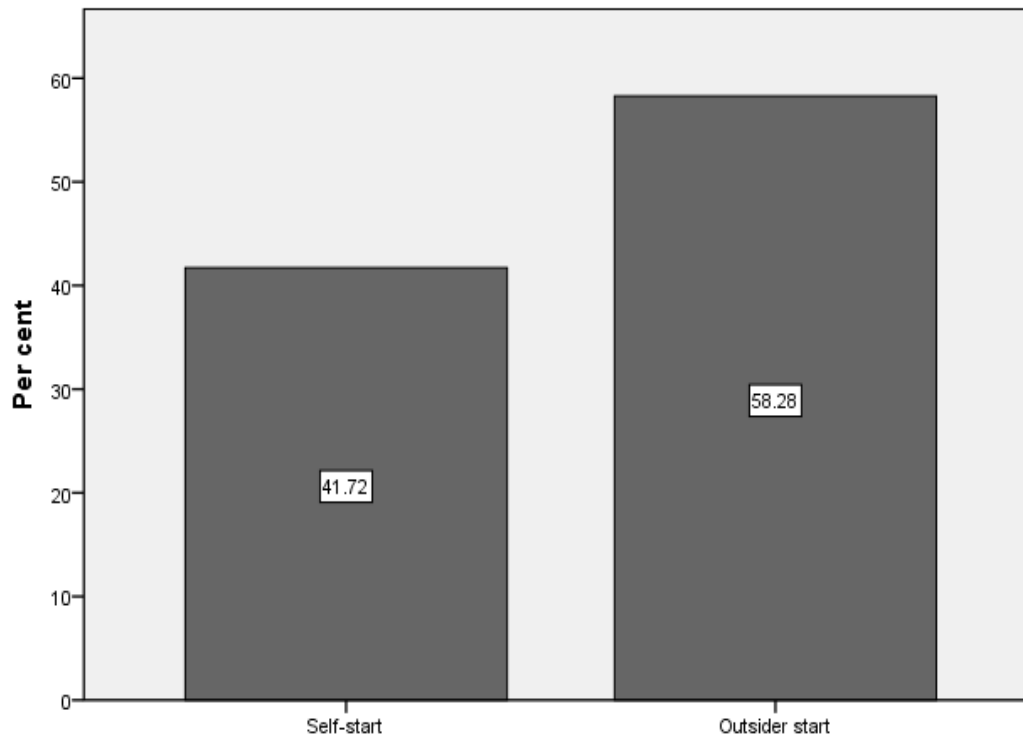


Figure 4.7 Who initiated the establishment of FBOs?

Source: Author's calculation based on the 2010 IFPRI survey of 501 FBOs

Note: 'Self-start' represents FBOs started by smallholder farmers themselves, while 'Outsider start' represents those initiated by outsiders such as government and NGOs.

First, interviews with FBO members show that when farmers initiate their own FBOs, they draw their members largely from family relations and friends with whom they feel comfortable working. Second, interviews with NGOs and government officials as well as FBO members reveal that if outsiders initiate the establishment of FBOs, they employ at least three main approaches to recruit members. The first approach is when outsiders, through a chief or opinion leader in a village, make an announcement for interested farmers to come together and form an FBO. Outsiders seem to employ this approach because it is the quickest way to form FBOs to implement their projects within a limited

timeframe. Very often, the outsiders have quotas for FBO size and therefore participation is limited to the first few farmers who express an interest.⁴⁸ In relatively small villages, the selection of members using this approach is somewhat formalised; that is, at least one member is selected from every household in the village (interview with FBO leader in Northern Region, 16/02/2013). However, the disadvantage of that approach is that it leads to the formation of FBOs whose members do not necessarily have a genuine interest in participating in FBOs, except to receive ‘free’ support from outsiders. In addition, this approach does not afford farmers the opportunity to choose members with whom they can cooperate. The overall effect of using this approach to select members is that it may lead to the formation of FBOs that lack clearly defined objectives and therefore hardly survive beyond the lifespan of the projects.

The second approach used by outsiders to recruit smallholder farmers into FBOs is for those outsiders to contact a chief or someone in the community, who then recruits smallholder farmers to participate in the FBOs. With this approach, ‘... there is a high tendency of selecting members from the same family or household’ (interview with AEA in Northern Region, 15/02/2013), as the contact persons tend to include their neighbours - about 60% of the AEAs interviewed expressed similar views. The approach also has the high possibility of selecting members along ethnic and party political lines. For example, farmers who are supporters of a ruling party have the greatest opportunity to participate in FBOs set up under projects by the ruling government. Field interviews reveal that the politicisation of who participates in FBOs goes beyond the village level, to embrace decisions by the ruling government as to which districts and regions should participate in FBO projects. This is particularly the case because governments implement many of the FBO projects and will therefore select regions, districts and villages that have a tendency to vote to retain them in power, a phenomenon often referred to as clientelism (World Bank and IFPRI 2010). In the context of agricultural services, clientelism refers to the excessive tendency of governing

⁴⁸ For example, an FBO size of about 50 members was required under the Ghana’s Millennium Challenge Account Program.

political parties to provide goods such as fertiliser and credit to specific clients in exchange for political advantage. However, clientelism can weaken collective action in FBOs, because FBOs may regard services as gifts rather than working collectively to achieve services to which they are entitled (World Bank and IFPRI 2010).

The final approach is a case where outsiders undertake direct recruitment of smallholder farmers into FBOs using participatory approaches, with no or little third-party involvement. Although interaction with the 40 FBOs in this study shows that outsiders hardly employ this approach in setting up FBOs, a variety of studies on rural collective action have shown that when farmers' knowledge is sought and incorporated in the formation of FBOs, such groups are more likely to sustain activities after project completion (Uphoff & Wijararatna 2000; Pretty & Ward 2001).

The above discussion points to two important issues, which are worthy of note. First, the way in which outsiders recruit smallholder farmers to participate in FBOs largely leads to the formation of FBOs that do not have clear objectives to undertake their own collective activities. Interviews with the eight AEAs revealed that the majority of outsiders spend little time in training farmers about how to develop strong FBOs, as they are often under pressure to form FBOs to meet key targets in the implementation of their projects. This leads to the establishment of FBOs whose members are not active participants in the internal activities of the organisations. Second, we should also note that recruitment approaches by outsiders lead to the formation of FBOs that their members consider mainly as avenues to access financial and farm inputs, rather than institutions that provide the opportunity to demand services as well as engage in economic activities.

The next step in many FBOs after recruiting members is to put a governance structure in place; that is, the selection of leaders, creation of rules, registration of the FBOs and opening of a bank account, which I now turn to discuss.

4.5.1.1 Governance in FBOs

The first important variable for good governance and improved performance in FBOs is leadership (Markelova *et al.* 2009). The ability of an FBO, for example, to organise its members for extension meetings depends on the kind of leaders that it has (discussed in Chapter 5). Typically, FBOs have four leaders: a chairperson, a secretary, an organiser and a treasurer. Salifu *et al.* (2012) report that the majority of FBOs use democratic principles in selecting their leaders, although they also observe that family lineage, gender, education, age and the political and economic statuses of members are key determinants of who becomes a leader. For instance, the position of secretary is always the preserve of the most educated member in the FBO (see Figure 4.8). The leaders of the 40 FBOs included in this study consisted of 23 chairpersons, 16 secretaries and one treasurer. As shown in Figure 4.8, all the secretaries surveyed had some level of educational qualification, although over 60% of them had only secondary education.

In contrast, education does not have to play a significant role in the selection of the chairperson, as 9 (39%) out of the 23 chairpersons had no education at all. Rather, FBOs tend to select the oldest or most respected person among the members as the chairperson (Salifu *et al.* 2012), which is largely a reflection of leadership style in rural Ghana. Similarly, if women are among the members, a woman gets the position of treasurer, because of the widely held perception that women are much less corrupt and therefore more trustworthy than their male counterparts in terms of guarding public resources (Salifu *et al.* 2012).

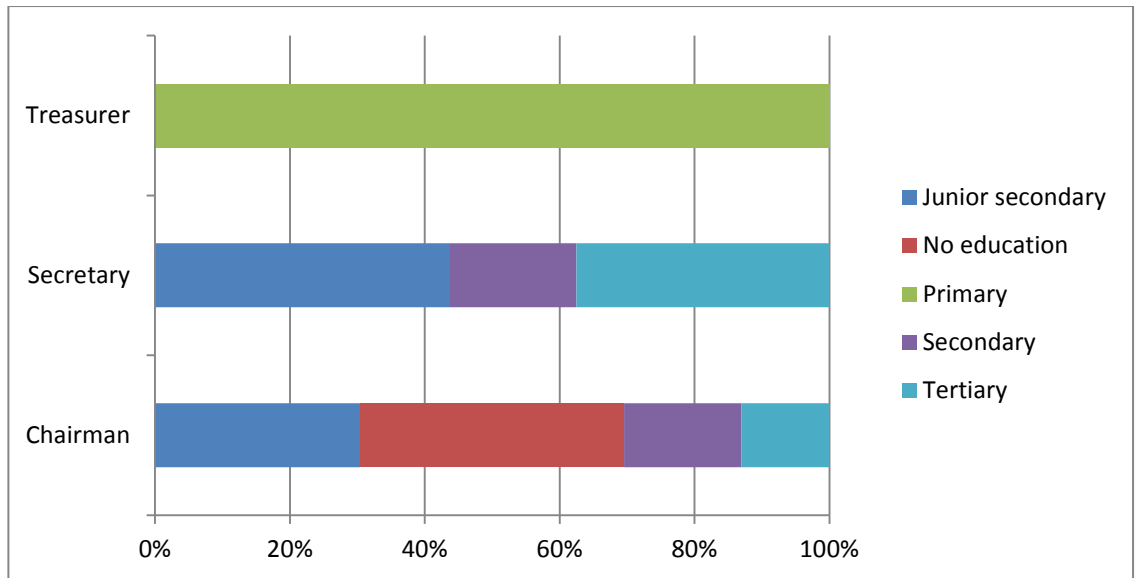


Figure 4.8. FBO leaders and their educational level

Source: Author’s calculation from fieldwork data

The second governance issue to consider is rules, which should provide FBO members with the confidence to participate and invest in collective activities (Pretty & Ward 2001). Similar to many organisations, FBOs create rules (often referred to as constitutions or by-laws) that should regulate how to become a member and exit, and how to undertake collective activities, as well as how to share benefits. The majority of the FBOs under consideration in this study have these constitutions and by-laws because they are often prerequisites for the registration of FBOs with the relevant departments and agencies. However, the ways in which FBOs acquire their constitutions and by-laws is questionable. Field evidence revealed that outsiders often draft FBOs’ constitutions and by-laws without taking the cultural and local conditions of the members into consideration. For instance, the DOC, one of the key institutions that registers FBOs, has a template constitution that it gives to FBOs that register with it. One may describe this constitution as a ‘bought’ one because FBOs pay to get a copy during their registration with the DOC. The problem with this is that the enforcement of rules becomes more

difficult because many of the rules are alien to the FBO members. Indeed, some studies (see, e.g., Ostrom 1990, 1995) suggest that when members of a group craft their own rules, they are better understood and adopted more easily than those that outsiders impose, because the local people have better information about the subtle nuances of their environment than do outsiders. For instance, many FBO constitutions reviewed in this study require members to make regular monetary contributions (often referred to as dues) but fail to take into consideration that, for most of the farming season, smallholder farmers do not have the money to make such contributions. For example, while 73% of the 120 FBO members surveyed indicated that they pay dues, only 35% of those who pay dues said that they pay on a monthly basis as stipulated in their constitutions. This suggests that many FBOs fail to abide by their constitutions and by-laws. Another example worth noting is the term of office for leaders. All the FBO constitutions I studied clearly indicated the number of years of tenure for which a leader can serve (often 2 or 4 years). However, interviews with FBO leaders revealed that they rarely hold elections to elect new leaders, and the leaders will usually serve until the FBOs collapse. The general view among smallholder farmers was that with their traditional style of governance, when leaders are elected, they are often allowed to rule until they die.

Similar to constitutions and by-laws, FBOs also open bank accounts as part of their registration processes (92% of the 40 FBOs surveyed had bank accounts). The bank accounts serve at least two purposes: first, to receive financial support from outsiders such as government and NGOs; and, second, to save money accruing from FBOs' activities such as entrance fees, membership dues and group farming (for a distribution on FBOs' sources of income, see Figure 4.9).

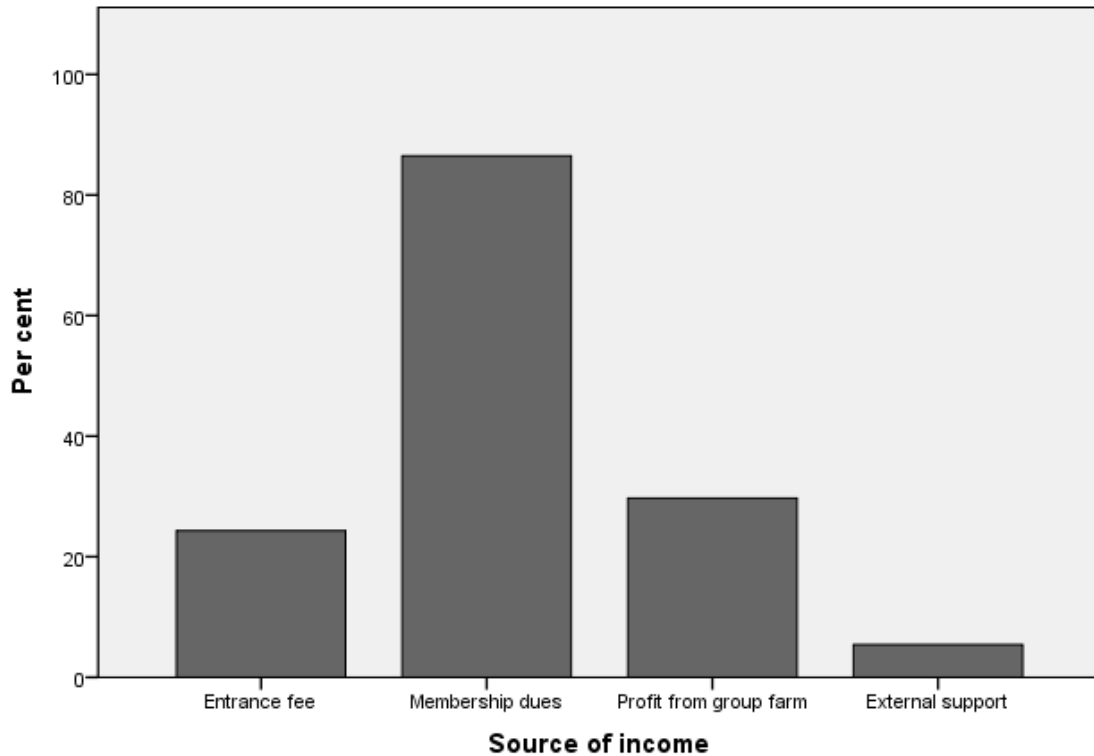


Figure 4.9. FBOs' sources of income

Source: Author's calculation from fieldwork data

As shown in Figure 4.9, membership dues constitute the most important source of income for the FBOs studied but, as noted already, not many members pay dues on a regular basis. The inability of the FBOs to receive dues on a regular basis is reflected in their average savings (see Table 4.3). Such savings, as little as they are, cannot boost collective activities in FBOs, as effective collective action would result in some level of administrative cost. As Rouse (2006) argues, FBOs with strong income generation, savings and capital accumulation will be more self-reliant, independent and sustainable in respect of their activities.

Table 4.3

Descriptive statistics on FBO savings

	Amount (GHC)	Amount (\$)
Mean	411.25	205.63
Median	300.00	150.00
Standard deviation	360.07	180.03
Minimum	0	0
Maximum	1,400	700

Source: Author's calculation from fieldwork data

Note: GHC indicates Ghana cedi and GHC1 = US\$0.50: this exchange rate is used for all dollar calculations in this chapter; 1 June 2013 exchange rates are available online

at <http://www.xe.com/currencytables/?from=USD&date=2013-06-01>. Accessed 07/12/13

The analysis in this section suggests that the election of leaders, the creation of rules, the opening of bank accounts and the registration of FBOs are mere formalities that enable FBOs to receive external support. A seemingly frustrated FBO member in the Eastern Region summed up this observation when he indicated that

... they told us to contribute money and open a bank account, register our group and all that, so that they will give us a loan but after going through all these [processes] we did not get the loan. (Interview with FBO member in Eastern Region, 03/01/2013)

In addition to the above discussion, it is also important to understand the composition of FBOs and their members, especially in relation to the socio-economic characteristics of their members.

4.5.1.2 The composition of FBOs

Discussions on the composition of membership organisations often referred two key variables: the size of the organisation and the homogeneity or heterogeneity of its members (reviewed in Chapter 2).

In relation to size, village-level FBOs in Ghana have a relatively small membership size. Fieldwork data for this study and the 2010 IFPRI survey put the average size of FBOs at 33 and 36 members, respectively. The membership size for FBOs in this study ranged from eight to 76. One reason for the relatively small membership is that many outsiders, when forming FBOs, prescribe small sizes, usually ranging from 10 to 50 members. This rationalisation by the outsiders may be based on the theoretical and empirical arguments that FBOs are more likely to be effective if they have a small membership (Olson 1965; Ostrom 1990; Coulter *et al.* 1999). Although many studies on collective action (see, e.g., Olson 1965; Ostrom 1990; Coulter *et al.* 1999) claim that collective action in a group will be more effective if the membership is small, this does not seem to be an important factor in explaining the performance of Ghanaian FBOs. For example, it is argued that rule enforcement is often easier in smaller groups because these groups have higher internal cohesion (Coulter *et al.* 1999), but the analysis here (Section 4.5.1.1) suggests that rules that are alien to FBOs may be difficult to enforce even if the FBO in question has a small membership.

It is also important to understand the socio-economic compositions of the FBOs; that is, whether FBO members are homogenous or heterogeneous. First, it is worth noting that the majority of FBOs are male-dominated.⁴⁹ According to fieldwork data for this study, the average membership ratio of male and female members in an FBO is 21 and 12, respectively. It is reasonable to attribute the dominance of males over females partly to the manner in which smallholder farmers are recruited into FBOs. As discussed, in recruiting FBO members, the tendency to select heads of families of rural households,

⁴⁹ The Ministry of Food and Agriculture's database suggests that about 58% of FBOs are male-dominated. This database is available at www.fboghana.org (accessed February 2012).

the majority of whom are relatively elderly men, is strong. Because of this tendency, the FBOs tend to have a relatively elderly membership, with an average age of about 48 years. An interview with a 25-year-old FBO non-member in the Northern Region supports this line of argument when he notes that, 'FBOs are meant for the old people. I am a young man and do not participate in groups with old people' (interview with FBO non-member in Northern Region, 22/03/2013). About 23% (9 out of the 35) of the FBO non-members interviewed expressed similar concerns. This also points to a key vulnerability in FBOs as a mechanism for training smallholder farmers and with regard to the long-term sustainability of FBOs.

In addition, FBO members are largely homogenous in terms of their economic activity, particularly with respect to the types of crops they cultivate. Their memberships also largely consist of friends and neighbours from the same kinship (see Section 4.5.1). Fieldwork has shown that when outsiders set up FBOs whose memberships are drawn from more than one village, smallholder farmers find it difficult to manage such FBOs. For example, five FBOs in this study reported that they were merged with other FBOs in neighbouring villages under the Millennium Challenge Account program (discussed in Chapter 1), but broke up immediately after receiving support from the program. This goes to support the argument that FBOs work better when they have homogeneous members (Ostrom 1990; Fischer & Qaim 2011).

The analysis in this chapter so far has shown the motivations of smallholder farmers in participating in FBOs as well as how FBOs are set up and governed. The discussion also shows that both smallholder farmers and outsiders (government and NGOs) consider FBOs as organisations that should increase smallholder farmers' access to extension services, farm inputs, credit and the outputs market. While I return to examine the extent to which FBOs are helping smallholder farmers to access extension services, inputs and credit in the next three chapters of this thesis, there remains much to learn about how smallholder farmers use FBOs to engage in a wide range of collective activities, which are discussed in the next section.

4.5.2 Collective activities in FBOs

This section discusses a variety of collective activities in which FBOs engage, especially those activities that they undertake with little or no support from outsiders such as government and NGOs. While the collective activities in which FBOs engage may depend on their types (see Section 4.3.3), the emphasis here is on production FBOs, as this is the focus of this research.

Four main types of collective activities have been identified in production FBOs, including joint purchase of inputs, joint production, joint marketing and mutual labour support. It will be evident in this section that most FBOs and their members undertake these activities to minimise transaction costs, and also as a strategy to prevent the FBOs from collapsing.

We should also note that FBOs and their members undertake these collective activities largely on an *ad hoc* basis. For instance, 83% of the 120 FBO members surveyed indicated that they participate in collective activities as and when necessary, with the average participation being on two occasions over the past 4 months preceding the survey of this research. The four main collective activities are discussed as follows.

Joint purchase of inputs

Some FBO members jointly purchase inputs such as fertiliser, insecticides and herbicides (see Figure 4.10). Others also contribute to buying agricultural equipment such as knapsack sprayers for common use. Similarly, some smallholder farmers use their FBOs to bring tractor contractors to their villages, because tractor operators are more willing to go to a village if the farmers assure them of a greater number of hectares available for ploughing. This was observed in 5 FBOs.

Approximately 24% of the 40 FBOs studied indicated that their members have jointly purchased farm inputs at least once since their establishment (see Figure 4.10). Similarly, 20% of the 501 FBOs in the 2010 IFPRI survey indicated to have jointly purchased inputs on at least one occasion (Figure 4.10). There are two main reasons why

FBO members jointly purchase inputs. The first relates to economies of scale, as bulk purchase may lead to a decrease in the unit cost of inputs. This is because bulk purchases attract discounts and FBO members save on transportation costs, as only one member goes to the market to buy on behalf of the FBO. Second, for smallholder farmers to purchase inputs on credit, inputs dealers sometimes prefer those who are in FBOs because they consider the group as collateral.

In spite of the advantages associated with joint input purchase, the majority of the FBOs are unable to undertake this collective activity because the FBOs lack the skills needed to mobilise money from their members. For example, during the field interviews, a majority FBO leaders (25 out of the 30 leaders interviewed) indicated that collecting money from their members to purchase inputs for them was difficult because their members were unable to raise money at the same time, which again points to weaknesses in the governance and management of FBOs.

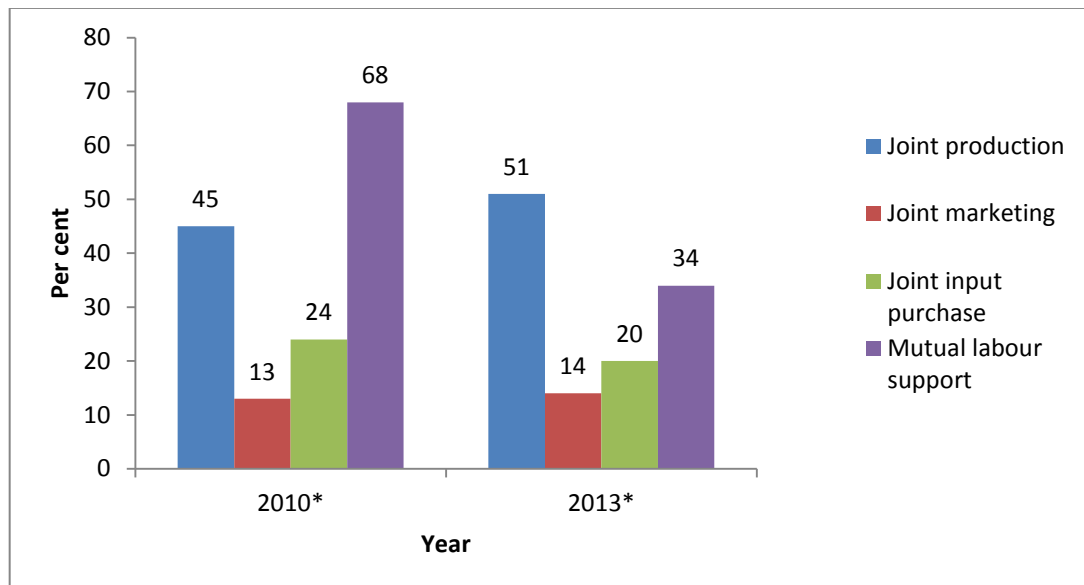


Figure 4.10. Collective activities in FBOs

Source: Author’s calculation based on fieldwork data and the 2010 IFPRI survey

Note: 2010* represents data from the 2010 IFPRI survey ($n = 501$) and 2013* represents the author’s fieldwork data ($n = 40$); these are not necessarily comparable datasets.

Joint production

Some FBOs have group farms where members undertake joint production but, as noted earlier (Section 4.3.3), these group farms are relatively small in size. Figure 4.10 suggests that joint production is the second most common collective activity among FBOs. About 51% and 45% of FBOs in this study and the 2010 IFPRI survey, respectively, undertook joint production.

Typically, FBO members provide labour for all activities on the group farm as well as making monetary contributions to purchase inputs for the farm. Concerning land for the group farm, most FBOs in Southern Ghana make monetary contributions to rent or buy it, whereas for those in Northern Ghana, members donate the land for joint production because land is relatively abundant compared with Southern Ghana.

In most case, AEAs initiate joint production among FBO members so that such group farms will serve for demonstration purposes. Some FBOs also do group farming as a way of keeping the members together in anticipation of future support. FBO members therefore do not regard joint production as a business-oriented collective activity from which they can make a profit. About 18% of the 40 FBOs surveyed indicated that they had stopped group farming because they were no longer attracting external support and not making a profit either. For example, an FBO member in the Eastern Region indicated that, ‘we were doing a group farm in order to get help [from outsiders] but since we are not getting help we got discouraged and have stopped the group farm’ (interview with FBO member, 03/01/2013). Nevertheless, when FBOs do make some revenue from their group farms, they mainly use that revenue to cover their administrative costs.

Joint marketing

A few FBOs also market their produce collectively (see Figure 4.10). Collective marketing can take at least three forms. First, the members gather their produce and then invite a buyer into the community. Second, they use a common facility to transport their produce to the market to benefit from collective bargaining power and minimise transportation costs. Finally, they link their members with agribusiness companies and facilitate contracts for members to sell their produce. While smallholder farmers in this study recognised the benefits of joint marketing, such as improved access to the market and higher prices for their produce, the majority of them still do not undertake this collective activity (see Figure 4.10). This is largely because they do not have the requisite organisational skills to monitor market information and organise their members to market collectively at a time when most of them would be willing to sell their produce.

Mutual labour support

Mutual labour support is the most common collective activity among the FBOs studied (see Figure 4.10). It refers to a situation in which FBO members provide each other with reciprocal labour support in their fields, a strategy they employ to cope with seasonal labour demands. Mutual labour exchange is the most common collective activity in FBOs, partly because it has been a practice among smallholder farmers through informal groupings since the pre-colonial period (DeGraft-Johnson 1958).

The above discussion further supports the argument that the majority of smallholder farmers participate in FBOs not necessarily to undertake internal collective activities but primarily as a means of accessing external support such as grants and credit. As shown in the discussion, in many cases, FBO members undertake internal collective activities to sustain the identity of the group in anticipation of future external support.

4.6 Conclusion

This chapter first explored the definition of FBOs and identified a four-tier structure, which consists of village-, district-, regional- and national-level FBOs. The discussion then focused on the diversity and prevalence of village-level FBOs. The analysis has shown that the number of village-level FBOs continues to grow in Ghana, although the country is yet to have comprehensive policies governing the activities of FBOs. The chapter argues that three main factors explain the continuous rise in the number of FBOs, namely, the preference of the government and NGOs to implement their agricultural-related projects and programs through FBOs; the preference of MOFA in delivering extension services to farmers via FBOs; and farmers' perception that FBO membership will facilitate their access to external support in the form of grants and credit.

With a focus on production FBOs (discussed in Section 4.3.3), the evidence in this chapter also shows that although the primary motivation for smallholder farmers to join FBOs is to access financial support in the form of grants and credit, the majority of the members rather end up receiving extension services.

The chapter then concludes that as the primary motivation for the majority of smallholder farmers who participate in FBOs is to facilitate their access to external support such as grants and credit, they undertake very little in the way of internal economic collective activities, such as joint production and joint marketing of their farm produce. Poor rule enforcement, weak leaders and a lack of clearly defined objectives in FBOs compound this situation.

However, for FBOs to be effective, their members must pay attention to both their internal and external work. Their internal activities, such as regular meetings, joint purchase of farm inputs and joint marketing, are crucial in building strong FBOs. Without strong internal activities, FBOs are unlikely to attract outsiders to provide services such as inputs and credit. Miracle and Seidman's observation, about six decades ago, that agricultural cooperatives in Ghana were often forced on farmers by the

government (see Chapter 1) and did not bear out farmers' own interests, as well as the individualistic nature of farmers in accessing services, are still relevant in today's FBOs (Miracle & Seidman 1968).

The next three chapters of this thesis focus on understanding the extent to which FBOs facilitate smallholder farmers' access to external support in the form of extension services, inputs (which could take the form of grants) and credit.

CHAPTER FIVE

IMPROVING ACCESS TO EXTENSION SERVICES: DO FBOs MAKE A DIFFERENCE?

5.1 Introduction

In Chapter 4, I set the stage to examine the key research question of this study: whether farmer-based organisations (FBOs) make a difference in the way smallholder farmers acquire extension services, inputs and credit by exploring the types, formation, characteristics and activities of FBOs. The evidence in the chapter shows that FBOs are becoming increasingly important stakeholders for the development of smallholder agriculture, resulting in continuous growth and expansion. Discussions in the chapter also showed that the majority of smallholder farmers participate in FBOs mainly to facilitate their access to external support in the form of credit, grants and extension services.

This chapter focuses on understanding the degree to which FBOs are helping smallholder farmers in accessing extension services. In this study, I follow Birner and colleagues' definition of extension services as a set of services that support farmers 'to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being' (Birner *et al.* 2009, p. 342). Effective extension services are critical for improved productivity among smallholder farmers. As noted earlier (Chapter 1), there are two main ways to increase agricultural output, namely 'expanding the land area under cultivation and improving the yields on existing cultivated land' (Norton 2004, p. 357). Analyses in Chapter 1 showed that agricultural growth in Ghana (in fact, in many African countries) is mainly driven by land expansion rather than increases in the productivity of the current farming land, partly because the adoption of modern technology is still low among smallholder farmers (Breisinger *et al.* 2012). However, increasing agricultural productivity through land expansion is not environmentally

sustainable (the case of Ghana is discussed briefly in Chapter 1); the only viable option is to improve yields on the cultivated land (Norton 2004).

As noted earlier (Chapter 1), central to increasing yields on cultivated land is the existence of effective extension services that facilitate farmers' use of improved technologies and modern farm inputs (Chang 2012; Diao *et al.* 2013). However, due to the majority of farmers in Ghana being smallholders, who are scattered geographically across the country, extension delivery to farmers is a huge challenge, as there are small numbers of agricultural extension agents (AEAs) to reach out to a wider spectrum of farmers (Chapter 1). FBOs are widely regarded as organisations that have a great potential to improve smallholder farmers' access to extension services. The Government of Ghana aims at developing FBOs into independent institutions that generate and deliver extension services for their members (GOG 2010).

With the primary aim of examining the degree to which FBOs improve smallholder farmers' access to extension services, this chapter adopts the following structure. It begins with a detailed account of extension delivery approaches that various Ghanaian governments have implemented over the past four decades, before discussing how government and other relevant stakeholders are now using FBOs to deliver extension services. Next, the chapter discusses the key extension technologies (messages) that service providers (mainly the AEAs) deliver to farmers. The chapter then examines whether FBOs make a difference in smallholder farmers' access to extension services by providing a critical comparison between smallholder farmers who participate in FBOs and those who do not. Finally, the chapter explores the factors that shape the role of FBOs in improving smallholder farmers' access to extension services.

5.2 Approaches to the delivery of extension services in Ghana: some established facts

Agricultural extension services in Ghana have evolved considerably during the past several decades. During the colonial period, the colonial government, foreign-owned companies and church missionaries provided extension services mainly to farmers who

cultivated export commodities such as cocoa and coffee (DeGraft-Johnson 1958; MOFA 2002). In the course of this period, the colonial governments and other stakeholders used agricultural cooperatives to facilitate the delivery of extension services to these cash-crop producers (DeGraft-Johnson 1958).

When Ghana attained independence in 1957, the sovereign government started providing extension services to farmers who cultivated food crops such as maize in order to modernise traditional farming practices across the country (Amezah & Dormon 2004). During this period, different government departments and donor projects continued to use agricultural cooperatives on a limited basis, mainly to provide technical information and to distribute farm inputs to farmers at subsidised rates (Amezah & Dormon 2004; Asuming-Brempong, Sarpong & Asante 2005). The extension approach in the post-independence period, however, received two major criticisms. First, it was argued that AEAs paid too much attention to pro-urban and progressive farmers, to the neglect of poorer smallholder farmers (Okorley 2007). The second criticism was that the various departments under the Ministry of Agriculture that provided commodity-based extension could not coordinate among themselves in providing extension services (Okorley 2007). To address some of these criticisms, the then Ministry of Agriculture established the Department of Agricultural Extension Services (DAES) in 1987, to bring together all public extension services under one umbrella (Asuming-Brempong, Sarpong & Asante 2005). In addition, the Government of Ghana adopted a World Bank-sponsored Unified Extension System (UES), which was introduced in many developing countries in the 1970s and 1980s to provide extension services to rural dwellers (MOFA 2002).

The DAES was responsible for implementing the UES model nationwide. The UES model employed training and visit (T&V) as the primary approach to delivering extension services, which emphasised regular training and visits to farms. The T&V method was based on the 'contact farmer' concept, which implied transferring technologies from AEAs to selected farmers in villages, called contact farmers, who would in turn transfer what they had learnt to other farmers (Nagel 1997). The T&V

approach to extension delivery suffered a major setback when the World Bank funding ended, as it required a high financial outlay (MOFA 2002). The approach was also regarded as non-responsive to farmers' needs, because it was top-down and single-line in command, with farmers playing only passive roles. In this respect, farmers did not play any meaningful role in the generation of new knowledge or technologies (MOFA 2002; Birner *et al.* 2009). In addition, the contact farmer concept failed not least because the so-called contact farmers often did not have the means to pass on what they had learnt to other farmers (Nagel 1997). These reasons, among others, led to a call for major extension reforms and in 2003, a new agricultural extension policy was ready for implementation in Ghana (Asuming-Brempong, Sarpong & Asante 2005).

The current agricultural extension policy in Ghana emphasises a pluralistic, participatory and demand-driven delivery of extension services, both due to inadequate extension personnel (e.g. AEAs) and limited budgets to provide public extension (MOFA 2002; GOG 2007). The policy therefore underscores the need for partnership among government, NGOs, private-sector organisations and FBOs in the delivery of extension services. In spite of this initiative, it is important to note that the government (i.e. the public sector) is still the major provider of extension services, although the past decade has witnessed an increase in the involvement of NGOs and the private sector in extension provision (Okorley 2007). While some NGOs and private-sector organisations hire their own AEAs (who often are not graduates from Agricultural Extension colleges),⁵⁰ many of them depend on the government's AEAs to deliver services to farmers (Owusu-Baah 2012).

⁵⁰ Two NGOs in the Northern Region of Ghana, Care International and the Presbyterian Agricultural Station, recruit their own AEAs to deliver services. However, Send-Ghana, in the Northern Region, relies on public AEAs to deliver extension services through a memorandum of understanding with MOFA.

The current extension policy also encourages the use of a wide range of extension methods, such as farmer field schools,⁵¹ mass communication through radio, television and communication vans,⁵² as well as the dissemination of extension through FBOs. In particular, it is argued that the use of farmer field schools and FBOs will ensure a high rate of participation of farmers in extension delivery, as these methods expect farmers to take part in the decision-making, such as defining goals, planning, implementing and assessing their extension activities (MOFA 2002; GOG 2007).

Today, although government, NGOs and private-sector organisations organise and deliver extension services using a variety of ways, FBOs appear to be the preferred method. The use of radio, television and communications vans in delivering extension services appears to be supplementary, because they seem to lack a target audience as compared to FBOs. It is because of this that I now turn to focus on FBOs by first exploring the different ways in which AEAs use them to deliver extension services.

5.3 Delivering extension services through FBOs

This section sets out to examine the different ways in which AEAs interact with FBOs in delivering extension services. Specifically, the section begins with a discussion on the roles and functions of AEAs under MOFA, before examining how they mobilise FBO members to discharge their duties. The section also explores different kinds of technologies that AEAs deliver to farmers.

5.3.1 The roles of agricultural extension agents

In line with extension service provision at MOFA, each AEA has a designated operational area (about eight communities or villages) and is expected to visit every village on a fortnightly basis (Kolavalli *et al.* 2010) – a target that AEAs rarely meet (see

⁵¹ The Farmer Field School (FFS) is a group-based learning process that involves technology development and dissemination based on adult-learning principles such as experiential learning (Naamwintome & Millar 2013).

⁵² Communication vans are mobile vehicles that disseminate agricultural information to farmers in the villages.

Section 5.4).⁵³ It is important to note that AEAs provide extension services to farmers at both the village and farm levels (for a detailed discussion, see Section 5.3.2). Their main function is to inform farmers of improved agricultural technologies, including crop varieties, as well as gathering and transferring information from farmers to relevant stakeholders such as research institutions (MOFA 2005). While it is becoming the standard in many countries for AEAs to work with farmers to identify problems and developed shared solutions (Anderson, Feder & Ganguly 2006), my fieldwork shows that extension services provision focus more on transferring technologies and products (e.g. seeds) to farmers, whose role is merely to apply the available technologies (for a detailed discussion, see Section 5.3.3). This suggests that the views of farmers are less likely to be incorporated into the development and provision of new agricultural technologies.

In addition to their core duty of providing agricultural technologies to farmers, current extension policies require AEAs to educate farmers on topics not directly related to agricultural production, such as HIV/AIDs, sanitation and hygiene, as part of their duties (MOFA 2002; GOG, 2007).

What is important to note is that AEAs are increasingly using FBOs to undertake a large share of their extension work, because they consider these organisations not only as a more cost-effective means of providing services but also as local institutions that have the potential to facilitate rapid diffusion of appropriate technology among smallholder farmers (GOG 2007). It is therefore important to understand how AEAs deliver extension services through FBOs.

5.3.2 How are extension services delivered in FBOs?

Typically, the delivery of extension services through FBOs involves three key processes, as outlined in Figure 5.1 and discussed below.

⁵³ A study of four Districts in Ghana suggests that about 44% of operational areas do not have AEAs (Kolavalli *et al.* 2010).



Figure 5.1. The process of organising extension meetings

First, the AEA contacts a leader of an FBO to schedule an extension meeting. Field interviews with the 40 FBO leaders and the eight AEAs show that many AEAs arrange extension meeting with FBO leaders via cell phones. This is not surprising, as cell phones appear to have penetrated deeply into rural Ghana. For example, of the 240 farmers surveyed, about 74% owned cell phones (see Table 3.6).⁵⁴ One would also expect FBOs to initiate extension meetings for their members, but field evidence shows that FBO leaders rarely do so. The interviews revealed two main reasons why the majority of FBO leaders find it difficult to initiate extension meetings. The first relates to the complexities of self-organising without the involvement of AEAs. Here, the leaders noted that organising members before inviting AEAs is difficult, particularly as members tend to be pessimistic about getting the AEAs into their communities to teach them on a timely basis. Second, they noted that they need financial resources to pay AEAs' travel and transportation ('T&T') when they invite them over. For instance, an FBO leader asserted that, 'when we invite [an] AEA ..., we must reward him in either kind or cash to at least take care of the cost of transportation to the village' (interview with FBO leader in Northern Region, 22/03/2013), which they do not have in most cases. This is because, as discussed in Chapter 4, the mobilisation of internal resources among FBO members is poor.

⁵⁴ This is line with statistics from the National Communications Authority, which reports, on a monthly basis, a continuous increase in the subscriber base in the country. For details, see <http://www.nca.org.gh/40/105/Market-Share-Statistics.html>

In the second process (see Figure 5.1), the FBO leader informs the members about the extension meeting. It is the expectation of the AEA that the leader will pass on details about the meeting to all members of the FBOs. This means that FBO leaders have a key role to play, and that the quality of the leaders will greatly determine the number of members who will participate in the extension meeting.

The final process is the extension meeting itself. Survey results from the 120 FBO members indicate that majority of AEAs hold extension meetings with them at the village or community centres (see Figure 5.2), which may not be appropriate venues for learning new farming technologies. It is reasonable to expect that a greater part of the teaching and learning between farmers and AEAs should take place at the farm level, for the purpose of practical demonstrations. However, as the evidence here shows (Figure 5.2), less than 40% of the extension meetings did take place at the farm level. Recent studies suggest that learning in the field is the preferred means of learning for farmers, as this provides hands-on learning as well as the sharing of ideas from peers (see, e.g., Franz *et al.* 2010). In line with this observation, field interviews with both AEAs and farmers revealed that extension teaching and learning do not significantly improve farmers' practical knowledge. The majority of the few extension meetings that took place in the field (on the farm) were between the AEA and individual farmers, rather than between the AEA and FBO members in a group (Figure 5.2).

Although both farmers and AEAs recognised the shortcomings of extension meetings in the village centres as compared to field-based learning centres, two main factors partly explain why the former is still the most popular approach. First, AEAs 'do not have the resources such as seeds, fertilisers, and agrochemicals to set up demonstration farms' (interview with AEA in Eastern Region, 03/06/2013); a view expressed by all the AEAs interviewed.

Some NGOs are investing in demonstration farms, albeit on a limited basis. For examples, in the East Gonja and West Mamprusi Districts, 1-acre (0.4 hectare) rice

demonstration farms were set up for two FBOs under a project sponsored by the Japan International Cooperation Agency (JICA) during the 2012 farming season.⁵⁵ To improve this situation, neither NGOs nor the private sector can do it alone; the state (government) must play a crucial role in supporting the setting up of demonstration farms across the country. As Green (2008) argues, states shape the evolution of the private sector and there are no short cuts through the private sector only.

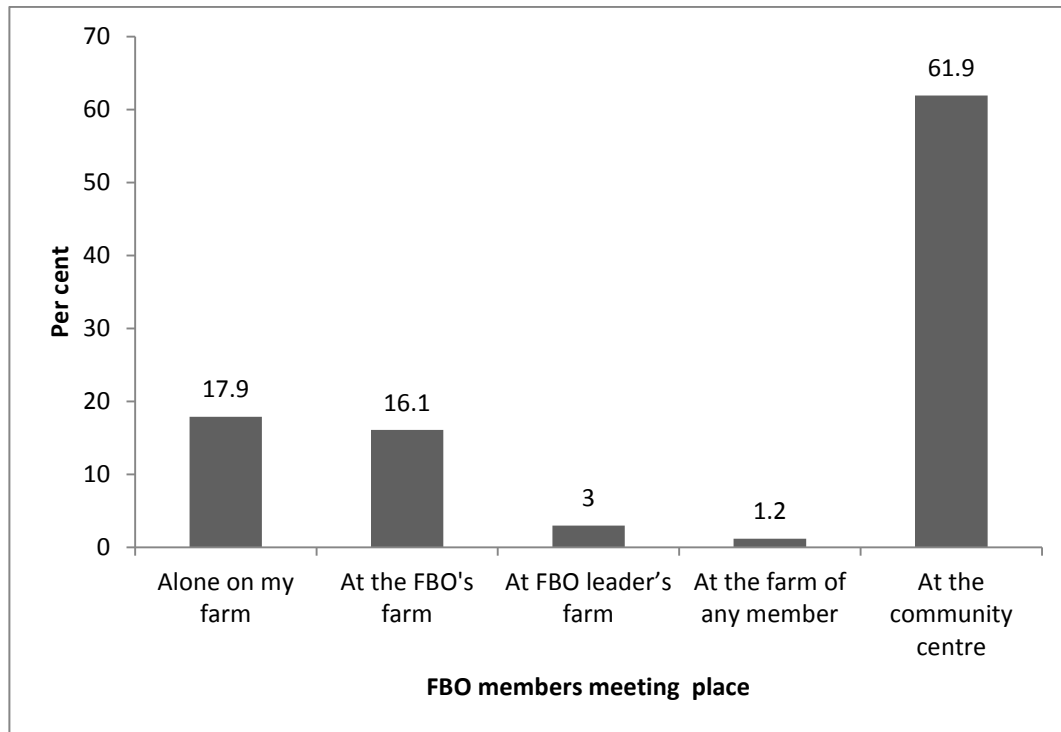


Figure 5.2. Where extension delivery with FBO members takes place

Source: Author's calculation based on fieldwork data

The second reason why the majority of the extension meetings take place in the village centres is the inability of most FBOs to maintain group farms that can serve as demonstration farms. For instance, of the 40 FBOs studied, only 18 had group farms.

⁵⁵ Other NGOs that support FBOs in the Northern Region to set up demonstration farms include the Presbyterian Agricultural Station and Send-Ghana.

We should note that the existence of a group farm does not necessarily provide the solution, as many of the FBOs may not have the internal resources to purchase the farm inputs required for effective teaching and learning (for a discussion on the generation of internal resources among FBO members, see Chapter 4).

Notwithstanding the above reasons concerning the inability to hold the majority of extension meetings at the farm level, evidence from the field shows that when extension meetings take place in village centres, they sometimes offer FBO non-members the opportunity to participate,⁵⁶ especially if the village is small. However, when FBO members cannot exclude non-members in their extension meetings, FBO members may have little incentive to incur cost to promote collective action in the FBO, a phenomenon often referred to in the literature of collective action as the ‘free-rider problem’ (Olson 1965; Ostrom 1990).

The discussion in this section so far has focused on a three-stage process for organising extension meetings as well as the key challenges that come with this process. However, Figure 5.2 suggests that there are other approaches to organising extension meetings. One approach that is evident in Figure 5.2 is extension meetings between AEAs and leaders or individual members. AEAs sometimes meet and teach only FBO leaders or a few members, who in turn are expected to pass on the knowledge to others. This is a common approach because all the AEAs interviewed indicated that organising FBO members to participate in extension meetings is often challenging. For instance, one AEA in the Northern Region reported that they sometimes adopt the individual learning approach because ‘getting a suitable time for all of them [farmers] is usually difficult’ (interview with AEA, 14/02/2013).

Another approach is to organise extension meetings outside the village. In this case, AEAs select a few members (usually the leaders) to participate in training workshops at the District and Regional levels, who are then expected to train their colleagues on their

⁵⁶ However, fieldwork interviews with FBO non-members generally suggest that they do not want to participate in FBOs’ meetings for which they are not members.

return.⁵⁷ Unfortunately, leaders and other participants at such meetings ‘do not impart the knowledge to their members [farmers]’ (interview with AEA in Northern Region, 08/12/2012), largely because they do not have the skills and capacity to do so. About 60% of the AEAs interviewed made similar remarks.

In summary, the analyses in this section have shown that delivering extension services through FBOs requires effective collaboration between AEAs and FBO leaders. In particular, it has been argued that the number of FBO members who participate in extension meetings depends on the ability of the leaders to mobilise the members. Another point worthy of note is that the majority of extension meetings take place at the village centres rather than in farms or on demonstration plots, where AEAs may easily pass on practical knowledge to farmers. Here, I have argued the need for government to play a key role in setting up demonstration plots for FBOs.

As noted earlier, it is also important to identify the different kinds of technologies that AEAs teach farmers during extension meetings.

5.3.3 Technologies promoted to farmers

This section presents a wide range of extension technologies (messages) that AEAs frequently promote among smallholder farmers. The focus here is to identify the most common extension technologies. This will form the basis for further examination of the frequency with which these technologies are promoted among smallholder farmers.

A recent World Bank study (World Bank and IFPRI 2010) on gender and rural services in three African countries, including Ghana, reported that the five common topics that AEAs teach farmers in Ghana are as follows:

- FBO formation, management and leadership;
- planting techniques;

⁵⁷ For example, an FBO member in the Tamale Metropolis of the Northern Region indicated that in 2012, their AEA ‘selected five people [members] who went for training and they are [were] expected to train the entire group’ on their return (interview with FBO member, 25/02/2013).

- improved seed variety of plant material;
- soil fertility management; and
- aquaculture (World Bank and IFPRI 2010).

In line with this World Bank study, the present study identified the following as the most frequently taught technologies through field interactions with the eight AEAs:

- preparation of the land;
- the use of improved seed varieties;
- planting distances;
- fertiliser application;
- weed control; and
- harvesting and post-harvesting techniques.

Field interviews with the AEAs revealed that the decision to teach farmers particular technologies is based largely on their discretion. In a few cases, when AEAs work on projects, the projects specify the technologies that should be taught to farmers. For example, under the Millennium Challenge Account Program (see Chapters 1 and 4), AEAs received specific guidelines on what technologies to teach farmers. Similarly, interviews with smallholder farmers in FBOs also show that when deciding what technologies they need assistance with, a great many of them do not have a voice. Naamwintome and Millar (2013) make a similar point when they describe extension delivery in many developing countries as a teacher–pupil relationship, with the AEAs assuming the position of knowing it all.

In addition to understanding the most common technologies that AEAs teach smallholder farmers, it was also important to understand those technologies from the perspective of the farmers. A question was included in the survey/questionnaires that asked farmers to indicate the three most common technologies they had recently learnt from AEAs. The responses to the question are summarised in Figure 5.3, showing that the three most common technologies that AEAs teach smallholder farmers are planting

techniques, fertiliser use and herbicide application. We should note that these technologies remain the most frequently taught among smallholder farmers even when one disaggregates the data by region (see Figure 5.3).

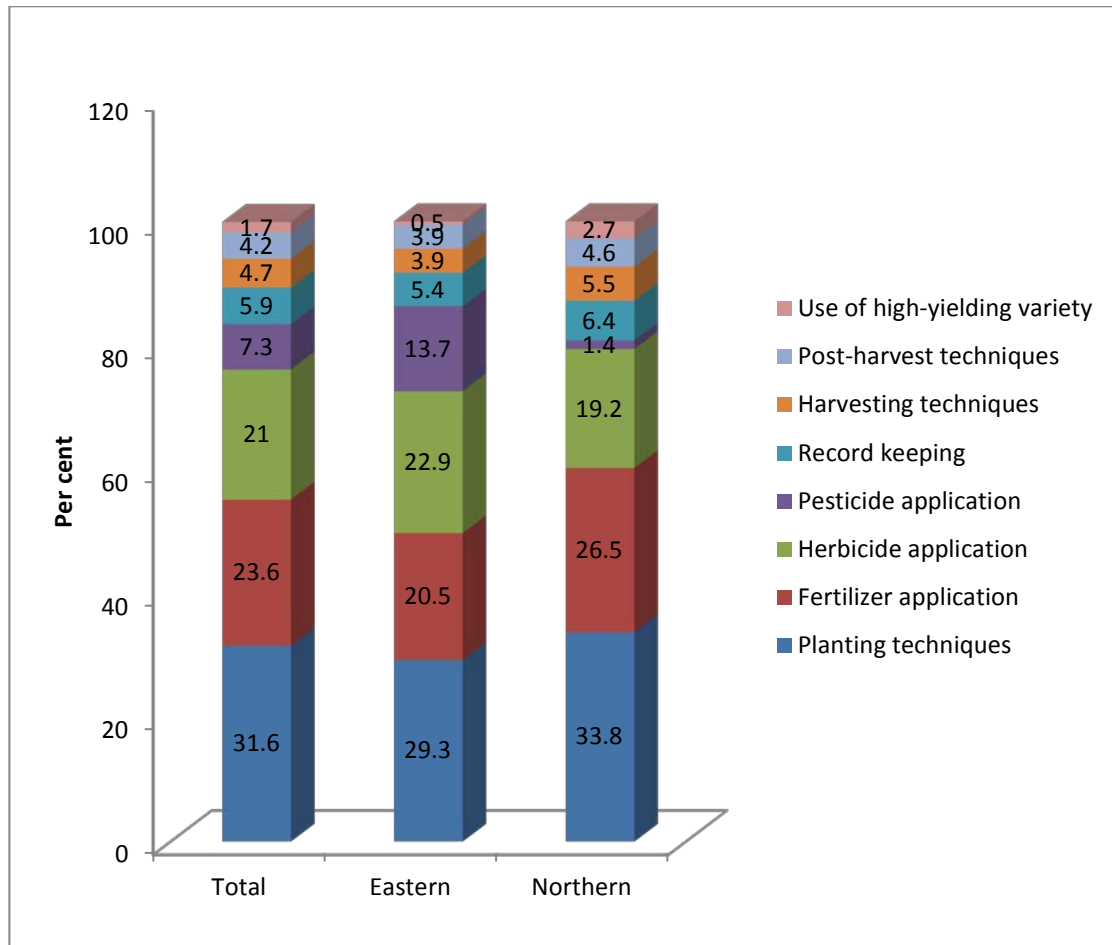


Figure 5.3. Farmers’ perspective of the most frequent extension services (topics taught) that they receive

Source: Author’s calculation based on fieldwork data

While smallholder farmers cultivate more than one crop, it is important to note that the teaching and learning of these technologies are mainly in relation to the maize crop. The majority of the farmers are taught these technologies because maize is not only a major

staple crop but also a crop grown in almost every part of the country. For instance, of the 240 smallholder farmers surveyed in this study, approximately 88% indicated that they cultivated maize.

To sum up, the above discussion shows that AEAs teach farmers a wide range of technologies, with planting techniques, fertiliser use and herbicide application being the most frequently taught technologies. However, the frequency with which AEAs teach farmers these technologies is still unclear. The section that follows answers this question. I also examine the extent to which FBOs influence how regularly AEAs teach smallholder farmers. In other words, one needs to examine if there are differences between FBO members and non-members regarding the frequency of the extension services (technologies) they receive.

5.4 Smallholders' access to extension services

'The truth is that if you do not belong to FBOs you hardly get training from us [agricultural extension agents].' (Interview with AEA in Northern Region, 07/12/2012)

This section has two main aims. First, it explores how frequently smallholder farmers receive extension services. Second, it examines the determinants of farmers' access to extension services and the extent to which FBOs influence the frequency smallholder farmers get extension services.

The analytical approach adopted in this section involves an extensive comparison between FBO members and non-members. As discussed in Chapter 3, the study used a propensity score matching technique, which reduced the smallholder farmers' sample from 240 (120 FBO members and 120 FBO non-members) to 226 (120 FBO members and 106 FBO non-members). For purposes of comparison between FBO members and non-members, the remainder of this chapter and the subsequent chapters use the reduced sample of 226. It is important to emphasise again in this chapter that the PSM technique was used mainly to ensure that the sampling approach used in selecting the two groups (FBO members and non-members) was robust to allow for a comparison between FBO

members and non-members regarding their access to extension services. In other words, the PSM technique here is not intended to undertake analysis of paired individual farmers' outcomes but rather to ensure a comparison between FBO members and non-members.

In undertaking these analyses, this section utilises both basic descriptive statistics and more complex statistical analyses such as regression analysis. The discussions also incorporate qualitative analysis, usually to provide in-depth explanations for the variations in accessing extension services based on field interviews.

5.4.1 A measure of accessing extension services: do FBOs count?

'I do not know any AEA ... AEA's do not work with those of us who are not in FBOs.'
(Interview with FBO non-member in the Tamale Metropolis of the Northern Region, 09/12/2013)

This subsection answers two interrelated questions. The first relates to the determinants of access to extension services and the second concerns how frequently smallholder farmers receive extension services from AEAs. The second question particularly examines whether FBOs facilitate how often smallholder farmers receive extension services from AEAs.

To begin with, evidence from the Ghana Living Standard Survey 5 (GLSS5) of 2005–6 – the most recent nationwide household survey data – suggests that AEAs visit about 51% of the rural communities in Ghana.⁵⁸ However, the GLSS5 did not collect data regarding how frequently AEAs visit farmers in the rural communities. Although this present research cannot claim to have a nationally representative sample, it included a question that required smallholder farmers to describe their access to extension services. An examination of responses to this question, as shown in columns 1 and 4 of Table 5.1, shows that the majority of the surveyed smallholder farmers indicated that they

⁵⁸ The Ghana Living Standard Survey 6 (GLSS6) was released towards the end of 2014, but I have not been successful in acquiring the up-to-date dataset.

sometimes (about 39%) or never (about 37%) received extension services. The figures further show that the majority of the farmers thought that they did not receive extension services in the manner they would have expected.

The responses become even more revealing when one disaggregates the data according to whether smallholder farmers are FBO members or FBO non-members. Table 5.1 suggests that membership of an FBO is the surest way for smallholder farmers to access extension, as none of the 120 FBO members indicated that they had never received extension services. In contrast, of the 106 FBO non-members, about 22% indicated that they had accessed one form of extension service (see column 3 of Table 5.1), with the majority of them (78%) indicating that they had never received any extension services.

Table 5.1

Smallholders' perspective on their frequency of access to extension services

Frequency of service	Frequency (%)		
	FBO member	FBO non-member	Total
Always get service	14 (11.7)	1 (0.9)	15 (6.6)
Usually get service	41 (34.2)	0 (0.0)	41 (18.1)
Sometimes get service	65 (54.2)	22 (20.8)	88 (38.5)
Never get service	0 (0.0)	83 (78.3)	83 (36.7)
Total	120 (100)	106 (100)	226 (100)

Source: Author's calculation from fieldwork data

It is also important to note that in Table 5.1, even with the FBO members, more than half (about 54%) indicated that they sometimes got services, suggesting that FBO members did not get extension services at a frequency that they would have wished.

A closer look at only FBO non-members shows that those who reside in communities with FBOs have a greater chance of receiving extension services compared to their counterparts in non-FBO communities. As shown in the Table 5.2, only 4 (12%) out of 33 FBO non-members who reside in communities with no FBOs ever received extension service, which suggest that the presence of FBOs in a community can enhance smallholder farmers chances of receiving extension services from AEAs. Bratton (1986a) made a similar observation about four decades ago using data from one agricultural season in Zimbabwe, when he noted that membership of farmer organisations is a major factor explaining a high level of contact between AEAs and farmers.

Table 5.2

Whether FBO non-members received extension services based on the type of community

Whether farmer receives extension services?			
Type of community	No	Yes	Total
Non-FBO community	29	4	33
	87.88%	12.12%	100%
FBO Community	54	19	73
	73.97%	26.03%	100%
Total	83	23	106
	78.30%	21.70%	100%

Source: Author's calculation from fieldwork data

While Table 5.1 shows the significance of FBO membership in accessing extension services, it is also important to explore the factors that determine farmers' access to

extension services beyond membership of FBOs. Table 5.3 presents a binary logistic regression on the determinants of farmers' access to extension services.

Table 5.3

Determinants of smallholder farmers' access to extension using binary logistic regression (Dep. Var.: Whether farmer received extension services)

Variables	B	S.E.	Wald	Sig.	Exp(B)
Whether farmer belong to FBO (dummy, 1=Yes)	2.229	.475	22.050	.000	9.295
Age	-.002	.024	.005	.946	.998
Years of farming experience	-.013	.026	.271	.603	.987
Whether farmer owns a cell phone (dummy, 1=Yes)	.149	.480	.096	.757	1.160
Landholding size under cultivation	-.148	.078	3.572	.059	.863
Distance from extension service centre	.001	.012	.003	.960	1.001
Gender (male=1)	1.153	.619	3.470	.062	3.168
Whether the village is assigned an AEA (dummy, 1=Yes)	1.775	.577	9.470	.002	5.899
Total landholding size	-.018	.023	.630	.427	.982
Farmer's years in education	.109	.041	7.216	.007	1.115
Whether farmer has access to radio (dummy, 1=Yes)	1.212	.574	4.461	.035	3.362
Constant	-3.969	1.223	10.530	.001	.019

Note. Observations = 226; Hosmer and Lemeshow Test: Chi-square = 3.637, d.f. = 8, Sig = 0.888, -2 Log likelihood = 180.426, Cox & Snell R Square = 0.439, Nagelkerke R² = 0.588; overall percentage of right predictions = 54.9

The dependent variable included in this regression is whether or not smallholder farmers receive extension services during the 2012 farming season. It is important to note that out of the 226 farmers, 102 (45%) received at least one form of extension service during

the 2012 farming season. While 88 (73%) out of 120 FBO members received extension services, only 14 (13%) out of 106 FBO non-members did.

The independent variables included in the regression are whether the farmer belongs to an FBO, the age of farmers, their years of farming experience, whether they own cell phone, their access to radio, their total landholding size and landholding size under cultivation. Other variable included in the regression are the gender of farmers, their years in education, their distance from the agricultural extension centre and whether the village is assigned an AEA from whom farmers can get extension support.

The results in Table 5.3 further confirm the finding that smallholder farmers' membership of FBO increases significantly their likelihood of receiving extension services. The results in the Table also suggest that smallholder farmers' access to radio, their years in education and the whether the village is assigned an AEA significantly increase their likelihood of receiving extension services. These results are expected; for instance villages without the presence of AEAs will find it difficult to access extension services from neighbouring villages. In relation to farmers' years in education, this finding corroborates other studies that have found farmers' years of education to be positively associated with their access to extension services (see, e.g., Foster & Rosenzweig 1996; Abdulai & Huffman 2005).

The remainder of the analysis now focuses on the intensity of farmers' access to extension services. Although Table 5.1 provides some insights regarding how often smallholder farmers receive extension services, it fails to tell us the varying degree of frequencies (i.e. the number of times) that farmers meet with AEAs. This study's questionnaire included a question that sought to understand the number of times AEAs visited the farmers in the 2012 season (April–October 2012). An examination of the number of times AEAs visited smallholder farmers in that farming season shows that, on average, AEAs visit farmers once during the farming season. Meeting farmers once in a season appears inadequate, but a study conducted in Ethiopia has shown that receiving at

least one extension visit per year reduces the likelihood of being poor by 10% (Dercon *et al.* 2009). However, as this section will show, it is important to note that in Ghana the majority of farmers do not receive at least one extension visit year. Extension visits are biased towards a particular group of farmers.

If the survey data are disaggregated by the two administrative regions, one can see that farmers from the Eastern Region had the highest average number of AEA visits, compared to their Northern counterparts (see Table 5.4). One may see the difference in the average number of AEA visits between the Northern and Eastern Regions as insignificant, but a test of differences in the averages, using an independent-sample *t*-test, shows that there is a statistically significant difference between the two regions.

Table 5.4

The average number of AEA visits to farmers in a season, by region

Region	Observations	Mean	Standard deviation
Northern	120	1.20	2.509
Eastern	106	1.92	2.680

Source: Author's calculation from fieldwork data

Note: The mean difference is significant at the 95% confidence level; $t = -2.071, p < .04$.

Figure 5.4 provides a further analysis of AEAs' average visits to smallholder farmers by district, which further supports why the average number of visits is higher in the Eastern Region compared with the Northern Region. Figure 5.4 shows that except for the East Gonja District, the average number of AEA visits for all districts in the Northern Region is less than for districts in the Eastern Region. A reasonable explanation for the variation may be that the number of farmers per AEA is lower in the Eastern Region as compared to the Northern Region. This line of reasoning is supported by the survey results, which show that while the average numbers of AEAs that smallholder farmers know, and from

whom they can get extension advice, are 0.65 and 0.94 in the Northern and Eastern Regions, respectively; an independent-samples *t*-test shows that the difference between the two regions is statistically significant ($t = -3.127, p < .002$). Another plausible explanation may be that extension centres, located predominantly in District capitals, are further away from smallholder farmers in the Northern Region, compared to those in the Eastern Region. For example, results from the survey suggest that the average distance between farmers and the closest extension centres is greater in the Northern Region (about 26 kilometres) compared with the Eastern Region (about 23 kilometres).⁵⁹

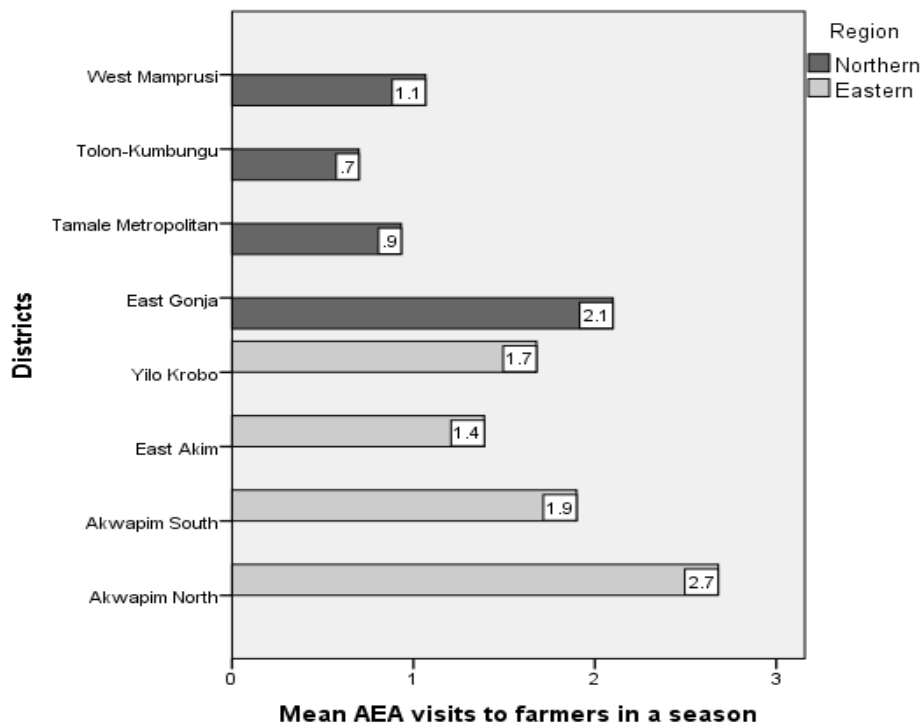


Figure 5.4. Average AEA visits to smallholder farmers by district in one farming season in 2012

Source: Author's calculation from fieldwork data

Although the above analysis helps to reveal some significant variations in AEA visits to farmers in different districts and regions, it does not indicate the roles of FBOs in the

⁵⁹ Agricultural extension centres in the District are usually the District Agricultural Development Units (DADU), which are located in District capitals.

process. Table 5.5 draws our attention to the extent to which FBO membership has a direct influence on whether smallholder farmers receive extension services. Table 5.5 clearly shows a sharp difference between FBO members and non-members regarding the average number of AEA visits they get in a given season, and an independent-samples *t*-test supports this difference as being statistically significant. This is not surprising, as AEAs tend to ‘visit farmers who are members of FBOs and ... do not bother about those farmers who are not [in organised] groups ...’ (interview with AEA in Northern Region, 03/06/2013), a view shared by all the AEAs interviewed. Indeed, of the 106 FBO non-members, about 36% indicated that they knew an AEA from whom they could get extension advice, but only 13% reported to have had at least one extension meeting with an AEA in the 2012 farming season. In contrast, of the 120 FBO members, about 96% indicated that they knew an AEA from whom they could get extension advice and a remarkable 73% reported having had at least one extension meeting with an AEA in the 2012 farming season.

Table 5.5

The average number of AEA visits to farmers in a season, by FBO members and non-members

Farmer type	Observations	Mean	Standard deviation
FBO non-member	106	0.21	0.727
FBO member	120	2.71	3.074

Source: Author’s calculation from fieldwork data

Note: The mean difference is significant at the 99% confidence level; $t = -8.642$, $p < .0000001$.

In spite of the significant difference between FBO members and non-members in terms of the average number of visits they get from AEAs, three important issues are worth exploring. The first issue concerns whether there are differences among FBO members

with regard to the number of visits they get from AEAs as well as the factors that may account for such differences (this is discussed in Section 5.4.3). Second, while FBO non-members sometimes get the opportunity to participate in FBO extension meetings when they are held at village centres (see Section 5.3.2), it is important to explore further what factors may influence the intensity of FBO non-members' access to extension services (explored in Section 5.4.4). Finally, as noted earlier, extension policies require AEAs to visit villages on a fortnightly basis during the farming season (Kolavalli *et al.* 2010). However, the average number of AEA visits to FBO members reported in Table 5.6 fall far short of this requirement; it is therefore important to understand the factors accounting for this shortfall (discussed in Section 5.4.5).

5.4.2 Does membership of an FBO guarantee equal access to AEA visits?

Our discussions in Chapters 3 and 4 show that members of Ghana's FBOs can be categorised broadly into leaders (executives) and ordinary members. This section examines whether leaders differ from ordinary members with respect to the number of extension visits they get in a farming season, as well as explaining why there may be variations between FBO leaders and ordinary members. This line of analysis is important because some studies (e.g., Bernard *et al.* 2008) have suggested that corrupt or selfish FBO leaders tend to capture, for themselves alone, benefits that are meant for all of the FBO members. Such analysis is also critical as leaders may capture most extension services, especially in contexts where they lack the managerial skills to mobilise all the members for extension meetings, as noted earlier.

To begin with, of the 120 FBO members surveyed, approximately 73% reported to have had at least one extension meeting with an AEA in the 2012 farming season (April–October). If the responses are disaggregated according to FBO leaders and ordinary members (see Figure 5.5), it becomes evident that FBO leaders have a greater chance of having an extension meeting with an AEA than ordinary members. It is important to remember that 40 out of the 120 FBO members surveyed were leaders. Of the 40 FBO leaders, 85% (34 leaders) reported having had an extension meeting with an AEA, while

about 68% (54 members) of ordinary members reported so, as shown in Figure 5.5. This finding becomes clearer if one compares the average number of extension meetings between FBO leaders and ordinary members in the 2012 farming season (see Table 5.6). The table shows that the numbers of meetings that FBO leaders have with AEAs is almost twice the number for ordinary members. A test of the mean difference using an independent-samples *t*-test supports the average number of extension meetings between FBO leaders and ordinary members as being statistically significant.

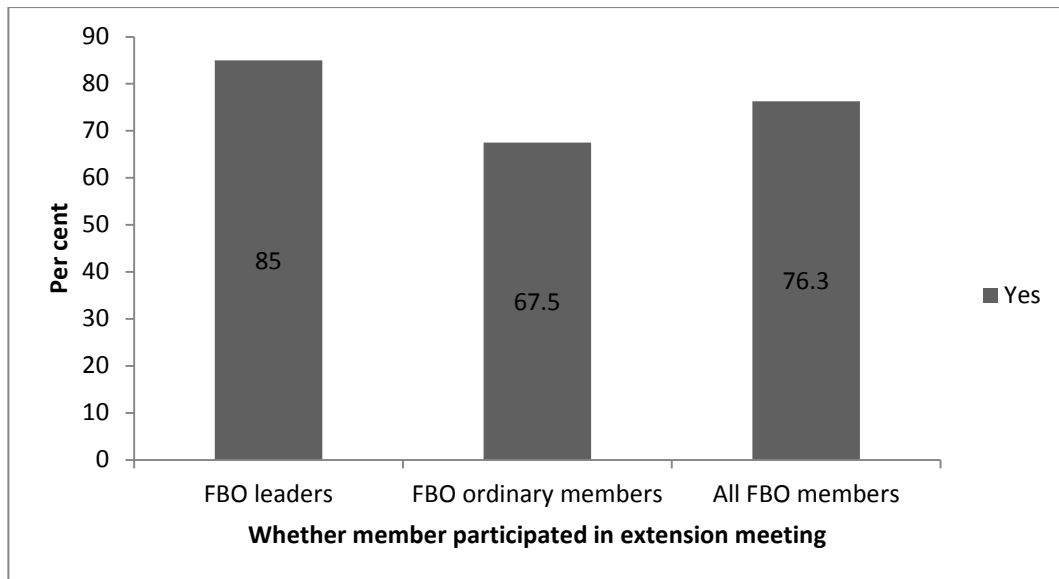


Figure 5.5. Whether an FBO participated in an extension meeting, by type of member, in one farming season in 2012

Source: Author’s calculation from fieldwork data

Here, two main interrelated factors explain the large difference between FBO leaders and ordinary members with regard to access to extension services. First, as we observed in Section 5.3.2, FBO leaders are the first people whom AEAs contact when organising extension meetings for these organisations. In many cases, the leaders are unable to mobilise their members to participate in scheduled extension meetings. An AEA in the Northern Region echoed this precisely when he noted that, ‘sometimes when we call for

the meetings, the other members will not come, so we end up teaching only the leaders ... We expect them [the leaders] to teach the other farmers' (interview with AEA in Northern Region, 15/02/2013). Similarly, unlike the ordinary members, 'most of us [leaders] have AEAs' cell phone numbers and can call them to our farms anytime we want' (interview with FBO leader in the East Gonja District of the Northern Region, 22/03/2013). It is therefore reasonable to argue that FBO leaders receive more extension visits from AEAs as compared to ordinary members because AEAs are more accessible to the former.

Table 5.6

The average number of AEA visits to farmers in a season, by type of FBO member

Farmer type	Observations	Mean	Standard deviation
FBO leader	40	3.85	3.919
FBO ordinary member	80	2.14	2.380

Source: Author's calculation from fieldwork data

Note: The mean difference is significant at the 99% confidence level; $t = 2.539, p < .01$.

This also points to weak leadership in FBOs, as their leaders appear less effective in motivating and mobilising members to participate in extension meetings. Markelova *et al.* (2009) argue that the ability of leaders to mobilise and motivate their members is a necessary leadership skill for successful collective enterprises in FBOs. However, when FBO leaders are not paid for mobilising and organising their members (as in the case of the FBOs in this study), they are less likely to be motivated to organise them to access collective services. In other words, as rational beings, FBO leaders will not put extra effort into mobilising their members if they know it will not result in extra benefit to them.

The second reason for the huge difference between FBO leaders and ordinary members in the number of extension visits they receive relates to the bias of AEAs in implementing projects. When a project requires an individual farmer to do a demonstration farm, rather than the entire FBO, the AEAs tend to select leaders, to the neglect of ordinary members. As can be expected, when a farmer is selected to do a demonstration farm, he gets frequent visits from AEAs. For example, two FBO leaders I interviewed, one each from the West Mamprusi and Tolon-Kumbungu Districts of the Northern Region, indicated that their AEAs selected them to do demonstration farms and, as a result, the AEAs visited them on their demonstration farms at least once per fortnight.⁶⁰

Two points are worth noting in the above analyses. The first is that membership of FBOs influences the frequency of the extension visits that smallholder farmers get from AEAs, and that FBO members receive more extension visits than do FBO non-members. The other important point to note is that FBO leaders get more services than ordinary members largely due to weak leadership and poor organisational skills in FBOs. In addition to FBO membership and leadership in FBOs, other factors are likely to influence access to extension services. The next section therefore explores the determinants of intensity of accessing extension services for both FBO members and non-members.

5.4.3 Determinants of accessing extension services: do they go beyond the existence of FBOs?

This section delves deeper into understanding other factors that influence how frequently smallholder farmers' access extension services. This line of investigation is important because the study has established, in the previous section, that membership of an FBO does not necessarily guarantee equal access to extension services among the members; instead, there is a particular bias in favour of the leadership. An important question, therefore, will be to examine whether other determinants influence how often they

⁶⁰ These demonstration farms were sponsored by the Savanna Agricultural Research Institute (SARI) located in the Northern Region.

access extension services. For instance, studies have shown that the frequency of access to extension services is higher for men as compared with women (World Bank 2010; Ragasa 2012). The aim in this section therefore is to investigate whether the number of extension visits smallholder farmers have with AEAs is influenced by a set of variables such as the gender and years of education of farmers, the size of landholding under cultivation and their access to radio and television (TV), as well as their ownership of cell phones. Other variables included are whether the village is assigned an AEA, the number of AEAs farmers know from whom they can get extension advice, the distance from the closest extension centre, whether FBO member is a leader, the membership size of FBO and whether the FBO has a group farm.

Table 5.7 reports the summary statistics of the key variables included in the analyses. The summary statistics are disaggregated according to FBO members and non-members, for easy comparison of their means. Appendices 5.1 (overall study sample), 5.2 (FBO non-member sample) and 5.3 (FBO member sample) also provide correlation matrices for these variables.

Table 5.7 shows that the average age of FBO members is greater than that of their non-FBO counterparts, which again reminds us of the fact that FBO membership is largely composed of the more elderly people (see Chapter 4). FBO members also own more cell phones as compared with FBO non-members. They also have more education and know more AEAs from whom they can get extension support, compared to FBO non-members. With many of the variables in Table 5.7 that relate to personal characteristics, the differences between FBO members and non-members are statistically significant.

The standard multiple linear regression, Ordinary Least Squares (OLS), is used to understand those other factors that influence access to extension services between both FBO members and non-members, beyond FBO membership itself.

Table 5.7

Descriptive statistics of selected variables for smallholder farmers, FBO members and FBO non-members

Variable	Description	FBO members (<i>n</i> = 120)	FBO non- members (<i>n</i> = 106)	Total (<i>n</i> = 226)
FreqAEA	Average number of times AEAs and farmers met in the last season	2.71 (3.07)	0.21 (0.73)*	1.54 (2.61)
Age	Average age (in years)	48.27 (10.14)	43.21 (11.94)	45.89 (11.28)
Gender	Gender (dummy, 1 = male)	0.73 (0.44)	0.61 (0.49)	0.68 (0.47)
Education	Average education (in years)	5.92 (5.73)	3.15 (4.40)	4.62 (5.32)
Cellphone	Whether farmer owns a cell phone (dummy, 1 = yes)	0.80 (0.40)	0.67 (0.47)*	0.74 (0.44)
Radio	Whether farmer has access to radio (dummy, 1 = yes)	0.90 (0.30)	0.64 (0.48)	0.78 (0.42)
TV	Whether farmer has access to TV (dummy, 1 = yes)	0.36 (0.48)	0.15 (0.36)	0.26 (0.44)
Farmexp.	Average years of farming experience	19.07 (10.49)	16.59 (11.60)*	17.91 (11.07)
Totland	Average total landholding size (in acres)	10.76 (10.57)	9.89 (12.65)	10.35 (11.57)
Landsize	Average landholding size under cultivation (in acres)	5.65 (3.37)	5.12 (3.45)	5.40 (3.41)
Distance	Average distance from the closest extension centre (in miles)	13.88 (15.50)	15.81 (18.01)	14.78 (16.71)
VillageAEA	Whether the village is assigned an AEA (dummy, 1 = yes)	0.96 (0.20)	0.36 (0.48)*	0.68 (0.47)
NoAEA	Average number of AEAs that farmer knows	1.18 (0.66)	0.34 (0.48)*	0.79 (0.72)
FBOmem	Whether farmer belong to FBO (dummy, 1 = yes)			0.53 (0.50)
Leader	Whether FBO member is a leader (dummy, 1 = yes)	0.33 (0.47)		
FBOsize	Average size of FBO	32.45 (17.70)		
VilFBO	Whether there is FBO in the village (dummy, 1 = yes)		0.69 (0.47)	

Source: Author's calculation from fieldwork data

Note: Figures in parentheses are standard deviations. * mean differences between FBO members and non-members are significant at the 99% confidence level.

It is important to indicate that all zeros (that is those farmers who did not receive extension services in the 2012 farming season) were dropped in the regression analysis.

The results of the regression analysis are summarised in Table 5.8, which reports both unstandardised coefficients and standardised coefficients, with corresponding standard errors. The analysis has three levels, labelled Models 1, 2 and 3. Model 1 estimates the determinants of extension services access intensity using the entire sample, while Models 2 and 3 estimate the determinants for FBO members and non-members, respectively.

In Model 1, the independent variables included are whether the farmers belong to an FBO, their gender and years of education, their size of landholding under cultivation, and farmers' access to radio and TV sets. The inclusion of gender in this model is important, as some studies have shown the neglect of women in extension delivery (World Bank and IFPRI 2010).⁶¹ Farmers' years of education and their access to radio and TV also have the potential to expose them to the need to acquire appropriate technologies from extension service providers to achieve better yields. I also include in the model variables such as farmers' ownership of cell phones and the distance from the nearest extension centre, whether the village is assigned an AEA, the AEA's known to farmers from whom they can seek extension advice. The inclusion of the cell phone is based on the rationalisation that farmers who have access to cell phones are likely to be contacted easily to receive different kinds of information such as extension messages.

An examination of the Model 1 coefficients supports the argument that the number of AEA's that farmers know from whom they can get support has a significant effect on the number of extension meetings they have with AEA's. This suggests that while membership in FBO's (this is significant at the 10% level) is important for smallholder farmers' access to extension services, the number of AEA's they know personally, from

⁶¹ For example, a study by the World Bank suggested that agricultural extension services are almost exclusively with male farmers, and that extension meetings are held at times that are not convenient for women (World Bank and IFPRI 2010).

whom they get extension support, is even more important for their access to the services. As discussed earlier in this chapter, we should note that smallholder farmers who participate in FBOs but do not have personal contact with AEAs get less in the way of extension services. Similarly, FBO non-members who have direct contact with AEAs can receive more extension services. The implication of this is that smallholder farmers in FBOs with no personal contact with AEAs will receive inadequate extension services, unless FBOs have the capacity to demand collective extension services from the AEAs for their members. In line with the above argument, Sims and Leonard (1990), in their study of the political economy of the development and transfer of agricultural technologies in developing countries in Africa and Asia, note that the most important determinant of the success of the delivery of extension services is the strength of FBOs.

Model 1 further shows that the distance of smallholder farmers to the agricultural extension centres significantly influences the number of extension visits they receive. The results suggest that farmers who are further away from the extension centres are likely to receive more extension services. A reasonable explanation could be that extension services providers focus more on smallholder farmers in remote areas who may need extension services most to increase their crop yields. Access to TV is also shown to be significant (at the 10% level) although negatively, suggesting that those farmers who have access to TV are likely to receive less extension services. Here, gender, the size of landholding, ownership of a cell phone and years of education are not significant. What is surprising is that ownership of cell phone does not significantly influence the number of extension visits smallholders get. This is surprising because interviews with all the eight AEAs revealed that they visit farmers who contact them via cell phones promptly. As one AEA from the Eastern Region noted, we ‘visit farmers who call us on our phones’ (interview with AEA in Eastern Region, 17/05/2013).

Model 2 has a different specification from Model 1 and runs on a subsample (FBO members only). Except for FBO membership and whether there is FBO in the village variables, it includes the same independent variables as Model 1.

Table 5.8

Determinants of access to extension services (OLS regression, Dep. Var.: number of AEA visits to farmers in a season)

Variable	Model 1		Model 2		Model 3	
	Overall sample		FBO members		FBO non-members	
	Unstandardised coefficient	Standardised coefficient	Unstandardised coefficient	Standardised coefficient	Unstandardised coefficient	Standardised coefficient
FBOmem	1.494 (0.861)	0.175 (0.861)*	–	–	–	–
Gender	-0.453 (0.779)	-0.063 (0.779)	-0.059 (0.932)	-0.008 (0.932)	-7.321 (0.967)	-1.901 (0.967)***
Education	0.045 (0.061)	0.084 (0.061)	0.016 (0.068)	0.03 (0.068)	0.211 (0.041)	0.654 (0.041)***
Landsize	0.074 (0.094)	0.074 (0.094)	0.02 (0.105)	0.02 (0.105)	0.276 (0.107)	0.509 (0.107)*
Radio	0.653 (1.056)	0.056 (1.056)	0.288 (1.167)	0.024 (1.167)	8.846 (1.166)	1.69 (1.166)***
VillageAEA	0.697 (1.373)	0.056 (1.373)	-0.21 (2.003)	-0.01 (2.003)	2.359 (0.62)	0.791 (0.62)**
Distance	0.045 (0.017)	0.243 (0.017)***	0.049 (0.019)	0.266 (0.019)**	0.041 (0.019)	0.328 (0.019)*
NoAEA	2.165 (0.471)	0.468 (0.471)***	2.213 (0.492)	0.496 (0.492)***	–	–
Cellphone	1.327 (0.805)	0.168 (0.805)	1.216 (0.876)	0.155 (0.876)	-0.096 (0.504)	-0.018 (0.504)
TV	-1.266 (0.673)	-0.208 (0.673)*	-1.72 (0.772)	-0.277 (0.772)**	-2.726 (0.619)	-0.914 (0.619)**
VillFBO	0.500 (1.796)	0.033 (1.796)	–	–	-0.466 (0.395)	-0.156 (0.395)
Leader	–	–	1.005 (0.635)	0.162 (0.635)	–	–
FBOsize	–	–	0.015 (0.018)	0.092 (0.018)	–	–
FBOfarm	–	–	1.021 (0.592)	0.169 (0.592)*	–	–
No. of obs.	102		88		14	
Pseudo R ²	0.346		0.380		0.981	
Adjust R ²	0.267		0.281		0.939	

Source: Author's calculation from fieldwork data

Note: *,** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Standard errors in parentheses.

However, Model 2 also includes whether the FBO has a group farm (joint production), the FBO size and whether the FBO member is a leader of the group. In line with Model 1, Model 2 shows that, among FBO members, the most important determinant of how many extension visits they receive is the number of AEAs they know from whom they get extension support.

This supports the earlier argument that membership of an FBO may not necessarily guarantee equal access to extension services. This line of argument is further evident in the following statement: ‘there is another group in the village which gets more training than our group because the AEA is closer to them’ (interview with FBO member in the East Gonja District of the Northern Region, 26/03/2013). In addition, Model 2 also supports the evidence in Model 1 that smallholder farmers who are further away from the District agricultural extension centres receive more extension visits. Model 2 further shows that farmers’ access to TV sets is significant but negatively influences access to extension services; that is, access to TV sets is likely to reduce the number of extension visits that smallholder farmers receive to about 28%. While one would expect smallholder farmers with TV sets to be better informed about the benefits of extension and to demand more extension services, this is not the case, because such farmers may feel they have learnt so much through their TV sets. They may not therefore see the need to demand or participate in regular extension meetings.

Model 2 also shows that the existence of group farms in FBOs significantly improves the number of extension visits members receive, although it is significant only at the 10% significance level. A reasonable explanation for this is that FBOs with group farms still find it challenging to mobilise their members for extension meetings. Here like Model 1, gender, the size of landholding, ownership of a cell phone and years of education are not significant. In addition, the Model shows that FBO leadership has an insignificant effect on the number extension visits FBO members receive. While the leadership variable is insignificant, it shows the tendency of FBO leaders getting more extension visits compared to ordinary members (discussed in Section 5.4.2).

Finally, Model 3 has different specification from Models 1 and 2; and it runs on a subsample (FBO non-members only). It includes all the independent variables for Model 2 except for whether the FBO has a group farm, FBO size and the numbers of AEAs farmers know from whom they get extension support. However, Model 3 includes the variable of whether there is an FBO in the village, as some participants were located in villages without the presence of FBOs. The inclusion of this variable is important to understand whether the presence of FBOs in villages significantly influence FBO non-members' access to extension services.

Model 3 shows that smallholder farmers who have more years of education are likely to improve their access to extension services. In relation to years of education, many studies on extension and adoption of technology have shown that farmers' years of education have a positive association with their access to extension and adoption of technology (see, e.g., Foster & Rosenzweig 1996; Abdulai & Huffman 2005). The model also shows that men compared to women are less likely to more receive extension services. It also shows that smallholder farmers' landholding under cultivation positively influence their extension access intensity, although this is significant only at the 10% level.

Model 3 further shows that the existence of AEA in the village significantly influences extension access intensity among FBO non-member. What may matter is whether FBO non-members personally know AEAs from whom they can get extension support. An FBO non-member in the Eastern Region rightly echoed this line of argument when he indicated that, 'I do not belong to an FBO but I still get training from the extension officer because he is my friend' (interview with FBO non-members, 17/01/2013).⁶² Other variables that influence FBO non-members extension access intensity are access

⁶² Another FBO non-member remarked, 'I am a friend to the extension officer, he teaches me alone on my farm' (interview with FBO non-member in the West Mamprusi District of the Northern Region, 20/12/2012).

to radio, distance from the agricultural extension centre and access to TV. However, the Model suggests that the presence or absence of FBO in a village has no significant effect on FBO non-members' access to extension services. This is not surprising as the evidence in this thesis shows that AEAs pay significant attention to farmers who belong to FBOs, compared to those without FBOs.

In conclusion, the analysis in this section shows that the most significant variable in explaining the probability of smallholder farmers' access to extension is whether they personally know AEAs who they can rely on for advice. We should note that there is a strong link between FBO membership and the numbers of AEAs smallholder farmers know, from whom they can get extension support. The implication of this is that FBOs are important channels through which AEAs introduce themselves to smallholder farmers and this suggests the need to increase both the number of FBOs and AEAs. The analysis further implies that smallholder farmers with no FBO membership are more likely to receive extension services if they have more years of education which also points to the need for broad-based education policies that will minimise or prevent early school dropouts.

In addition to the above discussion, it is important to note that the number of extension visits that the majority of FBO members receive does not meet their expectations (discussed in Section 5.4.1), although about 96% of the surveyed FBO members indicated that they know at least one AEA from whom they can request extension advice. As noted earlier, it is required that AEAs visit villages for which they are responsible on a fortnightly basis during a farming season (Kolavalli *et al.* 2010), but the average number of visits that FBO members received in the 2012 farming season (April–October) was approximately three. This raises a fundamental issue in relation to the capacity of FBOs and AEAs. Given that a major farming season runs from April to October and the requirement is for AEAs to make fortnightly visits to villages, the average number of visits per village (and by extension per FBO) should be about 14 per season. This evidence suggests a significant shortfall in the average number of extension

visits that farmers get. It is therefore important to understand what factors account for this shortfall among FBO members.

5.4.4 Accessing extension services in FBOs: what are the impediments?

This section explores the reasons why the average number of extension visits that FBO members receive from AEAs per farming season falls far short of expectations. As the key stakeholders directly involved in extension delivery here are FBOs and AEAs, the section examines the capacity and efficiency of both FBOs and AEAs in the context of extension provision and delivery.

5.4.4.1 The capacity and efficiency of AEAs

‘When we were given fuel and other incentives in the 1990s we used to go to eight communities in an operational area and visited each community at least two times a month but this is not possible in our current circumstance.’ (Interview with AEA, Northern Region, 06/02/2013)

The above quote from an AEA (one shared by all the AEAs interviewed) reflects the general obstacles that AEAs face in delivering extension services to smallholder farmers. One can divide the primary challenges that AEAs face into two categories: AEAs have multiple roles and the resources available to undertake extension delivery are limited. First, while it is estimated that there are about 2,500 smallholder farmers per AEA (Chang 2012), AEAs also perform multiple roles and functions.

Box 5.1: The diverse roles of agricultural extension agents

Agricultural extension agents (AEAs) are often the government officers who deal directly with farmers at the village level. Although AEAs have a core duty of providing advice to farmers on improved and proven agricultural technologies and practices, they are increasingly used by government agencies and NGOs to facilitate the implementation of projects that do not relate directly to agricultural production, processing and marketing. This is because it is believed that as AEAs work with farmers in the village setting, they are in good position to organise farmers quickly to implement their projects. An AEA in the Northern Region noted that, ‘our District Office often calls upon us to organise farmers in the villages and educate them on issues such as child labour, HIV/AIDs, and sanitation in the villages’. Whenever possible, the AEAs interact with the farmers about these issues through FBOs.

In addition, government agencies and NGOs engage AEAs in inputs distribution and the management of credit schemes, which are associated with a substantial amount of administrative tasks. Consequently, the AEAs are overburdened with other tasks, which contribute to their inability to organise regular extension meetings with farmers within an already resource-constrained extension services delivery system. To improve AEAs’ advisory services on agricultural technologies and practices, they need to ease off from somewhat overburdened tasks.

Source: Author’s interview with AEAs and FBO leaders

The roles of AEAs go beyond the provision of agricultural extension services to include the implementation of health programs and credit schemes (see Box 5.1). However, when AEAs have multiple roles, they get overburdened (World Bank and IFPRI 2010), making it difficult to discharge their core responsibilities of providing adequate services to FBO members. The delivery of adequate extension services to smallholder farmers would require the state (government) not only to increase the number of AEAs, but also to assign realistic roles and responsibilities to AEAs.

Second, while AEAAs are overburdened, they also have limited resources with which to discharge their duties. One may divide these resources into two categories: physical and financial.

Concerning physical resources, the eight AEAAs interviewed in this study indicated motorbikes as the chief physical resources they need in the provision of extension services. This corroborates Kolavalli *et al.*'s (2010) study of four districts in Ghana, when they observe that the distances travelled and the number of visits AEAAs make are higher where government and its extension department provide motorbikes to the majority of AEAAs. However, evidence from the field shows that many AEAAs do not receive motorbikes to discharge their duties. None of the eight AEAAs interviewed received motorbikes from the government, although six of them indicated that they use their personal motorbikes. An AEA in the Northern Region reported that out of 22 AEAAs in his District, only 11 received motorbikes from the employer (the government). This implies that the remaining 11 AEAAs will have to find their own means of transportation to visit smallholder farmers in the villages in order to provide extension services, a situation that will undoubtedly affect their extension service delivery.

Other physical resources that affect AEAAs' extension delivery are availability of training materials. Interviews with the AEAAs reveal that they do not have the required training materials (e.g. fertiliser, seeds and agrochemicals) to do demonstrations during training. The evidence here again points to the need for effective government, what (Green 2008) called an effective state, if AEAAs are to deliver adequate extension through FBOs. We cannot make much progress in improving smallholder access to extension if the very agents who are central in this process are under-resourced.

In relation to financial resource deficiencies, the major complaint of AEAAs was the irregular and late release of their fuel allowance (and, on worse occasions, the allowance not being disbursed at all), which again points to the weak capacity of the state. An AEA

in the Eastern Region appears to have summarised the views of AEAs on these issues when he notes:

We do not have motorbikes not to talk of fuel. They used to give us T&T [fuel allowance] but now it does not come as expected. We are in the middle of the year and we are yet to receive T&T. See, the whole of last year I was given only 100 *cedis* [about \$50] as T&T. How do you expect me to go to eight villages at least twice a month for each [village], which are scattered all over the place with 100 *cedis*? (Interview with AEA in Eastern Region, 30/05/2013)

According to another AEA I interviewed, given the logistical challenges that confront them, AEAs tend to visit the FBOs that call on them.⁶³ As expected, if AEAs use their personal motorbikes or use their personal resources to fuel the motorbikes, the number of visits they will make to FBO members will unquestionably remain lower than expected. Norton (2004) noted that resource deficiencies in the delivery of extension services in many developing countries have led to a syndrome of extension agents spending less time in the field. Indeed, issues about insufficient operational resources and unmotivated AEAs are common in many developing countries, with many advocating for privatisation of extension services, although there are already concerns that complete privatisation would not be feasible and realistic in many developing countries for now.⁶⁴ Our current efforts should therefore focus on enhancing the capacity of the public extension systems – especially the AEAs, who are in direct contact with the farmers. The state or government must play a central role in the design and implementation of effective strategies to ensure inclusive participation of NGOs and private-sector organisations in extension delivery.

⁶³ Interviews with AEAs in the Northern Region.

⁶⁴ A debate on privatisation of extension services is available at <http://www.dawn.com/news/1109943> (accessed 14/07/2014).

5.4.4.2 The capacity and efficiency of FBOs

While both internal and external factors may influence the ability of FBOs to undertake collective action such as accessing extension services (Ostrom 1990), the focus here is more on the internal factors. In referring to internal factors, I mean the capacity of FBO members to develop trust (e.g. rules), to communicate with each other and to engage in collective activities.

As discussed already, delivering extension services through FBOs requires collaboration between AEAs and FBO leaders, and then between FBO leaders and the members. In particular, this study has established that the number of FBO members who participate in extension meetings depends on the capacity of the leaders; the majority of FBO leaders participate in extension meetings alone because they lack the capacity to mobilise their members. As shown in Table 5.6, whereas the average number of AEAs visit to FBO leaders per season is about four times, it is only two times for the ordinary members.

The level of education is also quite low among the leaders. As discussed in Chapter 4 (see Figure 4.8), 9 out of the 40 leaders interviewed did not have formal education. Approximately 50% of the leaders who had formal education dropped out either at the primary or secondary level. Such low level of education has the tendency of influencing the management of FBOs such as keeping up-to-date records and supervising group activities. For instance, a review of 30 out of 40 FBOs constitutions shows that their members are expected to pay dues (make financial contributions) on regular basis. However, about 60% of the FBO indicated that their member fail to pay such dues on regular, which they attributed mainly to poor enforcement of rules.

The low level of education among the leaders was also recognised by the only three FBO leaders with tertiary education. Indeed, one of them in the Northern Region noted that, ‘almost all FBOs in this area have their secretaries being school leavers who often

are not well enlightened and lack the capacity to pull the group together'.⁶⁵ This evidence corroborates other studies that suggest that weak leadership in FBOs has adverse effects on their ability to undertake collective action (see, e.g., Barham & Chitemi 2009; Wilhemina *et al.* 2010). In a study of two agricultural cooperatives in Kenya, Hannan (2014) also suggests that governance and leadership play important roles in their access to outside support. However, evidence in this study shows that outsiders focus more on the provision of extension services and tangible goods such as fertiliser and seeds, with little focus on the organisational development of FBOs (see Chapter 4). Efforts in FBO development that neglect or focus narrowly on their capacity building in organisational skills, including trust-based relationships among FBO members on the one hand, and between the FBOs and outsiders (government and NGOs) on the other, would not lead to effective collective action in FBOs.

In addition, FBO members receive few visits from AEAs because many of their leaders fail to demand extension services from the AEAs, because they largely perceive FBOs as avenues through which they can receive inputs and financial support (see Chapter 4, Section 4.4.2). Six out the eight AEAs indicated that, in most cases, FBO members do not demand services but will wait until they deliver the services. As one AEA notes, 'if farmers do not ask for services they will get services only once a year'.⁶⁶ In particular, when FBOs receive extension services under government and NGO projects, they find no incentive to demand extension services when the projects fold up, because of their belief that new projects will turn up. Nonetheless, about 10 FBO leaders indicated that demanding extension services is frustrating mainly because of the limited number of AEAs available to them. As one FBO leader puts it, 'I called many times before the AEA finally came. He [the AEA] kept telling me he was busy working elsewhere. So I will say it is time wasting and disappointing to rely on them [AEAs]'.⁶⁷

⁶⁵ Interview with FBO leader in the Tamale Metropolis of the Northern Region, 04/02/2013.

⁶⁶ Interviews with AEAs in the Northern Region.

⁶⁷ Interview with FBO leader in the Akwapim North District of the Eastern Region, 24/04/2013.

In addition to the lack of good leaders to mobilise their members to demand extension services, many FBOs cannot afford the administrative costs that come with collective acquisition of extension services, let alone pay for the services themselves, because of their inability to generate internal resources (discussed in Chapter 4).

The key point to note here is that the commitment and active participation of FBO members in collective activities is crucial to improving the performance of FBOs. Much of this can be achieved if FBOs have the required organisational and leadership skills to get members involved in collective activities such as joint purchase of inputs and weekly or monthly meetings.

5.5 Conclusions

This chapter has indicated that agricultural extension services are critical for productivity-led agriculture and has examined the extent to which FBOs improve smallholder farmers' access to extension services. The evidence here shows that membership of FBOs is a strong determinant of smallholder farmers' access to extension services. The analysis has demonstrated that smallholder farmers who participate in FBOs receive more extension services than their non-FBO counterparts, which suggests a need to encourage broad-based participation of smallholder farmers in FBOs. Similarly, the analysis has further showed that smallholder farmers' access to extension services is largely influenced by the number of AEAs farmers personally know, who they can rely on for advice. The chapter argues that a strong link exists between FBO membership and the numbers of AEAs who smallholder farmers know, as FBOs remain important channels through which AEAs introduce themselves to smallholder farmers.

The chapter has also shown that membership of an FBO does not result in equal access to extension services. It has revealed that FBO leaders receive more services compared with ordinary members, and it has argued that this is largely due to weak leadership in FBOs. In addition to the disproportionate access to extension services in FBOs, the analysis in the chapter has shown that members generally receive extension services that are far below optimal levels. In this regard, the chapter has argued that the AEAs, who

play a pivotal role in extension delivery, are not only overburdened in their line of work, but also have limited resources with which to discharge their duties, and has indicated the need for the state or government to play a central role in this process.

Similarly, the chapter has established that FBOs have weak capacities to mobilise their members to demand extension services, partly because smallholder farmers largely perceive them as institutions for receiving farm inputs and financial support from government and NGOs.

The overall picture that emerges in the analyses in this chapter has two sides: the supply and demand sides. With the supply side, it must be noted that while FBOs improve smallholder farmers' access to extension services, the number of AEAs available to smallholder farmers is the most important determinant of access to extension services for smallholder farmers. Yet the provision of AEAs is currently beyond the reach of smallholder farmers. In Ghana and many developing countries, it remains largely the role of the state. With the demand side, it is important to note that FBOs generally lacks the capacity to collectively acquire extension services from the limited available AEAs mainly due to poor leadership and passive participation of members in collective activities. The implication here is that political leadership is necessary to increase the number of well-resourced AEAs available to smallholder farmers as well as increase the knowledge of smallholder farmers to ensure their active participation in FBOs. This does not mean that the state will have to do it alone. While the state needs support from NGOs, the private sector and smallholder farmers, it must play a pivotal role in this process. For example, when smallholder farmers are well educated and knowledgeable about their environment, they can make informed choices such as demanding extension services. As Green (2008) argues, effective government (what he called an effective state) and active participation of relevant stakeholders (what he called effective citizens) are the two most important ingredients that will ensure sustainable development and poverty reduction in developing countries.

As noted earlier, smallholder farmers' access to extension services alone is not enough for sustained productivity-led agricultural growth. They also need access to resources such as inputs and credit to realise the full potential of the extension services they have received or learnt from AEAs (Norton 2004). Smallholder farmers would be able to adopt the technologies they have learnt if they had adequate access to inputs such as fertiliser and seeds. Similar to extension services, FBOs are considered as local institutions that promote smallholder farmers' access to inputs and, additionally, facilitate their adoption of technology. It was therefore the aim of this study to understand the extent to which FBOs improve smallholder farmers' access to inputs and adoption of technology, which I examine in the next chapter.

Appendix 5.1. Correlation matrix for regression and descriptive statistics (overall sample, 226 observations)

	No. AEA visits to farmers	FBOmem	Gender	Education	Landsize	Radio	VillageAEA	Distance	NoAEA	Cellphone	TV	FBOfarm	VilFBO	Mean	STD
No. AEA visits to farmers	1.00													1.54	2.61
FBOmem	.48**	1.00												.53	.50
Gender	.21**	.12	1.00											.67	.47
Education	.33**	.26**	.34**	1.00										4.62	5.32
Landsize	.09	.08	.53**	.07	1.00									5.40	3.41
Radio	.23**	.31**	.45**	.27**	.27**	1.00								.78	.42
VillageAEA	.38**	.64**	.16*	.18**	.07	.27**	1.00							.68	.47
Distance	.05	-.06	-.02	-.11	-.05	-.13	-.08	1.00						14.78	16.71
NoAEA	.56**	.59**	.25**	.38**	.12	.29**	.67**	-.10	1.00					.79	.72
Cellphone	.20**	.15*	.27**	.35**	.16*	.34**	.17**	-.08	.25**	1.00				.74	.44
TV	.19**	.24**	.14*	.42**	.07	.29**	.17**	-.16*	.36**	.33**	1.00			.26	.44
FBOfarm	.42**	.55**	.04	.18**	.08	.11	.40**	.07	.41**	.11	.21**	1.00		.25	.44
VilFBO	.22**	.44**	.06	.07	.01	.11	.57**	-.10	.38**	.13	.19**	.24**	1.00	.85	.35

Note: ** and * indicate that the correlation is significant at the 0.01 and 0.05 levels (two-tailed), respectively.

Appendix 5.2. Correlation matrix for regression and descriptive statistics (FBO non-members sample, 106 observations)

	No. AEA visits to farmers	Gender	Education	Landsize	Radio	VillageAEA	Distance	NoAEA	Cellphone	TV	VilFBO	Mean	STD
No. AEA visits to farmers	1.00											.21	.73
Gender	.04	1.00										.61	.49
Education	.32**	.25**	1.00									3.15	4.40
Landsize	-.06	.60**	-.02	1.00								5.12	3.45
Radio	.19*	.50**	.20*	.28**	1.00							.64	.48
VillageAEA	.25	.19	.02	.06	.15	1.00						.36	.48
Distance	-.08	-.04	-.05	-.07	-.22*	-.09	1.00					15.81	18.01
NoAEA	.40**	.32**	.23*	.10	.20*	.75**	-.03	1.00				.34	.48
Cellphone	.17	.18	.30**	.08	.40**	.15	-.13	.25**	1.00			.67	.47
TV	.21**	.06	.33**	.03	.26**	.07	-.16	-.02	.24**	1.00		.15	.36
VilFBO	.05	.01	-.08	-.03	-.04	.46**	-.11	.31**	.09	.17	1.00	.69	.47

Note: ** and * indicate that the correlation is significant at the 0.01 and 0.05 levels (two-tailed), respectively.

Appendix 5.3. Correlation matrix for regression and descriptive statistics (FBO members sample, 120 observations)

	No. AEA visits to farmers	Gender	Education	Landsize	Radio	VillageAEA	Distance	NoAEA	Cellphone	TV	FBOfarm	Mean	STD
No. AEA visits to farmers	1.00											2.71	3.07
Gender	.25**	1.00										.73	.45
Education	.26**	.38**	1.00									5.92	5.73
Landsize	.10	.46**	.10	1.00								5.65	3.37
Radio	.12	.35**	.23**	.23**	1.00							.90	.30
VillageAEA	.16	-.04	.03	-.06	-.07	1.00						.96	.20
Distance	.16	.01	-.15	-.02	.04	.02	1.00					13.88	15.50
NoAEA	.42**	.17	.32**	.09	.09	.25**	-.13	1.00				1.18	.66
Cellphone	.18	.35**	.36**	.21*	.18*	.00	-.01	.17	1.00			.80	.40
TV	.08	.15	.41**	.07	.25**	-.02	-.15	.43**	.37**	1.00		.36	.48
FBOfarm	.23*	-.05	.06	.07	-.13	.20*	.18*	.17	.06	.12	1.00	.48	.50

Note: ** and * indicate that the correlation is significant at the 0.01 and 0.05 levels (two-tailed), respectively.

CHAPTER SIX

PROMOTING ACCESS TO INPUTS AND ADOPTION OF TECHNOLOGY: THE ROLE OF FBOs

6.1 Introduction

The previous chapter examined one of the key research questions of this study, namely whether farmer-based organisations (FBOs) contribute to improving smallholder farmers' access to extension services. The evidence in the chapter showed that membership of FBOs contributes significantly to improving smallholder farmers' access to extension services, although this tends to be somewhat constrained by the capacity of FBOs (e.g. in terms of weak leadership) and the limited availability of resources to agricultural extension agents (AEAs) (e.g. motorbikes and demonstration plots).

This chapter is motivated by the important observation that smallholder farmers' access to extension services is not a sufficient condition to increasing productivity; their ability to adopt appropriate technologies is also essential for improving productivity (Norton 2004). Fundamental to their ability to adopt these technologies is adequate access to inputs such as seeds, fertiliser and herbicides. For instance, it is not sufficient to train smallholder farmers in how to use improved seeds and fertiliser in order to improve their productivity without improving their access to the actual seeds and fertiliser.

This chapter seeks to understand the extent to which FBOs are helping smallholder farmers to access inputs such as seeds, fertiliser, herbicides and insecticides. It also examines whether FBO membership improves the adoption of extension technologies by smallholder farmers. This line of investigation is important, as government and other development partners consider FBOs not only as local institutions that can facilitate smallholder farmers' access to extension services, but also institutions that are crucial for improving smallholder farmers' access to inputs and the adoption of technologies (GOG 2007).

The chapter is organised as follows. It begins with a brief discussion of the role of inputs in improving agricultural productivity and presents two key government programs initiated to make major inputs accessible and affordable for smallholder farmers. It then examines whether FBOs improve smallholder farmers' access to inputs from two main perspectives. First, it explores whether FBOs have the capacity to purchase inputs in bulk to enable their members to benefit from economies of scale. Second, it compares the use and the intensity of use of inputs between FBO members and non-members, with the aim of understanding the extent to which FBOs facilitate smallholder farmers' access to inputs. The chapter then examines the factors that influence the intensity of use of inputs between FBO members and non-members. Finally, it discusses the adoption of technology among smallholder farmers. Here, the focus is on the three most common technologies that AEs teach farmer: row planting, fertiliser use and herbicide application (see Chapter 5). The objective here is to understand whether FBOs make a difference in the adoption of these technologies, as well as to explore key factors that influence smallholder farmers' decisions to adopt.

6.2 The role of farm inputs in productivity

In most developing countries, including Ghana, smallholder farmers' access to farm inputs such as improved seeds, fertiliser, pesticides, insecticides and herbicides is crucial for improving yields and accelerating agricultural growth (Todaro & Smith 2003).⁶⁸ One recent study in Madagascar, for example, suggests that the use of modern seed varieties is vital for farmers to meaningfully increase their crop harvests and hence get out of poverty (Minten & Barrett 2008).

While agricultural productivity is a function of many variables, including land quality and weather conditions, the low use of inputs such as improved seeds and fertiliser partly explains why growth in agricultural productivity remains fairly stagnant in many developing countries (Norton 2004). In Ghana, for example, the average yields for major

⁶⁸ The success of the green revolution in Asia was largely due to the high level of adoption of improved technology with the use of subsidized inputs, which led to a significant increase in yields (Chang 2012).

staple crops such as maize and rice are less than half of the achievable yields in part due to low fertiliser use, the use of low-yielding planting materials (e.g. seeds) and the use of traditional farming practices (MOFA 2011). This suggests that Ghana has the potential to increase the yields of major crops if farmers have adequate access to inputs as well as adopting appropriate technologies.

With reference to maize, the most widely grown cereal in the country, average production (in metric tonnes) per hectare remained fairly stagnant from 1993 to 2007 (see Figure 6.1). The average maize yield between 1993 and 2010 was about 1.5 metric tonnes per hectare. However, on-farm trials of maize at different stations across Ghana using recommended inputs and technologies have shown yields averaging 4–6 metric tonnes per hectare (Ragasa *et al.* 2013a). This suggests that with access to the right inputs and technologies, the current average yield of about 1.5 metric tonnes per hectare has the potential to increase in many folds.

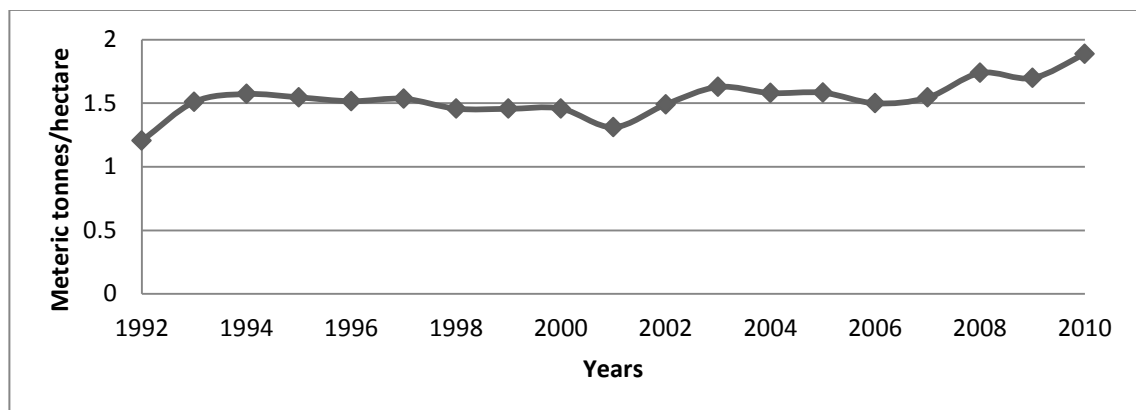


Figure 6.1. Average national maize productivity, 1992–2010

Source: Author’s calculation based on MOFA (2011) and raw data collected from MOFA about yields per hectare from 1992–2003

Against the backdrop of the low average yields, successive governments in Ghana have recently undertaken some initiatives to make key inputs such as improved seed varieties, fertiliser, herbicides and insecticides more accessible to farmers as a key step towards

improving their yields. Two major government initiatives currently being implemented to improve smallholder farmers' access to inputs are (a) the Fertiliser Subsidy Program (FSP) and (b) the Block Farms Program (BFP).⁶⁹ I refer to these two initiatives as part of the analysis in this chapter and Chapter 7; it is therefore important to briefly describe them here.⁷⁰

The Fertiliser Subsidy Program

The FSP started in 2008, with the goal of making fertiliser affordable and accessible to farmers.⁷¹ It also aims at increasing the current national average rate of fertiliser use from 8 kilograms per hectare (kg/ha) to 20 kg/ha (Benin *et al.* 2013). The FSP thus seeks to stimulate an increase in farm-level fertiliser application among farmers to increase their productivity and ensure food security (Banful 2011). The program first started with a voucher system, which involved the printing of coupons at the national level and their distribution to Regional Agricultural Development Units (RADUs) based on their estimated consumption of fertiliser. The RADUs then distributed them to their District Agricultural Development Units (DADUs), which in turn allocated them to AEAs for onward distribution to selected farmers identified by communities; with the voucher, a farmer then paid an amount lower than commercial fertiliser prices to redeem two 50 kilogram bags of fertiliser (for further details, see Benin *et al.* 2013). In 2010, a waybill system replaced the voucher system, partly because of inconsistencies in targeting farmers and the long distribution line that characterised the voucher system (Benin *et al.* 2013). Under the waybill system, the government subsidises fertiliser at the port of entry to enable farmers to purchase the subsidised fertiliser from designated agents without a voucher. To limit leakages under this system, in 2012 the implementers provided

⁶⁹ In addition to these two main government programs, it is important to point out that several local NGOs in Ghana, such as Send-Ghana, the Presbyterian Agriculture Station and Care-Ghana, have also initiated various programs to improve smallholder farmers' access to inputs.

⁷⁰ It must, however, be mentioned that doing an impact evaluation on these initiatives is beyond the scope of this research. For an impact evaluation of these initiatives, see Benin *et al.* (2013).

⁷¹ Ghana and other African countries seem to have initiated a fertiliser subsidy following Malawi's successful implementation of its subsidy program (Banful 2011).

passbooks (see Figure 6.2) to farmers through AEAs to purchase the subsidised fertiliser and seeds (for further details on the waybill system, see Benin *et al.* 2013).⁷²

The image shows a yellow 'FARMERS' PASSBOOK' form. The top header reads 'GOVERNMENT OF GHANA SEED AND FERTILIZER SUBSIDY PROGRAMME'. The title is 'FARMERS' PASSBOOK'. The form number is 'No: 01K00001'. The farmer's name is 'VIVAR YOUNGSON'. Gender is 'M' (Male) with 'F' (Female) also marked. Identity Card No. is 'S0510885'. Date of Birth is blank. House No. is 'GALISPE'. Place of Residence is 'GALISPE'. District is 'AKWAPIM NORTH'. Region is 'EASTERN REGION'. Farmer's Contact Number is '024796765'. There is a thumb print. The 'OFFICE USE' section has a stamp from the 'MINISTRY OF FOOD AND AGRICULTURE' and a signature 'AKWAPIM NORTH AKOPOVAH G-E. GARDYAKOVAH'. The date of issue is '0242-503724'. The left side of the form is a table for recording fertilizer purchases.

Type of Fertilizer		Quantity	Date of Purchase	Year
NPK	Liquid Fertilizer			
NPK	SOA			
others				
	Urea			
	SOA			
	Liquid Fertilizer			

Figure 6.2. A passbook for the purchase of fertiliser

Source: Author, taken in the Eastern Region during fieldwork

These passbooks are limited and not all farmers have access to them.⁷³ Although all farmers are eligible to receive the passbooks, fieldwork for this study shows that FBO members tend to receive more of such passbooks, compared to FBO non-members, partly because AEAs distribute the passbooks to farmers they know (for more details, see the next section).

⁷² The passbooks serve as a form of identity, which farmers can use to purchase subsidised fertiliser, and the government will only pay for fertilisers and seeds bought by farmers with passbooks (Benin *et al.* 2013).

⁷³ For example, according to one AEA in the Eastern Region, in the 2012 farming season he received 100 passbooks to distribute to farmers, when there are over 1,000 farmers in the eight villages he operates (interview, 30/05/2013).

The implementation of the FSP led to increased availability of fertiliser for farmers in the country (Benin *et al.* 2013). For example, the amount of fertiliser imported into the country between 2008 and 2010 increased by about 39.5% per year, compared to 2.4% prior to the implementation of the FSP; that is, from 2004 to 2007 (Benin *et al.* 2013). It may be reasonable to partly attribute the increase in the average maize production per hectare from 2008 to 2010 (see Figure 6.1) to the increased availability of fertiliser for farmers to use.

The Block Farms Program

The government launched the BFP in 2009 on pilot bases in six out of the ten administrative regions of Ghana; namely, the Ashanti, Brong Ahafo, Central, Northern, Upper East and Upper West Regions. By 2010, the program had been extended to all the ten regions. Based on the principle of economies of scale, the BFP aimed at bringing large tracts of agricultural land into blocks for the cultivation of selected crops (e.g. maize) that have a comparative advantage in the location in which they are cultivated. The BFP also aimed at improving the use of appropriate technologies (including inputs) to increase the productivity of farmers (Benin *et al.* 2013).

Today, some smallholder farmers are benefiting from subsidised inputs such as fertiliser, improved seeds, herbicides and pesticides in the form of credit under the BFP. Similar to the FSP, AEAs deliver the subsidised inputs to the farmers participating in the BFP on credit as well as recovering the credit. Fieldwork interviews with AEAs and FBO members in this study suggest that the BFP concept has not been operationalised fully in many locations as envisaged. Instead of supporting farmers with subsidised inputs to cultivate jointly on large tracts of land, rather the inputs are given to individual farmers, who cultivate on separate plots. Here, fieldwork showed that in distributing the inputs under this program, AEAs tend to target farmers who belong to FBOs, compared to FBO non-members.

In relation to the above discussion, the question of particular importance for this study relates to whether, and to what extent, FBOs play a role in facilitating smallholder farmers' access to the inputs distributed in both programs.

6.3 Accessing inputs among smallholder farmers

The overall objective of this section is to understand whether FBOs are helping farmers to access inputs. The discussions focus on four main inputs – certified seeds, fertiliser, herbicides and insecticides – because they are the most common technologies promoted to farmers for increase agricultural production in Ghana (see Chapter 5). The goal is to establish whether there is a significant difference between FBO members and non-members in their intensity of usage of inputs. It is important to emphasise that the analysis in this chapter on the smallholder farmers is also based on the reduced sample of 226. As discussed in Chapter 3, a propensity score matching technique (PSM) was applied on the sample of 240 smallholder farmers(120 FBO members and 120 FBO non-members), which was reduced to 226 (120 FBO members and 106 FBO non-members) after the analysis. We should note that the PSM technique was used mainly to ensure that the sampling approach used in selecting the two groups (FBO members and non-members) was robust to allow for a comparison between FBO members and non-members regarding their access to inputs. The use of PSM technique was not intended to undertake analysis of paired individual farmers' outcomes but mainly to ensure a comparison between the two groups of farmers.

This section begins with an examination of the capacity of FBOs to purchase inputs collectively for their members, as they are often considered as institutions through which smallholder farmers can purchase inputs jointly to minimise transaction costs (Rondot & Collion 2001; Bosc *et al.* 2002; World Bank 2007; Markelova *et al.* 2009). Second, it discusses the different kinds of support FBOs receive from external agencies, with a focus on inputs. Specifically, it examines whether inputs constitute a significant proportion of the support that external agencies provide to FBOs. Third, the section then explores the factors that influence inputs use and examines the intensity of usage of

inputs between FBO members and non-members. Finally, it discusses the factors that influence intensity of usage of inputs among smallholder farmers, paying particular attention to FBO membership in this process.

6.3.1 Collective purchase of inputs in FBOs

FBOs are considered to be local institutions that can help smallholder farmers to acquire inputs in bulk to reduce cost (GOG 2007; World Bank 2007). Through bulk or collective purchases, FBO members may acquire inputs at lower prices due to discounts that come with bulk purchases as well as reduced transportation costs. However, Chapter 4 showed that less than a third (20%) of the 40 FBOs surveyed indicated that they sometimes jointly purchase inputs such as fertiliser and herbicides.⁷⁴ Similarly, when farmers want to purchase inputs on credit, inputs dealers would reasonably prefer FBOs to individual farmers, as FBOs can serve as collateral.

To purchase inputs jointly, FBOs have mainly three options from which to choose. First, FBO members make financial contributions, based on the quantity of inputs they require, and the leaders then purchase the inputs on their behalf from input dealers.⁷⁵ The problem with this option is that ‘farmers often do not have money at the same time to collectively purchase inputs’ (interview with FBO member in Northern Region, 01/01/2013), a view shared by about 65% of the FBO members interviewed. The second option is when FBOs approach a private-sector input dealer and acquire inputs on credit. This option is rare because there is a seemingly a ‘lack of trust between FBOs and input dealers due to inadequate repayment of credit’ (interview with NGO in Northern Region, 12/06/2013).⁷⁶ The final option is when FBOs purchase inputs using their internal generated funds through collective activities such as joint production

⁷⁴ The 2010 IFPRI survey in Ghana, with a sample of 501 FBOs, also showed that about 24% of FBOs jointly purchase inputs (see Chapter 4).

⁷⁵ For example, according to one FBO member in the Tolon-Kumbungu District in the Northern Regions, in the 2012 farming season, they contributed and bought about 40 bags (50 kilograms per bag) of fertiliser collectively (interview, 11/02/2013).

⁷⁶ Similar views were indicated by the other NGO officials and AEAs

(group farms) and payment of dues.⁷⁷ The challenge with this option is that not many FBOs are able to generate internal funds (see Chapter 4).

The majority of FBOs are unable to purchase inputs collectively. This is not surprising, as previous analyses have shown that many FBOs find it difficult to undertake collective activities, largely due to their members' perception that FBOs are institutions through which they can receive external support, rather than institutions for undertaking internal collective activities for the benefits of all members. The section that follows therefore examines key external support to FBOs, with a focus on inputs.

6.3.2 Supporting FBOs with inputs

The majority of the 40 FBOs studied indicated access to grants (75%) and credit (65%) as the main reasons for which they were set up. By grants, smallholder farmers are referring to free access to inputs and cash; and with credit, they mean providing them with inputs or cash on loan basis. Similarly, the majority of the FBO members surveyed claimed that their reasons for joining FBOs were to access grants (63%) and credit (61%). Approximately 38% of the FBO members specifically indicated access to fertiliser, certified seeds, herbicides and insecticides as one of the key reasons for joining FBOs. The above shows that access to inputs is a strong motivation for establishing and joining FBOs.

The question that arises is whether FBOs play a significant role in helping their members to access inputs. Figure 6.3 shows different types of external support that the 40 FBOs had received since their establishment and it suggests that more than half of the FBOs (23 FBOs) received grants.⁷⁸ Often, grants to FBOs take the form of inputs such as seeds, fertiliser, herbicides and insecticides.

⁷⁷ This was observed in an FBO in the West Mamprusi District of the Northern Region, which purchased inputs from its savings and distributed to members (interview with FBO leader, 21/12/2012).

⁷⁸ It is important to indicate that of these 23 FBOs, 22 benefited from the Millennium Challenge Account program (implemented between 2007 and 2012), which supported FBO members with inputs such as seeds and fertiliser.

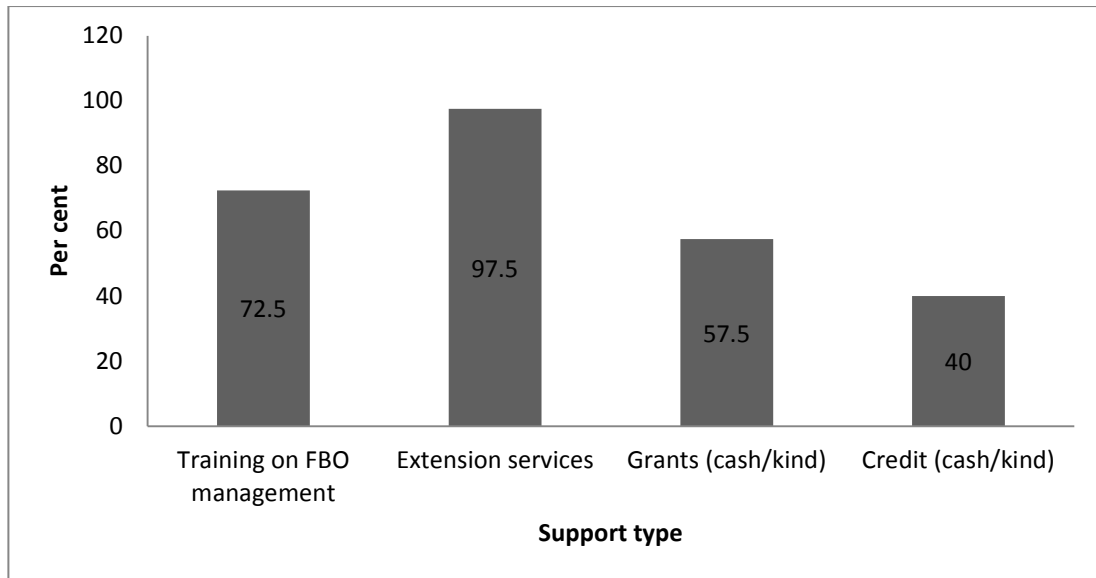


Figure 6.3. Types of external support that FBOs received

Source: Author's calculation based on fieldwork data

Figure 6.3 shows that credit is the least type of support that FBOs receive, with only less than half of the FBOs surveyed receiving credit since their establishment. The main sources of credit support to FBO are government and NGO programs.⁷⁹

Similarly, Figure 6.4 shows the results of the main forms of support that the FBO members surveyed claimed to have received from external agencies since joining. About 62% of the FBO members indicated that they received grants such as fertiliser, seeds and herbicides.⁸⁰ About 40% of the FBO members also received credit in the form of cash or as payment in kind.

⁷⁹ Key government programs from which FBOs received credit (kind/cash) include the Block Farm Program, the Millennium Challenge Account Program and the Microfinance and Small Loan Centre (MASLOC). NGO programs include the Presbyterian Agricultural Station, Send-Ghana, the Japan International Cooperation Agency (JICA), the Millennium Villages Project, the Trade and Investment Program for a Competitive Export Economy (TIPCEE), the Akwapim Community Foundation and a few rural community banks.

⁸⁰ The majority of the FBO members received these grants through the Millennium Challenge Account Program.

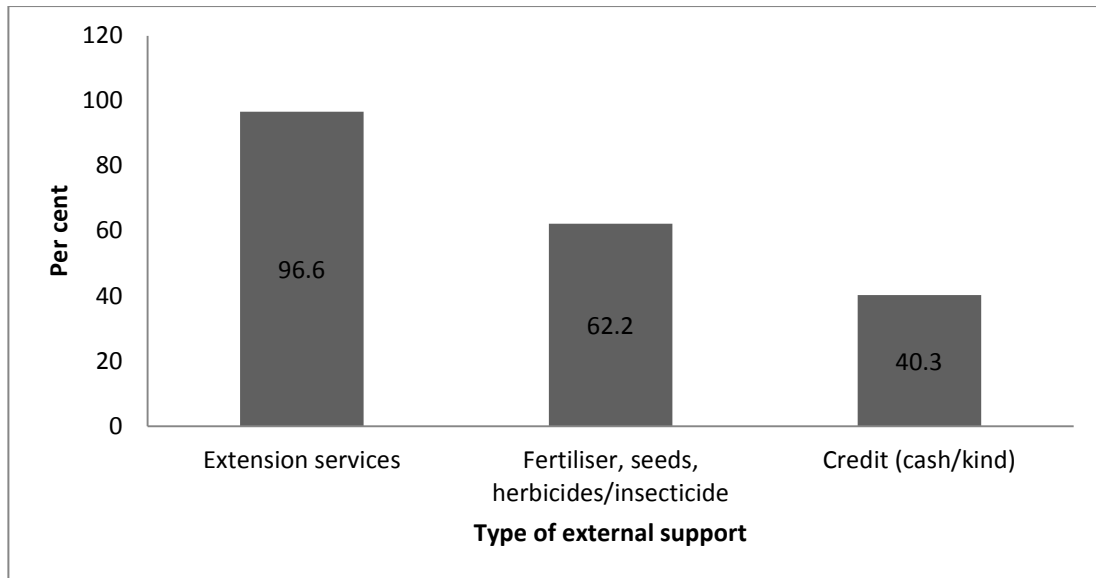


Figure 6.4. Types of external support that FBO members received

Source: Author's calculation based on fieldwork data

The key point to note here is that FBOs play a role in improving their members' access to inputs, although the quantity of inputs that smallholders received through FBOs is not yet clear. In the next section, therefore, I examine inputs use and use intensity between FBO members and non-members.

6.3.3 Inputs use among smallholder farmers: do FBOs make a difference?

This section explores smallholder farmers' use of certified seeds, fertiliser, insecticides and herbicides. It begins by answering the question of whether smallholder farmers applied/used each of the four inputs in the major farming season of 2012 (April–October) and explores factors that influence smallholder farmers' input use, and in particular the roles that FBOs play.

Use of certified seeds

The effectiveness of the other three inputs (fertiliser, herbicides and insecticides) in improving yields will depend on the nature and quality of seeds. Indeed, the

effectiveness of the green revolution in Asia through increased fertiliser use was enhanced because the new seeds were highly responsive to fertiliser (Chang 2012). While the use of certified seeds is crucial for increasing agricultural productivity, the available evidence suggests that in most countries in sub-Saharan Africa (SSA), including Ghana, seed systems are not well developed (Bay 1998; Scowcroft & Polak Scowcroft 1999).⁸¹ In many countries, the procedures for the release of seed varieties not only take several years (up to 6 years in some cases), but there is also a lack of coordinated and harmonised variety release systems (Adesina *et al.* 2014).

As shown in Figure 6.5, less than half of the smallholder farmers surveyed in this study indicated that they had used certified seeds in the major farming season of 2012.⁸² If one disaggregates the results according to region, about 66% of farmers who used certified seeds came from the Eastern Region and the remainder from the Northern Region. While it is difficult to prescribe reasons for the difference in the use of certified seeds between the two regions, field interviews with the eight AEAs revealed the main reasons for the relatively low use of certified seeds among smallholder farmers. The first is limited supply of the seeds due to low production levels and poor distribution; and the second is weak demand from smallholder farmers. This corroborates the work of Bay (1998), Scowcroft and Polak Scowcroft (1999) and Adesina *et al.* (2014).

In addition, the cost of certified seeds is relatively high and thus farmers are not motivated to purchase them. According to an NGO official in the Northern Region, the cost of certified seeds is too high for farmers to afford; he claimed that a farmer needs about 9 kilograms of maize seeds to supply a 1-acre maize farm and that the cost of 1

⁸¹ Due to the lack of a clear policy on seed production and distribution, the Seed Producers Association of Ghana (SEEPAG) has recently renewed its call on Parliament to pass without delay the National Seed Policy and Regulations Bill into law; available at <http://www.ghanabusinessnews.com/2013/05/30/group-renews-call-on-parliament-to-pass-national-seed-policy/> (accessed 05/07/2013).

⁸² As discussed in Chapter 5, the initial sample was 240 but was reduced to 226 due to propensity score matching analysis.

kilogram is about GHC8 (\$4) (interview, 12/06/2013).⁸³ Similarly, interviews with farmers majority of the farmers who failed to use the certified seeds showed that many of them are satisfied with their own seeds and feel reluctant to abandon seed varieties that they have been using for several years. For example, a farmer in the Northern Region noted that, ‘I do not buy seeds because I believe ... in my own seeds’ (interview, 27/02/2013).

The above observations are in line with a recent study in Eastern and Southern Africa that indicates that farmers’ low use of improved certified seeds is constrained by their low level of awareness of seed availability, their unwillingness to change to new seeds, the relatively high prices of the seeds and inadequate credit available to farmers to purchase them (Langyintuo *et al.* 2010).

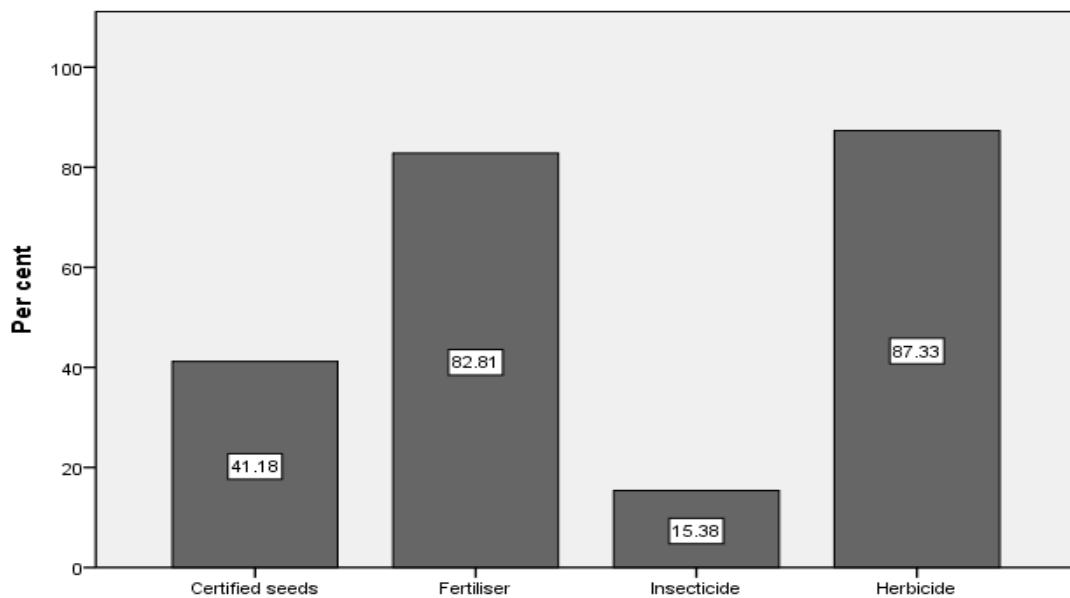


Figure 6.5. The use of inputs among smallholders

Source: Author’s calculation based on fieldwork data

⁸³ GHS1 = US\$0.50; this exchange rate is used for all dollar calculations in this chapter; 1 June 2013 exchange rates available online at <http://www.xe.com/currencytables/?from=USD&date=2013-06-01>

Do FBOs make a difference in the use of certified seeds? If one breaks the data down according to FBO membership, it shows that the use of certified seeds is high among FBO members compared to FBO non-members. As shown in Table 6.1, there is a significant difference between FBO members (55%) and FBO non-members (25%) in their use of certified seeds. In other words, the likelihood of using certified seeds among FBO members is more than twice as high as for FBO non-members.

Table 6.1

The use of inputs based on membership of FBOs

Type of input	FBO members (n = 120)		FBO non-members (n = 106)	
	Frequency	%	Frequency	%
Certified seeds	65	55	26	25
Fertiliser	104	88	79	77
Insecticide	26	22	8	8
Herbicide	110	93	83	81

Source: Author's calculation based on fieldwork data

There may be several reasons for this variation, but a key potential explanation here is that in distributing certified seed under various projects and programs, AEAs tend to target farmers who belong to FBOs.⁸⁴ In their study on maize productivity and fertiliser use in Ghana, Ragasa *et al.* (2013a) found that the majority of AEAs (76%) distribute various inputs such as certified seeds through FBOs, suggesting that the likelihood of farmers' usage of certified seeds depends significantly on FBO membership. However, Shiferaw *et al.* (2009) observed in Kenya that FBO membership did not have a significant effect on the adoption of improved maize seed, because both FBO members and non-members had equal access to the improved maize seeds.

⁸⁴ For instance, at least three FBOs in the Northern Region indicated that they had received certified seeds for trial from the Savannah Agricultural Research Institute (SARI).

Table 6.2

Determinants of smallholder farmers' use of certified seeds using binary logistic regression (Dep. Var.: Whether farmer use certified seeds)

Variables	B	S.E.	Wald	Sig.	Exp(B)
Whether farmer belong to FBO (dummy, 1=Yes)	.492	.434	1.282	.258	1.635
Age	-.024	.021	1.328	.249	.976
Gender (male=1)	-.958	.525	3.326	.068	.384
Years of farming experience	.055	.023	5.619	.018	1.056
Farmer's years in education	.163	.036	20.032	.000	1.177
Whether farmer owns a cell phone (dummy, 1=Yes)	.450	.417	1.165	.280	1.568
Whether farmer has access to radio (dummy, 1=Yes)	-.373	.483	.595	.440	.689
Total landholding size	-.011	.022	.274	.601	.989
Landholding size under cultivation	-.011	.065	.029	.864	.989
Distance from extension service centre	-.006	.010	.401	.526	.994
Whether the village is assigned an AEA (dummy, 1=Yes)	.770	.536	2.064	.151	2.160
AEAs farmers know from whom to get support	.325	.340	.914	.339	1.384
Constant	-1.306	.900	2.106	.147	.271

Note. Observations = 226; Hosmer and Lemeshow Test: Chi-square = 10.098, d.f. = 8, Sig = 0.258, -2 Log likelihood = 242.014, Cox & Snell R Square = 0.242, Nagelkerke R² = 0.327; overall percentage of right predictions = 74.8

Indeed, FBOs would not necessarily improve smallholder farmers' access to, and use of, certified seeds within a framework of institutional and policy bottlenecks regarding seed production and distribution (Langyintuo *et al.* 2010). That is, if FBOs and their members had the means to purchase improved certified seeds, the supply side would be the main limiting factor.

A logistics regression on the determinant of the use of certified seeds (see Table 6.2), however, shows the farmers' years of education and farming experience significantly determine whether they will use certified seeds. The results in Table 6.2 suggest that smallholder farmers' membership of FBO does not increase significantly their likelihood to use certified seeds. Rather, the results suggest that smallholder farmers who have more years of education and farming experience are more likely to use certified seeds. As observed in Chapter 5, smallholder farmers' year of education is coming up strongly as a determinant of adoption.

The study found it difficult to collect data on the quantity of certified seeds used, as most of the farmer who used them could not indicate a reasonable unit of measurement and quantify the seeds used.

Fertiliser use

There seems to be a consensus among researchers, policymakers and farmers about the contribution of fertiliser to agricultural productivity. However, due to low fertiliser use in SSA, various efforts exist to improve fertiliser use and optimal fertiliser application among farmers (Crawford *et al.* 2006, cited in Benin *et al.* 2013). In SSA, Ghana has comparatively low fertiliser use, with an average of 7.4 kg/ha, which is low compared to Côte d'Ivoire (35.2 kg/ha), Morocco (47.5 kg/ha) and South Africa (65.4 kg/ha) (Benin *et al.* 2013). It is therefore not surprising that in 2008, the Government of Ghana started a FSP to improve fertiliser use among farmers (see Section 6.2).

It is important to note that farmers use two major types of fertiliser: nitrogen–phosphorus–potassium (NPK) and sulphate of ammonia. As this study is interested in fertiliser use and use intensity, rather than the type of fertiliser, the analysis is not done according to fertiliser types.

Figure 6.5 shows that of the 226 smallholder farmers, about 83% indicated that they used fertiliser in the major 2012 farming season (April–October).⁸⁵ One may attribute the high level of fertiliser use to the importance that farmers attach to it as being critical for increasing their yields. Consistent with Chapoto and Ragasa (2013), the data further suggests that the use of fertiliser is higher in the Northern Region compared to the Eastern Region; this is expected, as the soils in Northern Ghana are relatively less fertile as compared to those in Southern Ghana (FAO 2005).⁸⁶

Fertiliser use is relatively high among FBO members (88%) compared with FBO non-members (77%). Among the FBO non-members, 78% of those in FBO villages used fertilizer, compared to 67% for those in villages without FBOs. This again suggests that presence of FBOs in villages can influence FBO non-members' fertilizer use.

However, the use of a binary logistic regression to find out the determinants of fertilizer use among the farmers shows that the years of farming experience is the most important determinant (see Table 6.3). Membership of FBO is not a significant determinant of fertilizer use partly because over 80% of the surveyed smallholder farmers indicated the use of fertilizer in the 2012 farming season. As we will observe later in this chapter, membership of FBO rather influences significantly the intensity of fertiliser use.

We should therefore note that the use of fertiliser does not necessarily mean a high intensity of usage. In other words, there are variations in the quantity of fertiliser use among smallholder farmers, with many applying suboptimal amounts of fertiliser (this is examined in detail in Section 6.4). For instance, Table 6.4 shows the average quantities of inputs use per hectare in the 2012 farming season (April–October) and shows that on average smallholder farmers used about 36 kilograms of fertiliser per hectare. It further shows a significant difference in the intensity of fertiliser use per hectare between FBO members (41 kilograms) and FBO non-members (30 kilograms).

⁸⁵ It is essential to note that almost all the respondents in the study who reported the use of fertiliser said that they had applied it on their maize farms.

⁸⁶ Available online at <ftp://ftp.fao.org/agl/agll/docs/fertuseghana.pdf>

Table 6.3

Determinants of smallholder farmers' use of fertilizer using binary logistic regression (Dep. Var.: Whether farmer use fertiliser)

Variables	B	S.E.	Wald	Sig.	Exp(B)
Whether farmer belong to FBO (dummy, 1=Yes)	.048	.509	.009	.925	1.049
Age	-.039	.023	2.953	.086	.962
Gender (male=1)	-.383	.579	.438	.508	.682
Years of farming experience	.054	.027	4.142	.042	1.056
Farmer's years in education	.040	.042	.896	.344	1.041
Whether farmer has access to radio (dummy, 1=Yes)	.653	.463	1.985	.159	1.921
Landholding size under cultivation	-.008	.071	.013	.910	.992
Distance from extension service centre	.000	.013	.001	.973	1.000
AEAs farmers know from whom to get support	.691	.427	2.627	.105	1.996
Distance to the closest agriculture market	-.023	.031	.541	.462	.977
Constant	1.642	.903	3.312	.069	5.168

Note. Observations = 226; Hosmer and Lemeshow Test: Chi-square = 14.363, d.f. = 8, Sig = 0.073, -2 Log likelihood = 198.808, Cox & Snell R Square = 0.089, Nagelkerke R² = 0.144; overall percentage of right predictions = 80.1

While Section 6.4 uses regression analysis understand the factors that influence the intensity of fertiliser use, a brief discussion of the factors that explain the difference in fertiliser use intensity between FBO members and non-members is important here. Three main factors can explain this significant difference. The first reasonable explanation could be that FBO members' land sizes under cultivation are relative larger than those of their non-FBO counterparts and that they would therefore use more fertiliser. However, this is not the case, as there is no statistically significant difference in the average land size under cultivation by FBO members (5.65 acres) and FBO non-members (5.12 acres).

Table 6.4

Average quantities of inputs use per hectare, according to FBO members and non-members

Type of input	All sample		FBO members		FBO non-members	
	Observed	Mean	Observed	Mean	Observed	Mean
Fertiliser (kilograms)	183	35.92 (17.30)	105	40.58 (16.59)*	78	29.79 (16.36)*
Insecticide (litres)	34	0.65 (0.43)	26	0.60 (0.40)	8	0.82 (0.52)
Herbicide (litres)	193	0.51 (0.31)	110	0.51 (0.28)	83	0.51 (0.34)

Source: Author's calculation based on fieldwork data

Note: Figures in parentheses are standard deviations. * represents a significant difference between FBO members and non-members at the 1% level.

The second factor that plausibly explains the difference in intensity of fertiliser use between FBO members and non-members relates to farmers' accessibility to fertiliser. As discussed already, when distributing inputs such as fertiliser under various projects and programs, AEAs usually do so through FBOs and their members (see Section 6.2). At least, this is largely the case under the FSP, where AEAs primarily target those smallholder farmers who participate in FBOs. About 95% of the FBO non-members interviewed indicated that they could not acquire fertiliser under the FSP because they did not get the passbook from the AEAs. As one FBO member notes, 'getting a passbook to buy fertiliser is difficult. You need to have strong ties with AEA before you can get one' (interview with FBO member in Northern Region, 19/03/2013).

Table 6.5

Average prices of inputs according to membership of FBOs

Type of input	Type of farmer	Observations	Mean (GH¢)	Standard deviation
	FBO member	105	38.34*	2.43
Fertiliser (price per 50 kilogram bag)	FBO non-member	79	41.27*	5.10
	FBO member	23	8.22	.93
Insecticide (price per 1 litre bottle)	FBO non-member	8	8.63	1.06
	FBO member	110	7.62*	0.72
Herbicide (price per 1 litre bottle)	FBO Non-member	82	8.05*	0.83

Source: Author's calculation based on fieldwork data

Note: * represents a significant difference between FBO members and non-members at the 1% level.

The final reason relates to affordability of fertiliser. The prices of fertiliser sold under the FSP and BFP are often lower than prices in the open market. As shown in Table 6.5, there is a difference between FBO members and non-members with regard to the average price at which they bought their fertiliser during the 2012 farming season (April–October). A test of differences in the averages, using a *t*-test, shows that there is a statistically significant difference between the average prices. This reveals that the average price at which FBO members buy fertiliser is cheaper compared with FBO non-members. A further disaggregation of the data according to FBO non-members who live

in villages with the presence of FBOs and those without FBOs in the village shows some difference in the average prices of fertiliser, that is, GHC40.72 and GHC42.73 respectively. However, a *t*-test indicates that the difference is not statistically significant ($t = 1.5673$, $p < 0.1212$).

Herbicide use

Farmers use herbicides for land preparation and weed control. Herbicides have become very popular among smallholder farmers in Ghana and are among the most widely used inputs (see Figure 6.5). Approximately 87% of smallholder farmers surveyed indicated that they had used herbicides in the major season of 2012 (see Figure 6.5). Similar to fertiliser use, the use of herbicides is higher in the Northern Region (56%) than the Eastern Region (44%). To test whether the proportions of herbicide use for the two regions are statistically different, I used the χ^2 test, with $\alpha = 0.05$ set as the criterion for significance. According to the χ^2 test of dependence, these differences are statistically significant; $\chi^2 = 4.345$, $p = 0.037$. A reasonable explanation for this difference is that the Northern Region (savannah) and Eastern Region (forest) lie in two different agro-ecological zones, with higher growth of weeds expected in the Northern Region compared to the Eastern Region.

While a regression analysis is undertaken in Section 6.4 to understand the determinants of herbicide use intensity among smallholder farmers, it is important to discuss briefly why such a high number of farmers (87%) used herbicides. The first reason relates to easy access and low cost due to the influx of cheap herbicides from China (Ragasa *et al.* 2013a). Herbicides are not only relatively accessible to most farmers but they are also more affordable for farmers compared to fertiliser. For example, the average price of 1 litre of herbicide is about eight Ghana *cedis* (\$4), compared to 40 Ghana *cedis* (\$20) for one bag (50 kilograms) of fertiliser. Second, interviews with farmers revealed that the use of human labour for land preparation and weed controls has become expensive, compared to the use of herbicides. This was also supported by interviews with the

AEAs. According to one AEA for instance, a farmer can use 1 litre of herbicides at a cost of nine Ghana *cedis* (\$4.5) to control an acre (0.4 hectare) of weeds, compared to 36 Ghana *cedis* (\$18) for the labour cost in controlling an acre (0.4 hectare) of weeds.⁸⁷

In spite of the widespread use of herbicides among smallholder farmers, it is still important to understand whether membership of an FBO increases farmers' intensity of herbicide use. Table 6.1 indicates that the use of herbicides is relatively high among both FBO members (93%) and FBO non-members (81%). Concerning the average quantity of herbicide use per hectare, there is no difference between FBO members and non-members (see Table 6.2), examined in detail in Section 6.4.

Insecticide use

Smallholder farmers also use insecticides for pest control. In this study, insecticides are the least used input (see Figure 6.5).⁸⁸ Indeed, only 15% of the surveyed farmers indicated that they had used insecticides/pesticides in the farming season. The data indicates that almost all the farmers who had used insecticides came from the Eastern Region, where the majority of farmers used insecticides on their cash crops and vegetable fields. Concerning whether FBOs make a difference in insecticide use intensity, the data suggests that there is no significant difference between FBO members and non-members (see Table 6.4).

The key points to note in this section are as follows. First, certified seed and insecticide use are relatively low among smallholder farmers; and while FBOs have a significant effect on the use of certified seeds, they have no effect on the use of insecticides among smallholder farmers. Second, fertiliser and herbicides are the most widely used inputs among smallholder farmers. While there is a significant difference between FBO members and non-members regarding their intensity of fertiliser use, there is no

⁸⁷ Interview with AEA in the Eastern Region, 03/06/2013.

⁸⁸ This is expected, as this study did not focus on farmers who grow cash crops (e.g. cocoa) and vegetables (e.g. tomatoes); cash crop and vegetable farmers have the likelihood of using insecticides, compared to farmers who grow cereals.

significant difference between them concerning the use of herbicides, largely because herbicides are easily accessible and more affordable.

As fertiliser and herbicides are the most widely used inputs among smallholder farmers, it is important to discuss in detail the factors that influence the intensity of their use in addition to FBO membership. This line of investigation is useful as FBOs only seem to have a significant influence for intensity of fertiliser use and not that of herbicides. The next section therefore employs regression analysis to understand the factors that influence smallholder farmers' intensity of fertiliser and herbicide use.

6.4 Beyond FBOs: understanding the intensity of fertiliser and herbicide use

The previous section established the significance of membership of FBOs in farmers' use of fertiliser, but not that of herbicides. It is therefore necessary to explore broadly the factors that influence smallholder farmers' intensity of use of herbicides and fertilizer. To do this, the section employs regression analysis (OLS). Table 6.6 shows descriptive statistics of the variables on which the analysis relies, presented according to FBO members and non-members for easy comparison. I begin with the factors that influence the intensity of fertiliser use.

6.4.1 The intensity of fertiliser utilisation

Table 6.7 reports the regression analysis of the factors that influence the quantity of fertiliser that smallholder farmers apply (Appendices 6.1 (overall study sample), 6.2 (FBO member sample) and 6.3 (FBO non-member sample) also provide correlation matrices for these variables). The table reports estimates of the unstandardised and standardised coefficients and the corresponding standard errors for independent variables, categorised into three: Models 1, 2 and 3. While Model 1 estimates the factors that influence the quantity of fertiliser used, using the entire sample, Models 2 and 3 estimate for FBO members and non-members, respectively. It is important to indicate that all zeros (that is those farmers who did not use fertiliser in the 2012 farming season) were dropped in the regression analysis.

Table 6.6

Mean statistics of selected variables according to FBO members and non-members

Variable	Description	FBO members (<i>n</i> = 120)	FBO non-members (<i>n</i> = 106)	Total (<i>n</i> = 226)
Fertperha	Average quantity of fertiliser use per hectare (kilograms)	40.58 (16.59) ₂	29.79 (16.36) ₃ *	35.92 (17.30) ₄
FBOmem	Whether farmer belongs to FBO (dummy)	-	-	0.53 (0.50)
Education	Average education (in years)	5.92 (5.73)	3.15 (4.40)	4.62 (5.32)
Radio	Whether farmer has access to radio (dummy)	0.90 (0.30)	0.64 (0.48)	0.78 (0.42)
Distmark	Average distance from the closest market (in miles)	4.78 (6.31)	6.96 (7.54)*	5.80 (6.99)
Distagric	Average distance from the closest extension centre (in miles)	13.88 (15.50)	15.81 (18.01)	14.78 (16.71)
NoAEA	Average number of AEAs that farmer knows	1.18 (0.66)	0.34 (0.48)*	0.79(0.72)
FBOfarm	Whether FBO has a group farm (dummy)	0.45 (0.50) ₁		
Fertprice	Average price of a bag (50 kilograms) of fertiliser (GHC)	38.34 (2.43) ₂	41.29 (5.13) ₃ *	39.60 (4.07) ₄
Herbprice	Average price of 1 litre of herbicide	7.62 (0.72) ₅	8.05 (0.83) ₆ *	7.80 (0.80) ₇
Herbperha	Average quantity of herbicide use per hectare (litres)	0.51 (0.28) ₅	0.51 (0.34) ₆	0.51 (0.31) ₇
Grants	Whether FBO member has received seeds/fertiliser/herbicide in past 3 years (dummy)	0.62 (0.49)		
Leader	Whether FBO member is a leader (dummy, 1 = yes)	0.33 (0.47) ₁		
FBOsize	Average size of FBO	32.45 (17.70) ₁		
VilFBO	Whether there is FBO in the village (dummy, 1 = yes)		0.69 (0.47)	

Source: Author's calculation based on fieldwork data

Note: Figures in parentheses are standard deviations. *, ** and *** indicate significant differences between FBO members and non-members at the 10%, 5% and 1% levels, respectively. ₁ represents *n* = 40, ₂ *n* = 105, ₃ *n* = 78, ₄ *n* = 183, ₅ *n* = 110, ₆ *n* = 83 and ₇ *n* = 193.

In Model 1, the variables included are whether the farmer belongs to an FBO, their years of education, their access to radio, their distance from the nearest market and extension centre, the AEAs known to farmers from whom they can seek extension advice and the average price of fertiliser.

As noted in Chapter 5, the inclusion of farmers' years of education and their access to radio is important because these variables have the potential to expose them to the need to increase the intensity of fertiliser use to achieve improved productivity. An examination of the coefficients of Model 1 further supports the evidence that membership of FBOs improves smallholder farmers' intensity of fertiliser use. The model also shows that farmers who have additional years in education will be able to increase their intensity of fertiliser use. As noted already, many studies have shown that years of education often tend to have a positive association with levels of adoption of technology (see, e.g., Foster & Rosenzweig 1996; Abdulai & Huffman 2005). As Green (2008) notes, education is seen as crucial in breaking the cycle of poverty, as it equips individuals to understand their environment and hence to lead full lives. He further argues that education and knowledge 'allows people to make informed choices, and strengthens their ability to demand their rights' (Green 2008, p. 43).

Model 2 has the same variables as Model 1 except for the inclusion of three more variables: whether the FBO member received grants within the past 3 years, whether the FBO member is a leader of the organisation and the size of the FBO. The grant variable is included because receipt of grants is one of the most important reasons why smallholder farmers participate in FBOs, and it will be useful to see how it influences intensity of fertiliser use. The inclusion of the FBO leadership variable will help us to understand the extent to which leaders of the FBOs may capture group benefits. As discussed in Chapter 2, the membership size of FBOs has been identified as one of the factors that influence their effectiveness and it is important to see how this variable influences the intensity of fertilizer use. Since Model 2 is run on a subsample of FBO members only, it excludes the variable of whether farmers belong to FBOs. Model 2

shows that among FBO members, the average price of fertiliser is the most important factor that influences intensity of fertiliser use. The results show that an additional unit increase in the price of fertiliser will result in about a 21% decrease in the quantity of fertiliser that smallholder farmers apply per hectare. As expected, a fall in the price of fertiliser is most likely to increase demand, which would result in a greater intensity of fertiliser use. This finding supports evidence from a recent study in SSA, which concludes that '[t]he price of fertilizers has been one of the major factors limiting the use of fertilizers for all farmers, especially for smallholders in agriculture' (Adesina *et al.* 2014, p. 257).

Model 2 also shows that the size of an FBO significantly influences the intensity of fertiliser use. The results suggest that as the size of an FBO increases its members are likely to increase their intensity of fertiliser application in their fields. Here, the analysis further shows that education is not a significant determinant of intensity of fertiliser use among the FBO members. The distance to the closest agricultural market where farmers can purchase fertiliser is not also significant. Similar to the results discussed in Chapter 5 (see Table 5.8), Model 2 also shows that FBO leadership has an insignificant effect on the intensity of fertiliser use among the FBO members. Nonetheless, the coefficients suggest that FBO leaders have a tendency to use more fertiliser per hectare, compared to the ordinary members.

Model 3 runs on the FBO non-members subsample. It has the same specification as that of Model 1, except for exclusion of the variable concerning whether farmers belong to FBOs. The Model also includes the variable of whether the FBO non-members live in FBO-villages or not. Similar to Model 1, the results in Model 3 also show the importance of education in improving smallholder farmers' intensity of fertiliser use. It suggests that additional years of education would increase fertiliser use intensity even among FBO non-members. Indeed, fertiliser use tends to be inefficient among smallholder farmers who lack adequate education (Crawford, Jayne & Kelly 2006).

Surprisingly, unlike FBO members, the coefficient of fertiliser price is positive (10% level significance) for FBO non-members.

Table 6.7

Factors that influence intensification of fertiliser use (OLS regression, Dep. Var.: quantity of fertiliser (kg) per hectare)

Variable	Model 1		Model 2		Model 3	
	Overall sample		FBO members		FBO non-members	
	Unstandardised coefficient	Standardised coefficient	Unstandardised coefficient	Standardised coefficient	Unstandardised coefficient	Standardised coefficient
FBOmem	6.329**	0.181** (3.107)			–	–
Education	0.607**	0.194** (.239)	0.340	0.121 (0.303)	1.313***	0.368 (0.411)***
Radio	2.422	0.054 (3.358)	-7.026	-0.108 (6.255)	5.109	0.149 (3.785)
Distmark	0.036	0.014 (.219)	0.116	0.044 (0.287)	-0.065	-0.027 (0.329)
Distagric	-0.127	-0.115 (.091)	0.037	0.034 (0.13)	-0.205	-0.206 (0.133)
NoAEA	2.480	0.102 (2.126)	3.307	0.133 (2.453)	-0.988	-0.03 (3.95)
Fertprice	0.083	0.020 (.315)	-1.406**	-0.208 (0.635)**	0.646*	0.204 (0.342)*
Grant	–	–	1.063	0.032 (3.847)	–	–
Leader	–	–	3.002	0.089 (3.416)	–	–
FBOsize	–	–	0.277**	0.29 (0.107)**	–	–
VillFBO	–	–	–	–	4.825	0.135 (4.411)
Number of observations	183		105		78	
Pseudo R2	0.168		0.196		0.244	
Adjust R2	0.134		0.119		0.168	

Source: Author's calculation based on fieldwork data

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Standard errors are shown in parentheses.

This may be explained by the fact that FBO non-members do not get opportunity to buy subsidised fertiliser from government and are willing to buy fertilizer at higher prices in the market. As found in Chapter 5, Model 3 also shows that whether FBO non-members live in FBO villages or not does not influence significantly their intensity of fertiliser use. Similar to the regression in Chapter 5 (Table 5.8), Model 3 here also suggests that the presence or absence of FBO in a village has no significant effect on FBO non-members' fertiliser use intensity.

In summary, the analysis here confirms the earlier finding that FBO membership should improve smallholder farmers' intensity of fertiliser use, and shows that a decrease in fertiliser prices should improve the intensity of fertiliser use among FBO members. The analysis also shows that smallholder farmers' additional years of education should lead to a greater intensity of fertiliser use. The implication of this is that while effective FBOs are crucial to ensure the rapid growth in fertiliser use among smallholder farmers, it is also important to increase investment that would drive down the costs of fertiliser as well as better extension services that can improve smallholder farmers' ability to use fertiliser profitably (Crawford, Jayne & Kelly 2006). It also points to the importance of improving education in rural communities, as this can lead to improved agricultural productivity and poverty reduction.

6.4.2 The intensity of herbicide use

Table 6.8 reports estimates of the coefficients and corresponding standard errors for independent variables to determine the factors that influence the intensity of herbicide use among smallholder farmers. It is important to indicate that all zeros (that is those farmers who did not use herbicides in the 2012 farming season) were dropped in the regression analysis. The independent variables included in the analysis are whether farmers belong to FBOs, farmers' years of education, their distance from the closest market and extension centre, the AEAs known to farmers from whom they can seek extension advice and the average price of herbicides.

The results in Table 6.8 support the earlier finding that there is no significant mean difference between FBO members and non-members concerning the quantity of herbicides used per hectare (see Table 6.4). It also shows that farmers who have more years in education are likely to intensify herbicide use, compared to farmers with fewer years of education. This is consistent with the earlier argument that improved education among smallholder farmers has a great potential to improve their access to extension services as well as increase their intensity of fertiliser use.

Table 6.8

Factors that influence intensification of herbicide use (OLS regression, Dep. Var.: quantity of herbicides (litres) per hectare)

Variable	Unstandardised coefficient	Standardised coefficient	Standard error
FBOmem	-0.086	-0.057	0.054
Education	0.023**	0.165**	0.004
Distmark	-0.011	-0.107	0.004
Distagric	0.004	0.104	0.002
NoAEA	-0.043	-0.041	0.038
Herbprice	-0.169**	-0.178**	0.029
Number of observations		193	
Pseudo R2		0.065	
Adjust R2		0.035	

Source: Author's calculation based on fieldwork data

Note: ** indicates significance at the 5% level. Standard errors are shown in parentheses.

The results in Table 6.8 also show that the average price of herbicides influences the intensity of herbicide use. It indicates that an additional unit increase in the price of herbicides would lead to a significant reduction in the quantity of herbicides that smallholder farmers apply per hectare.

To sum up, there are two key points to note in this section. First, FBOs do not have a significant influence on the intensity of herbicide use in the way that they do for fertiliser. Rather, the price of herbicide and the smallholder farmers' years in education significantly influence the intensity of herbicide use.

Second, it is important to note that the analysis here has only identified key factors that influence the smallholder farmers' intensity of fertiliser and herbicide use. The discussion does not tell us whether smallholder farmers are using optimal amounts of fertiliser and herbicides on their farms. In other words, one needs to understand whether farmers are applying these inputs in the right quantities, which is examined in the next section. More importantly, it also explores the extent to which FBOs enhance the optimal application of these inputs.

6.5 Adoption of technology

One of the key findings of Chapter 5 was that FBO members get more extension visits and training in agricultural technologies relative to their non-FBO counterparts. The previous section also indicated a high intensity of fertiliser use among smallholder farmers, as compared to their non-FBO counterparts. Yet, the question of whether FBOs influence the way in which smallholder farmers use recommended technologies remains to be answered. This question is important, as low adoption of technologies is often cited as the major reason for the relatively low yields in SSA (Benin *et al.* 2013; Ragasa *et al.* 2013a). The primary objective of this section is to understand whether membership of FBOs enhances smallholder farmers' adoption of recommended technology. The discussion here focuses on maize as it is the major crop cultivated by the majority of farmers; approximately 88% of the surveyed smallholder farmers cultivated maize. The analysis also centres on the three main technologies identified in Chapter 5 as the most

frequently taught technologies: planting in rows, application of fertiliser and herbicides. I explore two main issues under each technology. First is the extent to which smallholder farmers adopt each of these technologies, as well as whether FBOs make a difference in adoption of technology. This is important to understand because the classic justification for using FBOs to provide extension services is that information is likely to filter from FBO members to FBO non-members. Second, it examines key factors that influence farmers' decisions to adopt these technologies.

6.5.1 Row planting

Row planting technology involves a specified measurement for intra- and inter-row spacing between plants to ensure optimal plant density and spacing (see pictures in Figure 6.6). Smallholder farmers understanding of how far apart to space their seeds as well as how wide to dig trenches can have effects of their yields (AGRA 2013). With the right spacing in place, crops are most likely to make optimal use of the resources available to them, which would lead to an improvement in crop yields. It is therefore not surprising that row planting is the most common technology that AEAs teach farmers (see Chapter 5). Approximately 61% of the 226 respondents claimed to be practicing row planting on their farm.⁸⁹



Figure 6.6. Plants planted in rows and farmers planting in rows

Source: Author; taken in the Eastern Region during fieldwork

⁸⁹ When asked to indicate how they measure the spacing between plants, there were varied answers. While some said that they use ropes/lines that have the measurement, others said that with their farming experience over several years, they do row planting without the aid of ropes/lines.

An important question, however, relates to the extent to which FBO members and non-members differ concerning the practice of row planting. Figure 6.7 suggests that about 81% of FBO members practice row planting, whereas only 31% of the FBO non-members do so. This points to a high level of adoption of the technology among FBO members compared to FBO non-members. Other recent studies in developing countries, such as Matuschke and Qaim (2009), Wollni *et al.* (2010) and Schipmann and Qaim (2010), make a similar point when they show that group membership would lead to a high level of adoption of technologies. For instance, based on data collected from 241 smallholder farmers, Wollni *et al.* (2010) showed that group membership had a positive and significant effect on adoption of soil conservation technologies, and suggested that individuals who belong to groups are 24% more likely to adopt one soil conservation practice on their land than non-members.

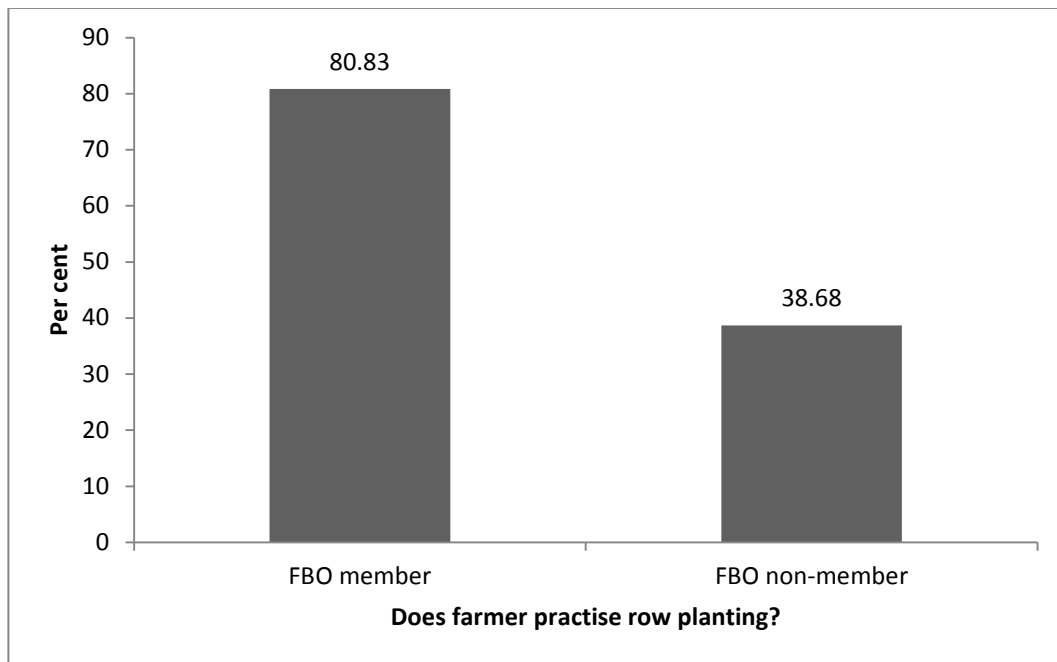


Figure 6.7. Practicing row planting

Source: Author's creation based on fieldwork data

Although this difference is not surprising, as FBO members get more training than FBO non-members do, one would have expected the practice of row planting to be much more widespread among FBO non-members than reported in Figure 6.7. This is because it is expected that FBO members should pass on the knowledge they have acquired to other farmers (GOG 2007). While there is evidence that FBO non-members learn from FBO members, it is likely to be on a very small scale.⁹⁰

Further examination of the data shows that the adoption of row planting is higher among FBO leaders (95%), compared to 74% for ordinary members. As FBO leaders have more access to extension services compared to the ordinary members (see Chapter 5), it is reasonable to expect them to have a higher level of adoption than the ordinary members.

It is also important to note that FBO members practice row planting on a limited basis. For example, among the FBO members, while the average land size under cultivation is 5.7 acres (2.3 hectares), on average they practiced row planting on 3.5 acres (1.4 hectares). What, then, explains farmers' seemingly low adoption of row planting? Based on field interviews, one can identify at least two main reasons why farmers do not practice row planting on a limited basis. The first relates to labour requirements. The majority of the farmers interviewed reported that row planting is labour intensive and requires more than one farmer at a time to practice. As one FBO member in the Tolon-Kumbungu District in the Northern Region explained:

The AEA has taught us how to do row planting but we are finding it difficult to practice it on our farms. Last year I cultivated 10 acres but only did row planting on two acres. You see, we now send all our children to school, so we cannot get cheap labour to do row planting on all our farms. (Interview, 04/03/2013)

In Sri Lanka, Namara *et al.* (2003) found that adoption of technology in rice farming was positively related to family size, which points to availability of labour. In

⁹⁰ For example, an FBO non-member in the Northern Region indicated that he sometimes asks farmers in FBOs to teach him what they have learnt (interview, 16/12/2012).

Madagascar, Moser and Barrett (2003) made similar observations and found that adopters of rice technologies did so only on small parts of their total rice crop, despite higher returns, because of labour constraints.

The second reason for the relatively low intensification of row planting is that many farmers claim that the application of sufficient fertiliser is a precondition for good yields if they practice row planting (interview with AEA in Northern Region, 15/02/2013). However, as noted, the majority of smallholder farmers do not have adequate access to fertiliser.

In spite of the limitations of row planting, smallholder farmers who adopted this practice and others such as optimal application of fertiliser reported significant improvements in maize yields, with an average increase from three bags to about ten bags.⁹¹ This implies that both row planting and recommended fertiliser application are important in improving crop yields of smallholder farmers.

6.5.2 Recommended application of fertiliser

Although the regression analysis in Section 6.4.1 shows that FBO membership and smallholder farmers' years of education significantly influence their intensity of fertiliser use, it is still not clear if they are applying the right quantity of fertiliser on their plots. While the recommended quantity of fertiliser required for an acre (0.4 hectare) of maize may vary based on the fertility level of the soil, in Ghana, MOFA's Directorate of Agricultural Extension Services (DAES) recommends that farmers growing maize should, at the minimum, use two 50-kilogram bags of nitrogen–phosphorous–potassium (NPK) and then two bags of sulphate of ammonia per acre (Chapoto & Ragasa 2013). However, field interviews with the eight AEAs and the smallholder farmers showed that three bags of fertiliser per acre (two bags of NPK and

⁹¹ The size of a bag of maize varies considerably and MOFA estimates the average weight of one bag at about 59 kilograms; see <http://www.fao.org/wairdocs/x5426e/x5426e03.htm>

one bag of sulphate of ammonia) is the most widely used application rate.⁹² The variation in the actual quantity of fertiliser to apply per acre is not peculiar to only Ghana. As Adesina *et al.* (2014) observe, in many parts of SSA fertiliser recommendations are outdated, with many relying on fertiliser application outcomes for cash crops without taking into consideration the ‘diversity of the farming systems, rainfall, risks, soil types, farmers’ resource constraints, and objectives for production’ (Adesina *et al.* 2014, p. 259).

Table 6.9

Average numbers of bags (50 kilograms per bag) of fertiliser use per acre of maize farm, according to FBO membership

Type of farmer	Observations	Mean (bags)	Standard deviation
FBO member	105	2.00*	0.82
FBO non-member	79	1.47*	0.81

Source: Author’s calculation based on fieldwork data

Note: * represents a significant difference between FBO members and non-members at the 1% significance level; $t = -4.384, p < .00002$.

Nonetheless, the survey data for this study shows that, on average, smallholder farmers apply about two bags of fertiliser per acre on their maize fields, a quantity which falls well short of the recommended three bags per acre. When disaggregated according to the two regions in this study, the results show no significant difference between the Northern (1.7 bags) and Eastern (1.8 bags) Regions. What is more important to know is whether membership of FBOs improves recommended fertiliser application among

⁹² Indeed, the Ghana Millennium Challenge Account Program supported FBO members with three bags of fertiliser for the cultivation of acre each. In addition, under the Block Farming Program, farmers receive three bags of fertiliser per acre.

smallholder farmers. Table 6.9 shows simple means comparisons of the quantity of fertiliser applied per acre of maize farm. The results show that the average quantity of fertiliser that FBO members apply per acre of maize farm is higher compared to the figures for FBO non-members. A *t*-test shows that this difference is statistically significant. As discussed, this is the case because many FBO members receive training in how to apply fertiliser and they purchase fertiliser at relatively cheaper prices, compared to FBO non-members. As the regression analysis in Section 6.4.1 also indicates, FBO members will intensify the use of fertiliser with a decrease in fertiliser price.

However, it is important to note that the average number of bags of fertiliser that FBO members apply per acre also falls short of the recommended three bags. Further disaggregation shows that the average bags of fertiliser per acre that FBO leaders apply (2.2 bags) is higher than the number for ordinary members (1.9 bags),⁹³ although it also falls short of the recommended three bags. The regression analysis in Section 6.4.1, however, showed that being an FBO leader does not significantly influence the intensity of fertiliser use.

It is important, therefore, to understand why smallholder farmers are unable to apply the recommended quantity of fertiliser per acre. This line of investigation is even more important for FBO members who have received training in fertiliser application and have a good chance of accessing more fertiliser through the FSP.

The field interviews show that the main reason why farmers are unable to apply recommended quantities of fertiliser on their farms is inadequate funding, which again corroborates the regression in Section 6.4.1 that farmers will buy and use more fertiliser if prices decrease. As one AEA explained:

⁹³ This is consistent with the finding in Chapter 5 that FBO leaders get more extension services than ordinary members do.

we teach farmers recommended fertilizer application but I am sorry to say that they do not usually go by it because they keep saying they do not have money to purchase enough fertilizer. (Interview with AEA in Eastern Region, 30/05/2013)

Adesina *et al.* (2014) also indicated the high cost of inputs and the poorly developed inputs market as key factors that contribute to the low adoption of agricultural technology among smallholder farmers in developing countries. It is therefore reasonable that many studies have emphasised the importance of smallholder farmers' access to credit as being crucial for adoption of technology (see, e.g., Abdulai & Huffman 2005; Ragasa *et al.* 2013a).

Another common reason expressed by many FBO members is delay in the supply of fertiliser by projects and programs (e.g. the FSP and BFP). With reference to the ongoing FSP (discussed in Section 6.2), about one third of the FBO members interviewed in the Northern Region indicated that the government usually supplies the fertiliser very late and at a time when farmers do not have money. Benin *et al.* (2013, p. 6) make a similar point in their study of Ghana's FSP when they note that, '[t]he ability of farmers to ... adopt the technologies ... offered by the different programs also hinges on timely supply or availability of the technologies and services'. The untimely delivery of fertiliser to FBO members could have been partly resolved if the FBOs had the capacity to facilitate the distribution of fertiliser to their members along the supply chains of the different programs.

The overall picture that emerges from the above analysis is that FBOs have the potential to improve smallholder farmers' intensity of fertiliser use. The analysis has shown that, on average, FBO members tend to apply more fertiliser per acre compared to FBO non-members, although their average application per acre is still lower than the recommended rate, largely due to inadequate financial resources for the purchasing of fertiliser.

6.5.3 Recommended application of herbicide

Although previous analysis (see Section 6.4.2) has shown that herbicide use is high for FBO members and non-members partly because herbicides are relatively accessible and cheaper as compared to fertiliser, it is not clear whether smallholder farmers apply herbicides at acceptable rates. Before I explore this issue, it is important to indicate that there are different types of herbicides,⁹⁴ but this study focuses only on the quantity of herbicides used rather than the type.

The quantity of herbicides that farmers apply per acre depends on whether the herbicides are used for land preparation before planting and/or weed control after planting. In this study, the survey focused on herbicides for weed control after land preparation. The survey results show that on average, smallholder farmers apply about 1.26 litres of herbicide per acre. While the recommended rate of herbicide application is estimated at about 2.5–3.6 litres per acre (MOFA/CRI/SARI 2005, cited in Ragasa *et al.* 2013a), the estimate includes both herbicides for land preparation and weed control. The figure of 1.26 litres per acre reported here is likely to increase to the recommended rates if it includes herbicides for land preparation.

Table 6.10

Average litres of herbicides used per acre of maize farm, according to FBO membership

Type of farmer	Observations	Mean (litres)	Standard deviation
FBO member	110	1.26	0.68
FBO non-member	83	1.25	0.85

Source: Author's calculation based on fieldwork data

⁹⁴ Examples of herbicides available in Ghana include Roundup®, Roundup® Turbo, Lasso-Atrazine® and Gramoxone®.

Table 6.10 shows that there is no significant difference between FBO members and non-members regarding the quantity of herbicides they apply per acre.

Two main factors may explain why FBOs do not make a difference in the adoption of recommended herbicide application among smallholder farmers. First, and as noted already, the relatively easy access and affordability of herbicides explains the even adoption of the input between FBO members and non-members. Almost all the farmers interviewed indicated the herbicides are affordable and readily available compared to fertiliser. As an FBO non-member notes, ‘herbicides are available in the market anytime for us to buy but with fertiliser even if we have the money it sometimes difficult to get and buy’.⁹⁵

Second, herbicide sellers teach FBO non-members the quantity of herbicide to apply per acre at the time of purchase. However, one AEA remarked that, ‘farmers listen to chemical dealers [herbicide sellers], but they are often poorly educated because many of the dealers cannot read instructions for herbicide application’ (interview with AEA in Eastern Region, 03/06/2013).⁹⁶ Meanwhile, the health of FBO non-members and their environment may be at risk if they are not trained in the proper use of herbicides, and this emphasises the need for training smallholders in the use of inputs even if they are readily available and cheaper in the market.

6.6 Conclusion

This chapter has examined whether FBOs facilitate smallholder farmers’ access to key inputs such as certified seeds, fertiliser, herbicides and insecticides. While FBOs are perceived as local institutions that should improve smallholder farmers’ access to inputs through collective acquisition of inputs, the analysis shows that the majority of them are unable to purchase inputs collectively. The chief reason is that FBOs and their members find it difficult to pool resources together to purchase inputs collectively, largely due to

⁹⁵ Interview with an FBO non-member in the Northern Region, 20/12/2012.

⁹⁶ An FBO leader in the Northern Region also reported that in his village there is no scientific means of mixing herbicides for application and that irrespective of the type of herbicide, they mix a tin of milk with one bucket of water (interview, 04/02/2013).

weak leadership. That is, most FBOs have weak leadership with regard to organising members to acquire inputs collectively as well as linking their FBOs to input dealers. In most cases, FBOs largely serve as targeted local institutions for external agencies to implement their projects and programs through which they provide inputs to smallholder farmers.

Among the four main inputs discussed, this study shows that fertiliser and herbicides are the most widely used. In relation to fertiliser, the discussion shows that membership of FBOs is significant in improving smallholder farmers' access to fertiliser. The analysis shows that fertiliser use and intensity is high among FBO members compared to FBO non-members. This difference is largely explained by the desire of external agencies to channel input distribution to farmers through FBOs. The analysis also shows that smallholder farmers' additional years of education and reduced cost of fertiliser should improve the intensity of fertiliser use. The chapter argues that while effective FBOs are important for improvement of the intensity of fertiliser use, it is also important to develop strategies that will make fertiliser more accessible and cheaper, which is currently beyond the reach of FBOs and their members. Similar to extension services, the state must play a crucial role to make fertilizer accessible and affordable for smallholder farmers. As in the case of the Green Revolution in Asia, the states recognised that fertilizer was critical for improved productivity among farmers and ensured that farmers had adequate access to it (Chang 2012; Birner & Resnick 2010). While strong and active FBOs are important for improved access to inputs, they may not make much impact if the inputs are not readily available, accessible and affordable to the smallholder farmers.

The chapter also emphasises that education is crucial for increasing the intensity of fertiliser use. While the chapter establishes the importance of FBOs in determining the intensity of fertiliser use, it shows that FBO members are unable to do apply fertiliser optimally, due largely to inadequate financial resources for the purchase of fertiliser.

Concerning herbicides, the chapter shows that FBOs do not have a significant influence on the quantity of herbicides that smallholder farmers apply on their farms, because herbicides are easily accessible and affordable for the majority of farmers. However, it argues that smallholder farmer' additional years of education and reduced prices of herbicides should increase the intensity of herbicide use.

The chapter also reveals that the majority of smallholder farmers do not use certified seeds, partly because certified seeds are expensive and are not readily accessible to smallholder farmers. Nonetheless, the study shows that there is a significant difference between FBO members and non-members in their use of certified seeds. This is because AEAs distribute certified seed under various projects and programs, with smallholder farmers who are participating in FBOs being their main targets.

Concerning whether FBOs make a difference in insecticide use and intensity of use, the analysis shows that there is no significant difference between FBO members and non-members in the average quantity of insecticides used.

The broad picture that emerges in the chapter is that while membership of FBOs plays a facilitating role in improving smallholder farmers' access to inputs and adoption of technology, it is on a limited scale, as they depend heavily on government and NGO programs to achieve this. FBOs generally do not have the capacity to acquire inputs directly from input dealers. Meanwhile, their over-reliance on government and NGO programs with poorly developed inputs markets, a high cost of inputs and inadequate extension services would not lead to sustainable access to inputs and adoption of technology (Adesina *et al.* 2014). We should therefore not lose sight of the fact that as many of these programs that are designed to quickly improve input use and adoption of technology among smallholder farmers (Crawford, Jayne & Kelly 2006) are channelled mostly through FBOs, membership of FBOs may not lead to any improved access to inputs after the programs cease to exist. This will be particularly the case if FBOs are not

linked to well-developed inputs markets, such as private-sector and commercial inputs dealers, in order to acquire inputs for their members.

It is important to note that the discussion in this chapter has shown that inadequate access to financial resources is a major obstacle that impedes both FBO members' and FBO non-members' access to and intensification of inputs. For instance, the analysis has shown that one of the factors that inhibit both FBO members and non-members in practicing optimal adoption of fertiliser application is that they have limited access to financial resources. Access to credit is therefore critical for smallholder farmers to improve their access to inputs and adopt fully the agricultural technologies that they understand (Norton 2004; Chang 2012).

The next chapter therefore examines credit access among smallholder farmers; in particular, the extent to which FBOs can improve their access to credit. This is even more important as FBOs are not only considered as institutions with the potential to link smallholder farmers to financial service providers but, also, government and NGOs initiate programs to provide inputs on credit to FBO members.

Appendix 6.1. Correlation matrix for regression and descriptive statistics (overall sample, 226 observations)

	FBOmem	Education	Radio	Distmark	Distagric	NoAEA	Fertprice	Mean	STD
FBOmem	1.00							.53	.50
Education	.26	1.00						4.62	5.32
Radio	.31**	.27**	1.00					.78	.42
Distmark	-.16	-.24**	-.16*	1.00				5.80	6.99
Distagric	-.06*	-.11	-.13	.60**	1.00			14.78	16.71
NoAEA	.59**	.38**	.29**	-.19**	-.10	1.00		.79	.72
Fertprice	.10*	.09	.14*	-.10	-.04	.17*	1.00	32.06	16.00

Note: ** and * represent the fact that the correlation is significant at the 0.01 and 0.05 levels (two-tailed), respectively.

Appendix 6.2. Correlation matrix for regression and descriptive statistics (FBO members sample, 120 observations)

	Education	Radio	Distmark	Distagric	NoAEA	Fertprice	Credit	Grants	Mean	STD
Education	1								5.92	5.73
Radio	.23*	1							.90	.30
Distmark	-.26**	.01	1						4.78	6.31
Distagric	-.15	.04	.49**	1					13.88	15.50
NoAEA	.32**	.09	-.17	-.13	1				1.18	.66
Fertprice	.12	.19*	-.09	-.06	.07	1			33.55	12.93
Credit	.13	-.04	-.12	-.10	.18*	-.14	1		.37	.48
Grants	-.17	-.15	-.07	-.37**	.09	.06	-.15	1	.62	.49

Note: ** and * represent the fact that the correlation is significant at the 0.01 and 0.05 levels (two-tailed), respectively.

Appendix 6.3. Correlation matrix for regression and descriptive statistics (FBO non-members sample, 106 observations)

	Education	Radio	Distmark	Distagric	NoAEA	Fertprice	Mean	STD
Education	1.00						3.15	4.40
Radio	.20*	1.00					.64	.48
Distmark	-.15	-.20*	1.00				6.96	7.54
Distagric	-.05	-.22*	.68**	1.00			15.81	18.01
NoAEA	.23*	.20*	-.08	-.03	1.00		.34	.48
Fertprice	.03	.09	-.09	-.01	.23*	1.00	30.38	18.81

Note: ** and * represent the fact that the correlation is significant at the 0.01 and 0.05 levels (two-tailed), respectively.

CHAPTER SEVEN

THE ROLE OF FBOs IN THE PROVISION OF AGRICULTURAL CREDIT TO SMALLHOLDER FARMERS

7.1 Introduction

The discussions in the previous chapter showed that one of the key reasons why smallholder farmers use inputs at below-optimum levels is the unavailability of adequate financial resources to acquire inputs. Access to good sources of credit has often been mentioned as critical if smallholder farmers are to raise their productivity through intensification of inputs use (Norton 2004; Abdulai & Huffman 2005; Chang 2012; Ragasa *et al.* 2013a). However, smallholder farmers in many developing countries have great difficulty in getting access to credit, partly because they suffer risks (e.g. dependence on rainfall and lack of capital assets) that are too high for private-sector financial institutions to lend to them (Chang 2012; Owusu-Baah 2012). Thus, smallholder agriculture in many developing countries has remained largely self-financed (Khandker & Koolwal 2014).

Importantly, many have considered FBOs as institutions that have the potential to improve smallholder farmers' access to credit (GOG 2007; World Bank 2007; Ali, Deininger & Duponchel 2014). For instance, using data from a nationally representative sample in Rwanda, Ali, Deininger and Duponchel (2014) found that participating in networks such as FBOs can contribute significantly to reducing the credit constraints of smallholder farmers. There are three main reasons for this potentially progressive role associated with FBOs. First, when lenders deliver agricultural credit through FBOs, it reduces the unit cost of loan administration (Tinsley 2004). Second, group lending improves loan repayment through peer pressure and joint liability (Birner & Resnick 2010). Third, FBOs can guarantee loans, whereas only a few smallholder farmers have capital assets for collateral to acquire loans (World Bank 2007). However, in Ghana and

many developing countries, it is not clear whether FBOs have the capacity to achieve these aims.

This chapter examines smallholder farmers' access to credit; in particular, the extent to which FBO membership brings about an improvement. It explores three main questions: (1) To what extent do FBOs improve smallholder farmers' access to credit? (2) Under what conditions are FBOs suitable for improving their members' access to credit? (3) Finally, what factors inhibit FBOs as suitable local institutions for improving smallholder farmers' access to credit?

To answer these questions, this chapter is structured as follows. First, a brief outline of rural financial systems in Ghana is provided to underscore sources of credit and credit potentials in the agricultural sector over the past five decades. Next, the chapter examines the extent to which smallholder farmers acquire credit. Then, it explores whether membership of FBOs improves smallholder farmers' access to credit and credit delivery in the agricultural sector. In relation to credit delivery, the chapter examines whether FBOs have the capacity to reduce loan default rates, which have been disappointing among smallholder farmers in past decades (Bratton 1986b; World Bank 2007). Specifically, the chapter discusses the conditions under which FBOs improve loan repayment as well as the conditions under which they encourage high loan default among their members.

7.2 Sources of credit to smallholder farmers: an overview of the rural financial structure in Ghana

One may divide the evolution of rural agricultural finance in Ghana into three main phases: (1) a period marked by private individuals, governments and donors providing credit to farmers; (2) a liberalised financial sector, in which the banks became major partners in lending to farmers; and (3) a period that witnessed the emergence of microfinance institutions.

During the first phase, which spans from the colonial period up to the early 1960s, the main sources of agricultural credit for smallholder farmers were mainly from informal sources such as government and donor projects, moneylenders, *susu*,⁹⁷ traders, family and friends (DeGraft-Johnson 1958; Aryeetey 1994). While government and donors mainly provided inputs credit (e.g. for fertiliser) through agricultural cooperatives, traders and moneylenders provided largely cash credit (DeGraft-Johnson 1958; Aryeetey 1994). However, a key limitation of credit from traders and moneylenders was that they often exploited their monopolistic positions in rural areas and charged smallholder farmers high interest rates (Aryeetey 1994; Chang 2012). Consequently, the above sources of agricultural credit were not adequate to resolve the challenges of agricultural financing in rural areas, prompting a shift towards a more formalised system of agricultural financing in rural areas. This ushered in the second phase of the evolution of rural agricultural financing in Ghana.

In the second phase (from 1965 to the early 1980s), the Government of Ghana took at least three key initiatives to improve access to financial services in rural areas. First, in 1965, the Agricultural Development Bank (ADB) was established, with a primary mandate of lending to the agricultural sector (Meyer 2013).⁹⁸ The ability to deliver on this mandate was undermined by the fact only about one third of the ADB's branches were located in rural areas, and even in the rural areas, most of them were located in cocoa-growing areas (Mensah 1993, cited in Nair & Fissaha 2010).

The second key initiative involved the government instructing all commercial banks operating in Ghana to lend at subsidised rates, and that at least 20% of their loan portfolios should be allocated for agricultural purposes (Nair & Fissaha 2010). In spite of this directive, lending in rural areas remained low because commercial banks' lending

⁹⁷ *Susu* is a traditional savings collection system in which a group of people agree among themselves to contribute money regularly into a pool and the sum is given to a member at each contribution, until all participating members have received the sum contribution.

⁹⁸ The Agricultural Development Bank (ADB) was called the Agricultural Credit and Cooperative Bank at establishment, but was renamed in 1968.

requirements were too high for smallholder farmers to meet. For instance, smallholder farmers needed to have high-deposit accounts and stronger collateral before they could access loans from the banks (Nair & Fissaha 2010). The directive even suffered a major setback following the World Bank's insistence that the allocation of subsidised credit for agricultural purposes should be abolished (Owusu-Baah 2012). The intervention of the World Bank led to withdrawal of all the major banks from agricultural funding, except for the ADB (Owusu-Baah 2012). Contrary to the World Bank's directive, experience in many of the now-developed countries has shown that it is crucial for the governments of developing countries to be significantly involved in the provision of agricultural credit (Chang 2009, 2012). This is because without government directives for mandatory lending to smallholder farmers, major private-sector financial providers are less likely to extend credit to them (Chang 2009, 2012).

Third, in the 1970s, the Government of Ghana started supporting the establishment of rural community banks to provide financial services to the rural people, given the limited spread of the ADB in rural areas (Nair & Fissaha 2010). Established through partnership with the Bank of Ghana and rural communities, the aim was to make rural community banks community owned; providing a wide range of services to rural dwellers such as 'individual savings with credit' and 'group savings with credit' (Steel & Andah 2003). With the 'group savings with credit' service, for example, the expectation was that groups of farmers would open joint savings accounts and mobilise savings deposits to levels that qualified them for a loan (Steel & Andah 2003). A limitation of this third initiative is that there are no clear policies on how the rural community banks should provide credit to farmers on a realistic basis. Nonetheless, various governments and NGOs sometimes use the rural community banks to provide credit and grants to smallholder farmers under their programs (Nair & Fissaha 2010).⁹⁹ Today, there are about 136 rural community banks with over 400 branches, and they

⁹⁹ Examples of government programs that have utilized rural community banks in providing grants and credit to farmers include Ghana's Millennium Challenge Account Program and the Agricultural Services Sub-sector Investment Program.

constitute the largest formal financial service providers in rural areas (Bank of Ghana 2012).

The final phase in the evolution of agricultural finance experienced the emergence of microfinance institutions and financial NGOs (late 1980s onwards). This period has witnessed the growth of non-bank financial institutions and there are about 145 of such financial institutions in Ghana, including saving and loans companies, credit unions, credit bureaux and financial non-governmental organisations (FiNGOs) (Bank of Ghana 2012). In spite of the surge of non-bank financial institutions, many of them, unfortunately, provide services in urban and peri-urban areas and therefore do not deliver the required services needed in rural Ghana (Nair & Fissaha 2010). In many developing countries, it has been observed that while the microfinance revolution opened access to loans for millions of poor people, as access to credit requires no formal collateral, 'it has not reached most agricultural activities, except in high-turnover activities such as small livestock and horticulture' (World Bank 2007, p. 13).

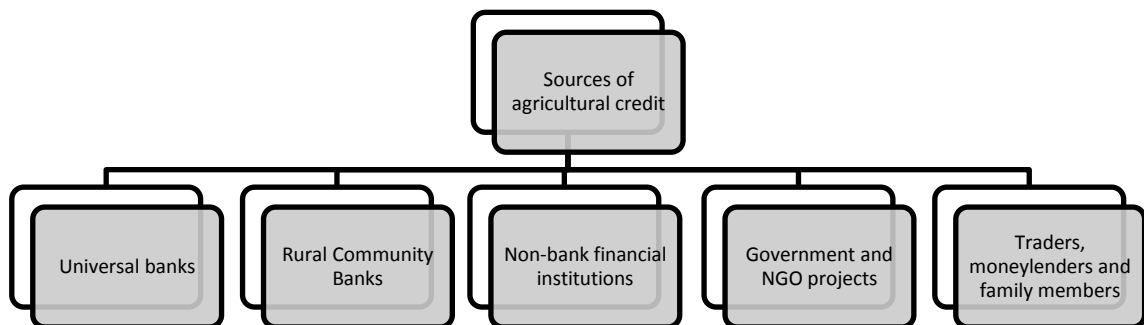


Figure 7.1. Sources of agricultural credit

The above overview suggests that Ghana has a wide range of agricultural sources of credit for farmers to access, summarised in Figure 7.1. However, many of these sources still ignore lending to smallholder farmers. Indeed, between 1997 and 2006, only about 2% of commercial banks' loans went to the agricultural sector in Ghana (Owusu-Baah

2012). This has led to the emergence of pressure groups in the agricultural sector in Ghana recently, calling on government to instruct all financial institutions to allocate 20% of their loan portfolio into the agriculture sector.¹⁰⁰

7.3 Accessing credit among smallholder farmers

While it is difficult for smallholders to access credit, this study explored the various sources from which smallholder farmers acquired agricultural credit within the 3 years immediately preceding the survey. As noted already (see Chapter 3), a propensity score matching technique (PSM) was applied on the sample of 240 smallholder farmers, which was reduced to 226. As stated in the previous chapters, the PSM technique was used mainly to ensure that the sampling approach used in selecting the FBO members and non-members was robust to allow for a comparison between FBO members and non-members regarding their access to credit. It should be noted again that the PSM technique was not intended to show analysis of paired individual farmers' outcomes but mainly to ensure a comparison between FBO members and non-members.

The study found that banks (mainly rural community banks), government and NGO projects, relatives, moneylenders, traders and input dealers were the main sources of funding for rural smallholder farmers. As shown in Figure 7.2, banks and extended family relations (relatives) were the most frequent sources from which the surveyed smallholder farmers obtained credit, with very few farmers obtaining credit via government and NGOs. The evidence suggests that traders and moneylenders are less attractive to smallholder farmers in their acquisition of credit; although the discussion in the previous section indicated they were the main sources of credit to farmers long before the introduction of formal institutions in rural areas. Interviews with smallholder farmers revealed that traders and moneylenders charge exorbitant interest on credit they provide. As one FBO member in the Yilo Krobo District of the Eastern Region notes, 'the interest the moneylenders charge is so high and in the end the loan is not beneficial;

¹⁰⁰ An example of a pressure group that made such a statement is the General Agriculture Workers Union; available online at <http://business.myjoyonline.com/pages/news/201307/109189.php> (accessed 10/06/2013).

so I will stop taking loan from them’ (30/04/13). This finding supports Tinsley (2004), in his extensive work on smallholder agriculture in developing countries, when he notes that smallholder farmers need ‘to avoid informal credit provided by landlords, traders, and shopkeepers with interest rates often exceeding 100 per cent per season’ (Tinsley 2004, p. 124). Tinsley (2004) however noted that the high interest rates sometimes reflect the actual cost of loan administration.

In spite of the high interest rates associated with these informal sources, they continue to be major sources of credit for many rural dwellers (World Bank 2001). Research in the mid-1990s shows, for example, that in Nepal, 81% of rural borrowing came from informal sources, and in Nigeria the figure was about 70% (World Bank 2001, p. 40).

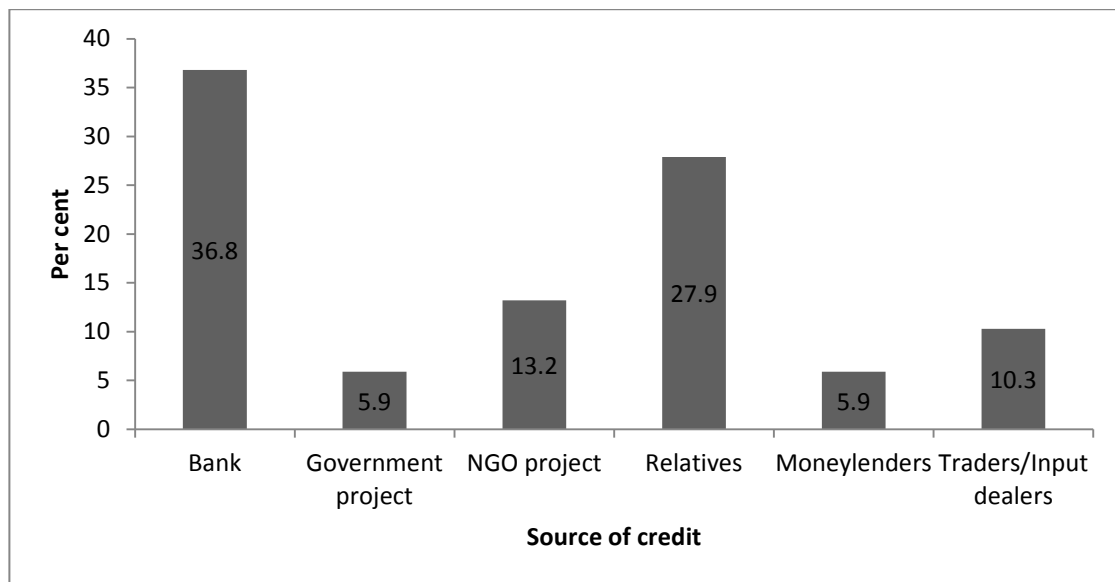


Figure 7.2. Smallholder farmers’ sources of credit

Source: Author’s calculation from fieldwork data

With an understanding of the different sources from which smallholder farmers obtain credit, I now turn to examine the extent to which they access credit from these sources.

Responding to the question of whether they had accessed credit within the 3 years immediately preceding the survey, only about 30% (68 farmers) of the 226 surveyed farmers indicated they had acquired credit, suggesting that the acquisition of credit is quite low among smallholder farmers. Compared to extension services (discussed in Chapter 5), credit is scarcer for smallholder farmers. Unlike extension services that are provided largely by the public sector, the public sector alone cannot provide credit to smallholder farmers, since agricultural financing requires a wide variety of alternatives (World Bank 2007).

As only about one third of the surveyed smallholder farmers acquired credit, it is important to understand why the majority of farmers fail to acquire credit. The survey results show that about 65% of farmers who did not access credit identified lack of knowledge regarding procedures for acquiring credit beyond their families and friends as the main reason. Other studies suggest that smallholder farmers' ability to acquire credit is limited by a lack of information and education (see, e.g., Meyer 2013). Similarly, it is reasonable to assume that the availability and closeness of financial institutions to smallholder farmers will improve their access to credit, but evidence from this study does not support this assumption. Only 1% of the surveyed smallholder farmers who did access credit indicated lack of financial service providers in their vicinity as the reason why they could not access credit. This is reasonable, as the majority of the farmers live within the catchment areas of financial institutions (particularly rural community banks). Indeed, the average distance of all surveyed farmers to the closest financial service provider is about 11 kilometres and 14% of them have banks located in their communities.

In addition to the above, 23% of the surveyed farmers identified lack of collateral and/or savings as the reason why they could not access credit. For a very long time, the financial institutions have found credit to smallholder farmers to be an unprofitable venture. Because of this, they often require capital assets or adequate savings from smallholder farmers before they will provide loans to them (Bratton 1986b; World Bank

2007; Dorward *et al.* 2009; Karlan *et al.* 2012). Finally, about 13% of the smallholder farmers indicated high interest rates from financial providers as the reason why they did not acquire a loan.

The discussion in this section shows a relatively low level of access to credit among smallholder farmers, largely due to lack of information and collateral to acquire credit. As many have considered FBOs to be important local institutions that can improve smallholder farmers' access to credit, in the next section I examine the extent to which they assist their members in accessing credit. However, before one undertakes such an analysis, it is important to indicate that collecting data from both FBO members and non-members regarding credit they have accessed is difficult. Despite providing extensive background about this study to participants, many respondents saw me as a potential source of financial support and therefore either refused to disclose relevant information or underestimated the credit they had already accessed (this is also discussed in Chapter 3). The underlying thinking here was the fear of undermining their own chances of securing further credit if full disclosures were made. Consequently, while 40% of the 40 FBOs surveyed indicated that their members had received credit from external sources, only 31% of FBO members provided credit information.

7.4 Do FBOs enhance smallholder farmers' access to credit?

The evidence in this thesis shows that access to credit is a powerful motivation for cooperation among smallholder farmers, with about 65% of the 40 FBOs surveyed in this study identifying access to credit as the main reason for which they were set up (see Chapter 4). However, only 40% of FBOs reported to have accessed credit. Similarly, about 61% of the 120 FBO members mentioned 'to access credit' as the reason why they joined, but only 31% indicated that they had received credit from external sources (see Chapter 4). How, then, do FBOs make smallholder farmers different regarding access to credit? To answer this question, I begin with an examination of the view that FBOs can generate internal income through collective activities, which they can lend to their members (World Bank 2007).

Chapter 4 indicated that the main sources of internal income for FBOs are through collective activities such as payment of dues and joint production. FBOs with internally generated income sometimes invite their members to borrow, although this was rarely observed in this study. Of the 40 FBOs surveyed, only 20% offered credit services to their members on an *ad hoc* basis. For example, through its members' monthly contributions, an FBO in the Northern Region loaned GH¢30 (US\$15)¹⁰¹ each to its members to plough 1 acre (0.4 hectare) in the 2012 farming season (April–October).¹⁰² Often, the amount of money involved in FBOs' internal loan arrangements is small, and may only be enough to purchase a bag (50 kilograms) of fertiliser or pay for the cost of ploughing an acre (for a description of an FBO internal credit scheme, see Box 7.1).

Box 7.1: Understanding internal credit arrangements in FBOs: the case of Sugru Vella Farmers Group

Sugru Vella Farmer Group is located in the West Mamprusi District of the Northern Region. An AEA initiated the establishment of this FBO in 2008, to benefit from Ghana's Millennium Challenge Account Program. The FBO registered with the Department of Cooperative (DOC) in 2009, with 45 members. It currently has 44 members, of whom 11 are females.

Under the Millennium Challenge Account Program, each member of this FBO was provided with grants in the form of seeds, fertiliser and money for land preparation to cultivate 1 acre (0.4 hectare) of maize in the 2009 farming season. At the end of the farming season, the FBO tasked each member with contributing a bag of maize (about 59 kilograms) to the group. In 2010, the FBO sold the bags of maize it collected from its members and started a 2-acre group farm (1 acre each for maize and rice). In the 2011 and 2012 farming seasons, the FBO provided interest-free in-kind credit (one bag of fertiliser) to its members from the profits it made from the group production. As at December 2012, the FBO had a balance of GHS 400 (US\$200) in its bank account and was preparing to recover the in-kind credit it provided to its members in the 2012 farming season.

Source: Author's interview with FBO leader, 21/12/2012

¹⁰¹ GHS1 = US\$0.50; this exchange rate is used for all dollar calculations in this chapter; 1 June 2013 exchange rates available online at <http://www.xe.com/currencytables/?from=USD&date=2013-06-01>

¹⁰² Interview with FBO leader in the Tolon-Kumbungu District of the Northern Region, 13/02/13.

The above analysis points to the fact that not many FBOs have internal credit schemes for their members. Even the few FBOs with internal credit arrangements operate on an *ad hoc* basis, making this a less viable option for improving smallholder farmers' access to credit.

Below, I explore whether differences exist between FBO members and non-members regarding their access to credit. Figure 7.3 shows the sources from which both categories obtain credit. It suggests that FBO members and non-members differ significantly in many respects. First, while family relations (relatives) are the most important source of credit for FBO non-members, banks tend to be the main source for FBO members. Unsurprisingly, whereas only 24% of FBO non-members held bank accounts, a remarkable 55% of FBO members did. This indicates an appreciable level of awareness among FBO members on the need to open bank accounts. Second, the results presented in Figure 7.3 reflect the fact that smallholder farmers can only access credit from government and NGO programs if they belong to FBOs, as not a single FBO non-member in this study received credit from such sources.

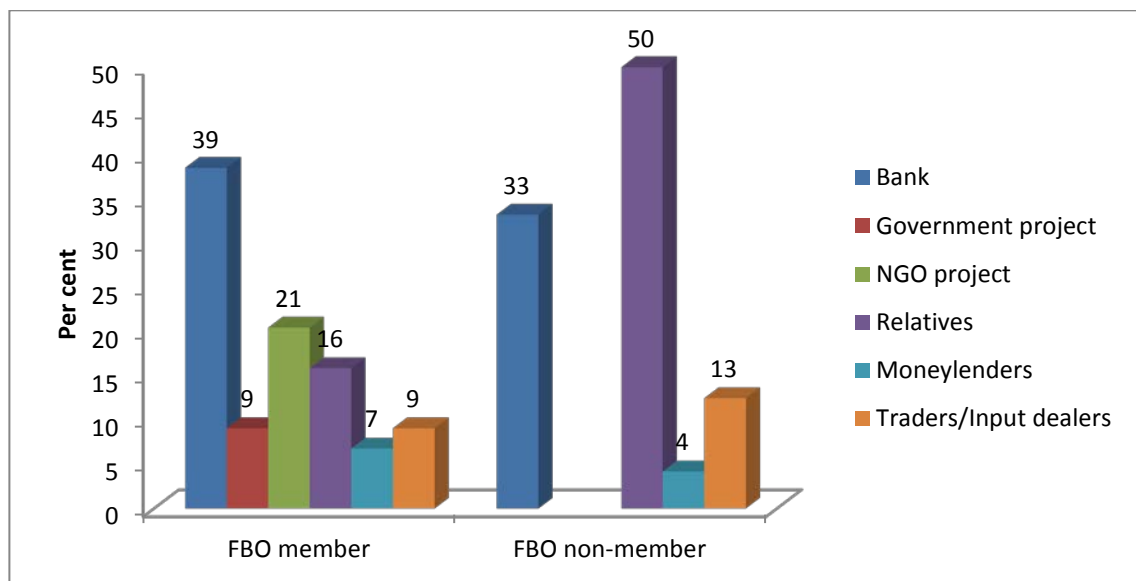


Figure 7.3. Comparing sources of credit between FBO members and non-members

Source: Author's calculation from the fieldwork data

One must also note that of the 68 smallholder farmers (30% of the surveyed farmers) who had accessed credit within the 3 years immediately preceding the survey, 65% were FBO members and 35% FBO non-members. Similarly, approximately 37% of all FBO members had accessed credit, while about 23% of FBO non-members had done so (only about 38% of FBO non-members who accessed lived in villages without FBOs). Using the Pearson χ^2 test, with $\alpha = 0.05$ set as the criterion for significance, to check whether the proportions of FBO members and non-members who had accessed credit were statistically different from each other, the test results show that the differences are statistically significant. The average amount of credit FBO members and non-members received also differed: while the average amount of credit FBO non-members received in the 3 years immediately preceding the survey was about GHC413 (US\$207), FBO members received about GHC739 (US\$370). However, a test of the differences in the averages, using a *t*-test, shows there is no statistical significant difference between them.

What is important to observe here is that the average amounts of credit received by both FBO members and non-members are relatively low. However, while more than two thirds of FBO non-members (74%) did not have knowledge of the procedures for accessing credit, only about half of the FBO members (54%) did not have such knowledge. In addition, unlike their non-FBO counterparts, several FBO members reported the unavailability of collateral and high interest rates charges as the reasons why they could not access credit (see Figure 7.4). However, as pointed out in the introduction to this chapter, it has often been argued that FBOs can guarantee loans for their members (World Bank 2007). Evidence from this study shows that obtaining credit from banks, for example, goes beyond FBO membership. The requirements posed by rural community banks are too high for many FBOs to meet. For example, they require FBOs to make some minimum savings in their group accounts before they are eligible to apply for a loan.¹⁰³ One FBO leader reported that a bank asked them to have savings of GHC3,000 (US\$1,500) in their group account before they could be granted a loan of

¹⁰³ Banks will normally require FBOs to have bank accounts, business plans and registration certificates with the relevant authority as part of their loan application process.

GHC15,000 (US\$7,500), an amount they were unable to raise.¹⁰⁴ Another FBO leader indicated that they needed GHC2,000 (US\$1,000) savings in their group account to borrow GHC10,000 (US\$5,000), which they also failed to raise.¹⁰⁵ The above accounts underscore the inability of FBOs to generate internal savings through collective activities, as already observed in Chapter 4.

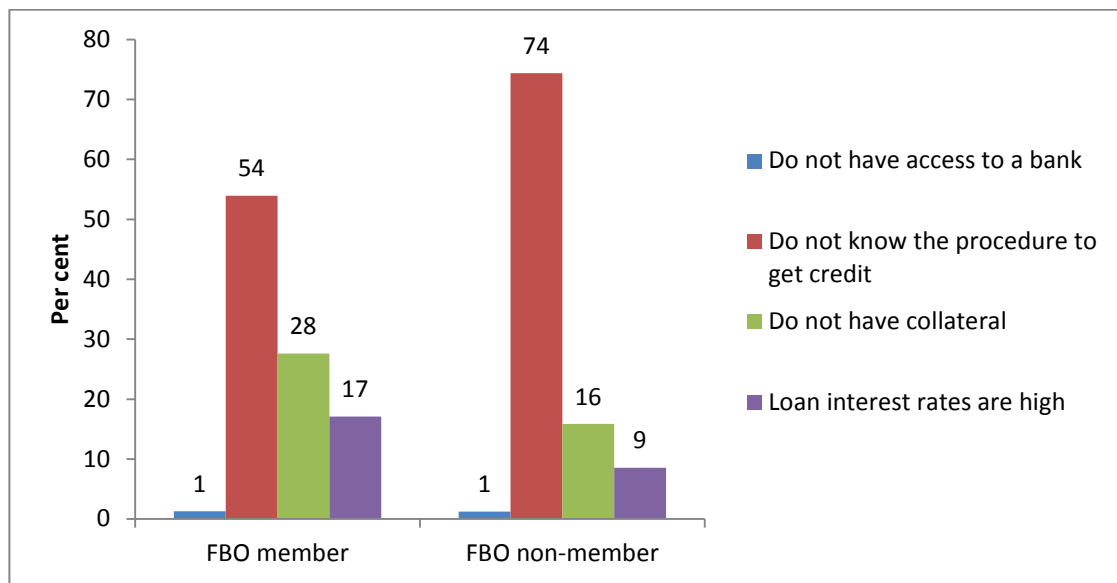


Figure 7.4. Comparing reasons why FBO members and non-members have not accessed credit

Source: Author’s calculation from fieldwork data

Field interviews with farmers, government and NGO officials suggest that banks and other financial institutions have strict requirements for lending to FBOs, because they have high loan default rates, which does not necessarily support the argument that group lending improves loan repayment through peer pressure and improved responsibility for individual borrowing (Birner & Resnick 2010). To examine loan repayment among FBOs, one needs to have adequate data on credit disbursements to FBOs and their repayment. However, as noted already, collecting such data from FBOs was difficult

¹⁰⁴ Interview with an FBO leader in the Akuapim North District of the Eastern Region, 01/01/2013.

¹⁰⁵ Interview with an FBO leader in the East Akim District of the Eastern Region, 06/04/2013.

because farmers either did not want to disclose the details of their access to credit or simply did not keep records. Nonetheless, to demonstrate loan disbursement and repayment, and explain the conditions under which FBOs improve or do not improve loan default rates, this research examines four credit schemes administered to FBOs in the next section.

7.5 Credit schemes with FBOs: what conditions make them successful?

This section subjects four credit programs, from which some of the sampled FBOs for this study benefited, to close scrutiny. The aim here is to demonstrate that FBO formation will not necessarily guarantee improved credit delivery and loan repayment if weak FBOs are set up and loan disbursement and administration are poor. The analyses here therefore focus on the institutional arrangements of the credit programs with the FBOs and the conditions that shape their performance (or the conditions that make them successful or otherwise). The discussion is divided into two main subsections. The first examines two government credit programs that have performed poorly, through a low level of loan repayment, and explores the factors that account for their poor performance. The second subsection considers two NGO credit programs that have experienced a high level of loan repayments from FBOs and examines why there are low default rates in such credit programs.

7.5.1 Government credit schemes with FBOs

The two credit programs analysed here were administered to FBO members under the Block Farming Program (BFP), discussed in Chapter 6, and Ghana's Millennium Challenge Account Program (see Chapter 1). I first present some basic facts about the two credit programs of interest here, before turning to explain the factors that shape their varied effectiveness.

7.5.1.1 Credit to FBOs under the Millennium Challenge Account Program

As already mentioned in previous chapters, between 2007 and 2012, the Millennium Challenge Account Program supported approximately 1,200 FBOs with training in

agricultural technologies, seeds and fertiliser (ISSER 2012). Of the 1,200 FBOs, 275 received credit, shown in Table 7.1 according to the regions covered in the program. About 9,500 FBO members received credit under this program to improve their agricultural activities. The program disbursed two types of loans to FBOs: short term (18 months) and long term (36 months). The program channelled its loans to FBOs through selected rural community banks, which were expected to recover the loans. Disbursement of loans to FBOs started in March 2008 and ended in September 2010. The maturity dates of the loans also span from August 2009 to September 2012.¹⁰⁶

Table 7.1

The numbers of FBOs under the credit scheme of the Millennium Challenge Account Program, by region

Region	Number of FBOs
Ashanti	43
Central	24
Eastern	56
Greater Accra	10
Northern	109
Volta	33
Total	275

Source: Author's calculation based on raw data from the Millennium Development Authority, 2013

At the end of the program, a total of about GHC22.6 million (US\$11.3 million) had been disbursed to the FBOs. However, as of June 2013, the time the researcher collected the data, only about GHC2 million (US\$1 million) had been recovered (see Figure 7.5),

¹⁰⁶ It is important to note that there were three FBOs in the data with maturity dates of March 2013, August 2013 and December 2013.

which represents a recovery rate of about 9.2%. One can best describe this recovery rate after the end of the program as disappointing. Indeed, a key official who worked under this program assessed the credit component of the program in the following words: ‘If you ask me about my assessment of the loan component of the program, I will say it was a complete failure; and I will blame our system in Ghana’ (interview, 06/06/2013).

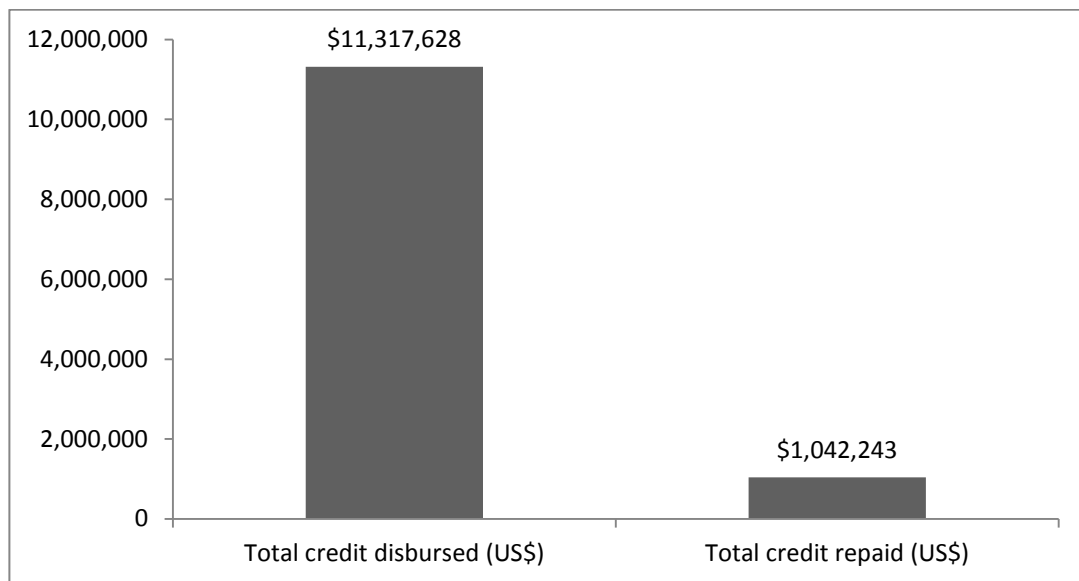


Figure 7.5. The total credit disbursement and repayment for FBOs

Source: Author’s calculation based on raw data from the Millennium Development Authority, 2013

Note: GHC1 = US\$0.5.

If one disaggregates the total disbursement and total repayment according to the six administrative regions that the program covered, the default rate is high across all the regions (see Figure 7.6). Although it is beyond the scope of this research to explain specific factors that account for the regional variations in total disbursement and repayment, some points are worthy of note. First, although the Northern Region had the highest number of FBOs (see Table 7.1), FBOs in the Eastern Region received the highest amounts of credit. Second, the Northern Region had the highest recovery rate

(19.3%) and the Central Region the lowest recovery rate (0.3%). The Eastern Region, with the highest total credit disbursed, had a recovery rate of 9.3%.

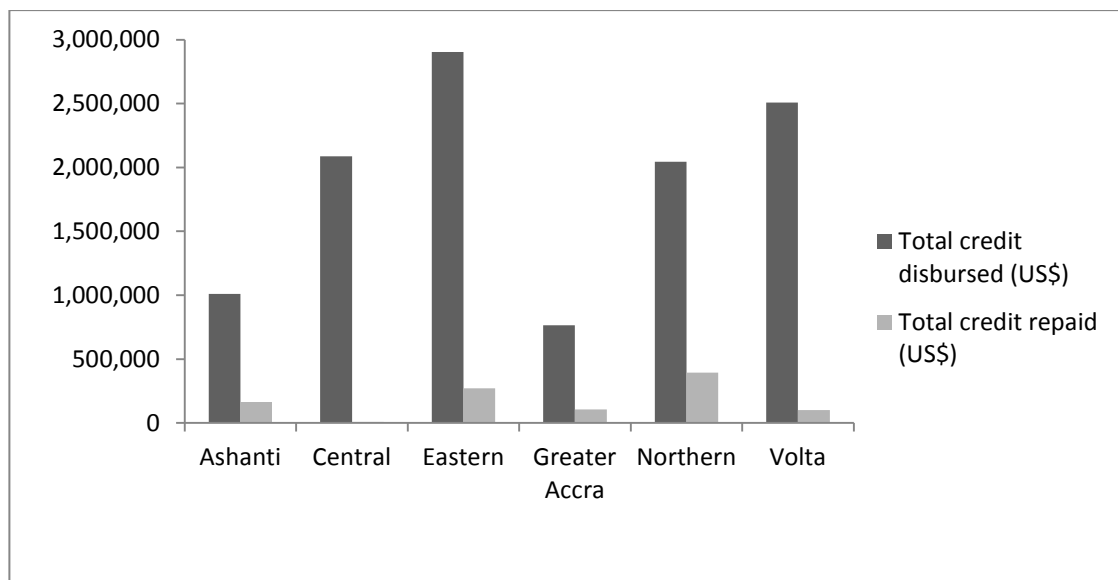


Figure 7.6. The total credit disbursements and repayments for FBOs by region

Source: Author's calculation based on data from the Millennium Development Authority, 2013

Note: GHC1 = US\$0.5.

The loan recovery figures shown in Figures 7.5 and 7.6 after the completion of the program offer little hope that the FBO members could ever repay such loans. What is important to understand is why FBOs are unable to improve credit recovery through peer pressure and joint liability. Before I return to answer this question, let me examine another government credit program for FBOs.

7.5.1.2 Credit to FBOs under the Block Farming Program

The BFP (discussed in Chapter 6), implemented largely through FBOs, provides in-kind credit to FBO members. It started in 2009 and focuses on providing seeds, fertiliser, herbicides and the cost of ploughing to FBO members on credit. In the 2009 farming season, about 15,722 farmers with a total of about 14,288 hectares benefited from the

program (MOFA 2010b). Due to poor repayment of the credit, the BFP currently provides only fertiliser and seeds on credit to FBO members.¹⁰⁷ AEAs deliver the in-kind credit and must recover the credit as payment in kind (farm produce) after the harvest, with no interest.

Unlike the Millennium Challenge Account Credit Program, it was difficult to access disbursement and recovery data under this program for all the ten administrative regions in which it is being implemented. I only acquired data for the Northern Region, covering the 2010 farming season. Figure 7.7 shows expected and actual recoveries in bags of maize and rice in the Northern Region. It is important to note that expected recovery in bags is equivalent to the total cost of inputs that the program provided to farmers on credit.

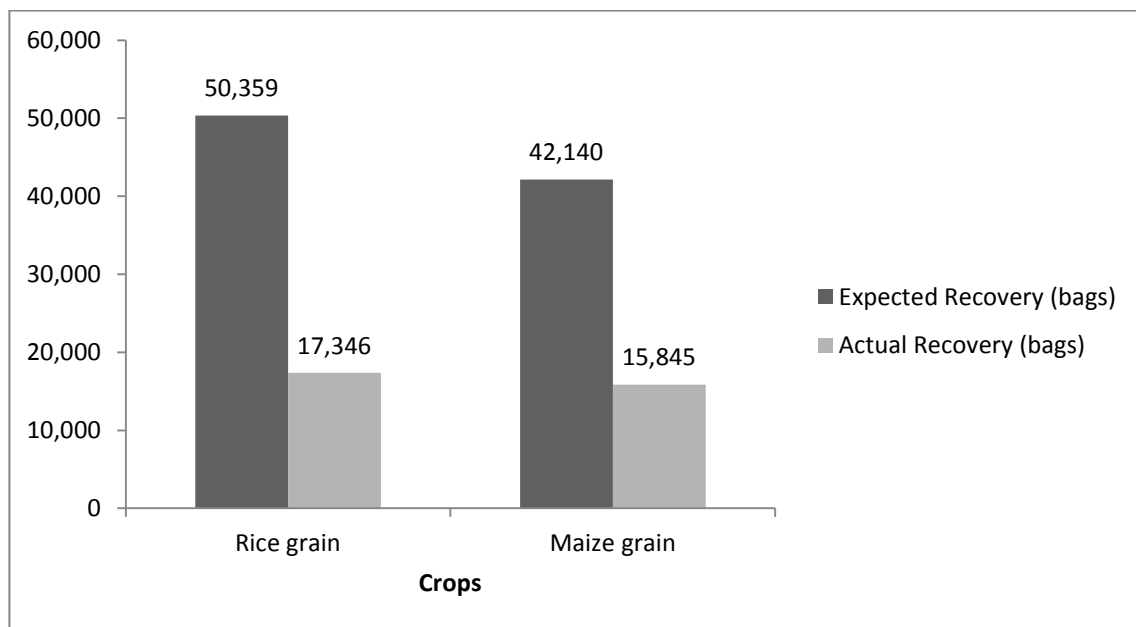


Figure 7.7. The expected and actual recovery of in-kind credit to FBOs in the Northern Region for the 2010 farming season

Source: Author's calculation based on data from the Northern Regional Agriculture Development Unit (RADU), Ministry of Food and Agriculture (MOFA), 2013

¹⁰⁷ Interview with AEA in the Northern Region, 07/12/2012.

Although Figure 7.7 suggests that actual credit recovery under the BFP for the Northern Region is better, compared to the Millennium Challenge Account Credit Program, one cannot still describe this as satisfactory. A reasonable explanation for their difference may be that while the Millennium Challenge Account Credit Program recovered in cash, the BFP recovered in kind. The recovery rates for rice and maize under the BFP for 2010 were 34.4% and 36.7%, respectively, compared with an average of 9.2% for Millennium Challenge Account Credit Program. As the recovery rates under the BFP and the Millennium Challenge Account Credit Program are low among FBOs, the next section explains why delivering credit through FBOs does not provide satisfactory results.

7.5.1.3 Explaining low levels of loan repayment in FBOs under government credit schemes

It is important to acknowledge that bad weather conditions (e.g. inadequate or too much rainfall) may result in a poor harvest among smallholder farmers, which will affect their ability to pay off loans they would have invested in their farms. However, the focus in this section is not to explore these natural factors but, rather, to examine the political, social and institutional factors that influence loan repayment in FBOs.

First, while it is essential for government to be involved in providing credit to smallholder farmers, systematic political interference results in a low level of loan repayment even with the involvement of FBOs. When FBO members – and especially those members who support the ruling party – know that the government is providing credit, they regard the loans as gifts, especially if the FBOs and their members did not receive adequate orientation and training at their formation stage. An FBO leader in the Eastern Gonja District of the Northern Region appears to have summarised the above line of argument when he notes that

Politics is the cause of low credit recovery in FBOs. For us, once your party is in power and you get credit you will not pay. We think they give us the credit

because we have our party in government. (Interview with FBO leader, 19/03/2013)

Similarly, responding to why there continues to be low credit recovery among smallholder farmers even when credit is channelled through FBOs, an NGO official notes that, ‘MOFA has a lot of political colouration in its activities, so passing credit programs through MOFA tends to politicise everything, so farmers will not pay’.¹⁰⁸ The above explanation for low loan recovery is not entirely new in developing countries, as Tinsley (2004) also reports that in Zambia, politicians seeking votes would often inform farmers that they simply did not have to repay loans if they were elected into office, because the loans would be gifted from the government. An official at MOFA argues that government should be committed to creating long-term credit facilities that transcend political parties for FBOs, in order for farmers to appreciate that loans received are not rewards for their party political affiliations.¹⁰⁹

The second explanation for poor loan repayment in FBOs is untimely release of credit to farmers. For instance, when government agencies deliver either credit in kind or cash to FBOs in the middle of the farming season, it has a tendency to reduce their yields well below anticipated levels, making it difficult to repay their loans. In relation to the BFP, an AEA remarked that, ‘... on [a] yearly basis, our recovery is less than half of what we disbursed; this is partly due to untimely distribution of inputs to farmers’.¹¹⁰ In its own report, MOFA, the implementer of the BFP, acknowledged that inputs, especially fertiliser, arrived with farmers late (MOFA 2010b). The literature already abounds with the effects of late release of inputs or credit to smallholder farmers (see, e.g., Bratton 1986b; Tinsley 2004) but not in relation to FBOs. With strong FBOs, one would expect timely delivery of credit to their members, as they have the potential to demand and facilitate the delivery of credit. A senior official at MOFA supported this argument when

¹⁰⁸ Interview with NGO official in the Northern Region, 10/06/2013.

¹⁰⁹ Interview with MOFA official, Accra, 06/06/2013.

¹¹⁰ Interview with AEA in the Northern Region, 15/02/2013.

he noted that, ‘support to FBOs in the form of credit will be more effective if they are sent directly to the FBOs and not through a chain of government institutions’.¹¹¹ However, as the analyses in Chapters 4–6 show, many FBOs do not have the capacity to chase or link up with credit providers to demand credit at the right time, and often have to wait for credit to be delivered at a time deemed appropriate to the credit providers.

Another reason for the low recovery of credit in FBOs is inadequate supervision and monitoring by credit providers. Since, at their current level of development, many FBOs in Ghana do not have effective leadership to manage the use of credit and enforce strict sanctions for members who default (see Chapter 4), credit providers must participate in supervising and monitoring to ensure that FBO members are investing the credit appropriately and observing cultural practices (e.g. weeding). Indeed, it has been established that collective action is effective where there is strict enforcement of rules (Ostrom 1990; World Bank 2001; Poteete, Janssen & Ostrom 2010). It is important to note that the main agents in the administration of many government credit schemes are the AEAs, who are not only limited in numbers but also do not have adequate mobility resources (e.g. motorbikes) to undertake effective monitoring and supervision (see Chapters 1 and 5). For instance, If AEAs are unable to visit FBO members at the time of harvesting to recover credit, the members will sell or use their produce for other purposes (interview with AEA, 15/02/2013). It is therefore not surprising that an FBO leader made the following remark about AEAs regarding credit recovery: ‘We ask that when they give us loans, they should come regularly to collect some of the money as it is difficult for us to go to the bank and repay ourselves.’¹¹² In addition, when the government channels credit to FBOs through rural community banks, as in the case of the Millennium Challenge Account Program, the banks are less likely to have the human resources to monitor and supervise the use of the credit, and will therefore depend on the FBOs themselves to use the credit appropriately and repay the loan.

¹¹¹ Interview with senior official at MOFA, 09/05/2013.

¹¹² Interview with FBO leader in the East Gonja District of the Northern Region, 22/03/2013.

Finally, we should note that credit to FBOs is usually not for collective investment; rather, their members receive it and make individual investments. Unfortunately, FBOs usually do not keep credit records of their members; it is therefore puzzling how their leadership can enforce loan repayment when they have no such records. For instance, of the 40 FBOs surveyed, only 50% kept records. However, these were not records about credit; rather, they were records of their own monetary contributions and minutes. When FBOs do not keep records of their individual members' activities, their leaders cannot manage or coordinate their investment.

This discussion shows that, at their current level of development, FBOs will not be able to improve repayment of the loans provided to smallholder farmers by government unless credit disbursement is devoid of politics, and there is improved supervision and monitoring of credit disbursement and investment. The next section examines two NGOs' credit programs with FBOs, which turn out to be relatively successful in terms of loan repayment, compared to the government projects.

7.5.2 NGO credit programs with FBOs

The Presbyterian Mile 7 Agricultural Station (PAS) and the Social Enterprise Development Foundation (SEND) Financial NGO (FiNGO) implemented the two credit programs discussed in this section. They are both local NGOs that operate in the Northern Region of Ghana. This section is structured as follows. The first subsection presents the PAS credit program with FBOs, while the second discusses SEND FiNGO's credit program. The final subsection discusses the factors that account for the performance of the two credit programs in relation to FBOs.

7.5.2.1 The Presbyterian Mile 7 Agricultural Station credit program

The PAS credit program is part of its broader market access program,¹¹³ which is aimed at linking FBOs to important actors in the agricultural value chain, such as banks, input

¹¹³ In addition to the Mile 7 station, there are other Presbyterian Agricultural Stations in Northern Ghana, including Langbensj, Garu and Sandema.

dealers and markets. The station operates in five Districts (see Figure 7.8). PAS establishes FBOs and provides training in crop production, financial management and agribusiness. According to the data I collected from the station in March 2013, the number of FBOs under this station grew from 24 in 2005 to 103 in 2012.

In 2010, the station supported 53 FBOs involving about 1,009 smallholder farmers with credit, mainly to cover the cost of seeds and ploughing up to a maximum of 2 acres (0.8 hectare) ¹¹⁴ per farmer. The station guaranteed and assisted the FBOs in accessing credit from rural community banks. The loans were not given in cash to the FBOs and their members. Rather, the station used the money to buy certified seeds for the FBOs and their members, as well as organising tractors to enable them to plough.

Figure 7.8 shows the total amount of credit that the station disbursed to the FBOs, as well as total recoveries for the 2010 farming season. The data are presented according to the five Districts that the station operates in the Northern Region. The total cost of seeds and ploughing provided to the FBOs stood at GHC21,300 (US\$10,650). At the end of the farming season, the station recovered about GHC20,580 (US\$10,290) from the FBOs, mainly in kind (farm produce). This represented a recovery rate of 96.62%. Indeed, as shown in Figure 7.8, three out of the five districts recorded 100% recoveries, with the remaining two Districts also recording impressive recovery rates of 90.9% and 87.50%.

When one compares the recovery rates here with those discussed in Section 7.5.1, it raises a fundamental question of what factors account for the low default rate. I will return to this question after discussing the other NGO credit program.

¹¹⁴ In addition to the Mile 7 station, there are other Presbyterian Agricultural Stations in Northern Ghana, including Langbensj, Garu and Sandema.

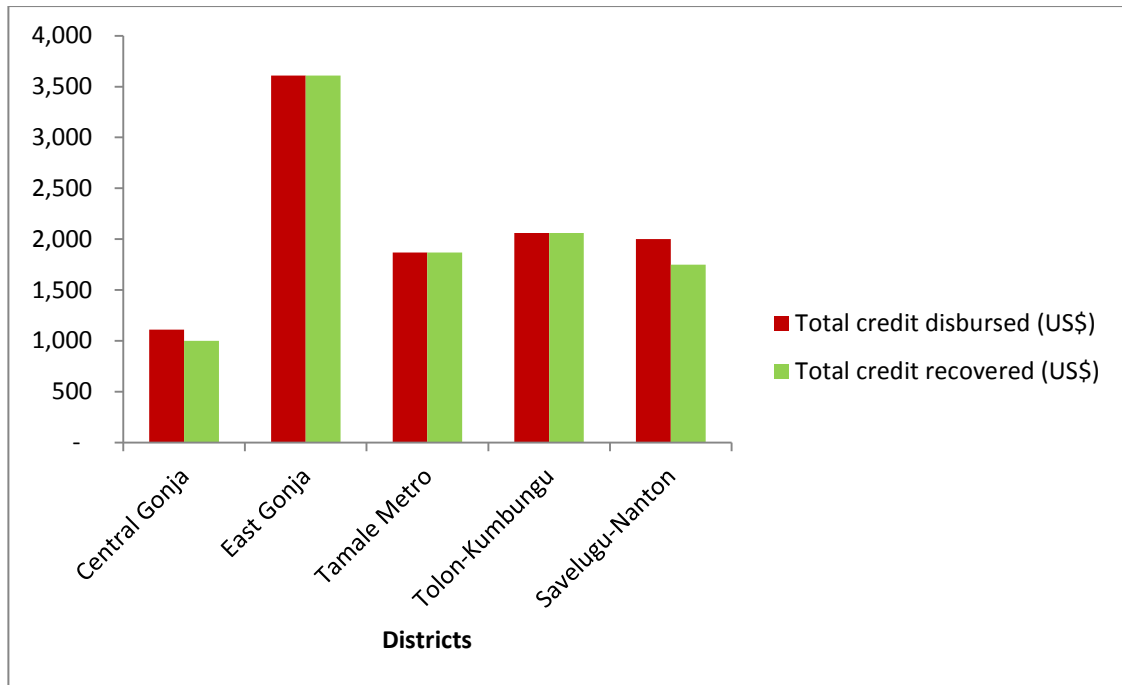


Figure 7.8. The total credit disbursed and recovered from FBOs in the 2010 farming season under the Presbyterian Mile 7 credit program

Source: Author’s calculation based on data from the Presbyterian Mile 7 Agricultural Station, 2013

Note: GHC1 = US\$0.5.

7.5.2.2 The SEND FiNGO credit program

The main aim of the SEND FiNGO is to promote the development of an inclusive financial sector among the poor in society, through the establishment and development of community-based member-owned credit unions. It also aims at improving microfinance services for FBOs through its credit unions. Key requirements for FBOs to access credit from its credit unions include the opening of a deposit account and making an agreed saving based on the credit needs of the FBOs. Under this program, FBO members receive credit in cash; each FBO member receives either GHC100 (US\$50),

GHC150 (US\$75) or GHC200 (US\$100). SEND FiNGO also sometimes assists farmers in acquiring tractor services and inputs collectively with the credit.¹¹⁵

By the year 2012, SEND FiNGO's credit unions had loaned credit to about 48 FBOs in three Districts in the Northern Region. From 2008 to 2011, its credit unions loaned GHC161,421 (US\$80,710) to FBOs and recovered GHC105,290 (US\$52,645), representing a 65% loan recovery rate over the period. Figure 7.9 shows the yearly loan disbursement from the credit unions to FBOs and recoveries from 2008 to 2011. In 2008 and 2009, there was not a single default from FBOs and their members. In 2010, although there was a default, the rate was low (only 4%) and could rarely have had any significant adverse implications for the credit program. In 2011, the unions experienced a high default rate from FBOs and their members (63%). In an interview, a senior official at SEND FiNGO explained that the high default rate in 2010 was largely due to bad rains, which resulted in a poor harvest (interview with NGO official in Northern Region, 14/06/2013).

In spite of the relatively high default rate in 2011, one can conclude that SEND FiNGO's credit program with FBOs has been a success. Again, the question is what accounts for the high credit recovery under this program compared with those discussed in Section 7.4.1.

¹¹⁵ Interview with NGO official in the Northern Region, 14/06/2013.

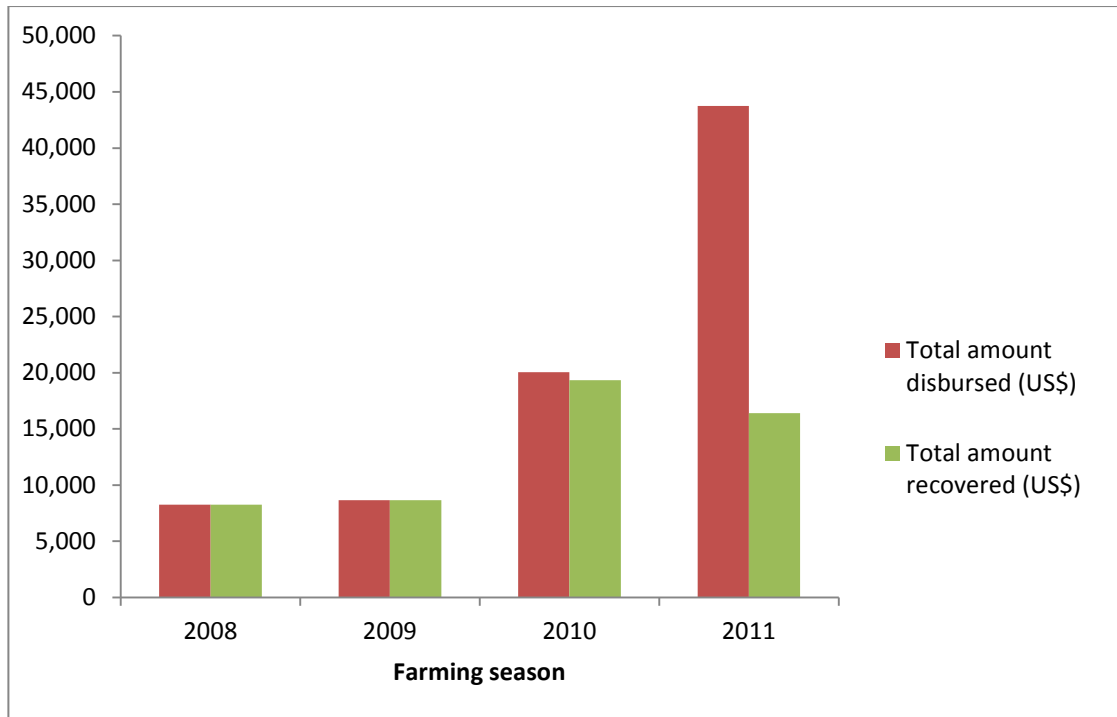


Figure 7.9. The total credit disbursed and recovered from FBOs in the 2008–11 farming seasons under SEND FiNGO credit program

Source: Author’s calculation based on credit data from the SEND FiNGO, 2013

Note: GHC1 = US\$0.5.

7.5.2.3 Explaining the high level of loan repayment under NGO credit programs

Discussions in this chapter have already outlined some of the key factors that affect FBOs’ ability to improve credit delivery among smallholder farmer, with a focus on loan repayment (Section 7.5.1.3). This section discusses the conditions under which FBOs improve their loan repayments.

As I shall discuss, when FBOs have weak leadership and little in the way of collective activities, recovering loans provided to them requires the effective participation of the loan providers. They need to participate in educating the FBOs and their members on how to use loans effectively, providing loans to them on a timely basis, and supervising

and monitoring loan use through to harvesting and recovery. While these activities have a tendency to increase the cost of the loan administration to FBOs, they appear necessary in the early stages of FBO development, to nurture them into strong local institutions that will take up such roles on their own when they mature.

The first explanation for the high recovery rates under the two NGO credit programs discussed is the awareness by FBOs that such loans are not free. In providing loans to FBOs, ‘our first major step is to educate them [that] the loans will not be free and that we are only helping them with credit to improve their production’.¹¹⁶ This kind of education is necessary, as many smallholder farmers participate in the FBO only to receive grants or gifts. As noted already, farmers require adequate education in order to know that.

Second, when credit is delivered to FBOs late in the farming season, it will be difficult for FBO members to make maximum benefits out of such credit (kind or cash) to repay their loans. Compared with government credit programs, the NGO programs have less bureaucracy and tend to deliver credit on a timely basis. For instance, SEND FiNGO not only has all its credit unions located in close proximity to FBOs, but also makes decisions on credit applications locally, in the shortest possible time.¹¹⁷

Another factor that explains the high level of loan recovery is the supervision and monitoring of loan use. Ideally, FBOs must have leaders who will manage and supervise credit they have received but, as indicated already, at their current level of development many FBOs lack such leadership qualities. It is therefore necessary for loan providers to assist FBO members by supervising and monitoring how credit is used. In assessing the success of their credit program, a program officer at the PAS concludes that, ‘monitoring is key for the success of our program; our officers are always on the ground’ with the FBOs (interview with NGO official in Northern Region, 12/06/2013), although this will require a large number of committed field staff. This argument is in line with Meyer

¹¹⁶ Interview with NGO official in the Northern Region, 12/06/2013.

¹¹⁷ Interview with NGO official in the Northern Region, 13/06/2013.

(2013), who argues that loan providers need to develop appropriate systems for planning loan disbursement and monitoring loan performance with farmers.

Similarly, as the sustenance of any credit program will depend on its recovery rate, there must be mechanisms in place to recover credit from FBO members. Without strong FBO leadership, it is highly unlikely that members will repay their loans if they are not encouraged or coerced to do so. Recognising that at this stage of their development FBOs themselves cannot recover credit from their members, the NGOs participated in the recovery process under their programs. For instance, the PAS credit program links FBOs and their members to a marketing company,¹¹⁸ which buys their produce and ensures that farmers' loans are deducted from their total revenue.¹¹⁹ However, some FBO members claimed that with this mechanism, they end up using all their produce to pay loans, not least because the price of farm produce is often lower at the time they are compelled to sell to the company. As an FBO leader in the Northern Region noted, 'the timing of our repayment was not good because at that time, prices of our produce were very low and we virtually gave all the produce to them'.¹²⁰

Finally, if sanctions are in place for FBOs and their members who default, farmers will have less incentive to default. However, if there are no penalties for FBOs that default, as in the case of the government credit programs discussed, then FBOs and their members will not cooperate and will therefore default. In the NGO credit programs discussed, FBOs and their member who default lose the opportunity to participate in future programs. According to the program officer of the Presbyterian Mile 7 Agricultural Station, 'if any group defaults ..., we force them to pay before we get them off our program'.¹²¹ In the case of SEND FiNGO, until every member of an FBO pays, it is ineligible to apply for loan from its credit unions. With such punitive measures in

¹¹⁸ This company is called the Savannah Marketing Company, and is located in Tamale.

¹¹⁹ Interview with NGO official in the Northern Region, 12/06/2013.

¹²⁰ Interview with FBO leader in the Tolon-Kumbungu District, 16/02/2013,

¹²¹ Interview with NGO official in the Northern Region, 12/06/2013.

place, if FBOs and their members want to continue benefiting from a credit program, they must repay their loans.

7.6 Conclusion

This chapter has shown that smallholder farmers' access to credit is crucial for increasing their productivity through intensification of the use of inputs. The chapter has also examined the extent to which FBOs improve smallholder farmers' access to credit. The analysis in the chapter has shown that access to credit is relatively low among smallholder farmers, as financial services providers do not find the smallholder agricultural sector attractive because of its high risks (e.g. dependency on rainfall).

It was also found that FBOs largely rely on external agencies for credit, although a few FBOs can generate internal income through collective activities for their members to borrow. It also indicates that credit access is relatively low for both FBO members and non-members, although FBO members have better access because government and NGOs use FBOs to deliver credit to smallholder farmers.

The chapter has argued that the way in which FBOs are founded to participate in credit programs – that is, whether credit is disbursed through government or NGO programs – is critical for credit recovery. It shows that there is a high rate of loan repayment default among FBO members under government credit programs, compared with NGO programs, not only because smallholder farmers treat credit from government as handouts, but also because of poor supervision and monitoring of loans.

The chapter also contends that the formation of FBOs to deliver credit to smallholder farmers alone would not guarantee improved credit delivery and loan repayment. It has demonstrated that when FBOs have weak leadership and little in the way of collective activities, loan recovery requires the effective participation of the loan providers in educating the FBO members, ensuring timely delivery of loans, supervising and monitoring loan use and undertaking recovery itself. It has further argued that the effective participation of loan providers is necessary in the early stages of FBO

development to nurture them into becoming strong local institutions that will take up those responsibilities when they mature. This is particularly necessary at the current stage of FBO development, as the motivation for the majority of smallholder farmers to participate in FBOs is mainly to receive tangible resources such as inputs and cash. The utmost attention must therefore be paid to ensure a strong relationship between FBOs and their members on the one hand and credit providers on the other.

CHAPTER EIGHT

CONCLUSION: UNDERSTANDING THE EXTENT TO WHICH FBOs MAKE A DIFFERENCE AMONG SMALLHOLDER FARMERS

8.1 Introduction

This study set out to explore the extent to which farmer-based organisations (FBOs) improve smallholder agriculture in Ghana, particularly in respect of smallholder farmers' access to extension services, inputs and credit. The research was guided by the notion that improved knowledge of and access to agricultural extension services, inputs and credit play important roles in improving the overall productivity of smallholder agriculture (World Bank 2007; Chang 2012; Hazell & Rahman 2014) and examined the roles that FBOs play in this process. Central to this thesis was the aim of understanding whether, and to what extent, smallholder farmers' membership of FBOs improves their access to extension services, inputs and credit, with special attention to understanding the factors that shape the performance of FBOs in this process.

As pointed out in Chapter 1, smallholder farmers in Ghana and many developing countries in sub-Saharan Africa (SSA) constitute the majority of the population and are often geographically dispersed, which makes it difficult for governments and other development agencies with limited resources to improve their access to extension services, inputs and credit (GOG 2007). A key theoretical assumption has been that smallholder farmers, when organised into FBOs, would improve their ability to access services through collective action (Rondot & Collion 2001; World Bank 2007; Bernard *et al.* 2008; Hazell & Rahman 2014). Some key arguments have been that FBOs would provide collective voice to smallholder farmers and reduce their transaction costs of accessing services, as well as serving as collateral security for smallholder farmers to acquire credit (Rondot & Collion 2001; Stockbridge, Dorward & Kydd 2003; GOG 2007; World Bank 2007; Bernard *et al.* 2008; Hazell & Rahman 2014). Consequently, Ghana and many developing countries witnessed significant investment in the

development of FBOs. In Ghana, such investment has led to a continuous growth in the population of FBOs, but it remained unclear whether FBOs make a significant difference in the way smallholder farmers' access extension services, inputs and credit.

To answer this key research question, the study adopted a mixed-methods approach to data collection and analysis. One method of data collection involved questionnaires administered to 240 smallholder farmers (both FBO members and non-members), mainly to measure whether membership of FBOs improves access to extension services, inputs and credit. However, a propensity score matching technique (PSM) was applied on the sample of 240 smallholder farmers, which was reduced to 226 to ensure that the sampling approach used in selecting the FBO members and non-members was robust to allow for a comparison between FBO members and non-members. The use of PSM technique was not intended to provide analysis of paired individual farmers' outcomes but rather to ensure a comparison between FBO members and non-members.

Another method was semi-structured interviews with 90 smallholder farmers, 12 government officials and four NGO officials, mainly to understand the factors that shape the performance of FBOs. The study has also utilised a variety of secondary sources, including survey dataset on FBOs in 2010 by the International Food Policy Research Institute (IFPRI) and credit programs data from government agencies and NGOs, as well as documentation from FBOs themselves. The data analysis has therefore utilised both quantitative and qualitative approaches. The quantitative data analysis has involved both descriptive and inferential statistics, such as frequencies, percentages, means, cross-tabulation and multiple regressions. The qualitative approach to analysis has utilised thematic analysis and descriptions.

In relation to the question of whether FBO membership improves smallholder farmers' access to extension services, inputs and credit, the thesis has shown a positive but rather limited relationship between FBO membership and access to these services. This thesis

has presented three main arguments to explain the limited role of FBOs in improving smallholder farmers' access.

First, the thesis has argued that government and NGOs play key roles in the formation of the majority of FBOs, but pay little attention to building the governance and management structures of FBOs, which are critical for undertaking internal collective activities. Consequently, the majority of FBOs have a weak leadership and governance structure in place and therefore are unable to undertake effective collective activities, such as mobilising their members to receive or demand extension services and joint purchase of inputs.

Second, the ways in which external agencies organise smallholder farmers to participate in FBOs (usually through projects and programs) gives the general impression among smallholder farmers that FBOs are mainly institutions to receive 'handouts' such as inputs, grants and credit, rather than organisations to undertake internal collective activities for the benefit of all members. These perceptions have adverse effects on the intensity of internal collective activities in FBOs, even when smallholder farmers themselves form the FBOs.

Third, I have argued that the majority of external agencies involved in the development of FBOs often fail to nurture them into stronger organisations through regular supervision and monitoring of their activities. Despite the widespread belief among government, donors and NGOs that FBOs are important institutions with the ability to improve smallholder agriculture in developing countries (World Bank 2007), they are often used largely as a transmission belt to deliver irregular and short-term services to smallholder farmers. This means that while FBOs are key partners in the advancement of smallholder agriculture, the way they have been set up and developed undermines their capacity to undertake internal collective activities without the intervention of government and NGOs.

The above arguments differ significantly from the extant literature on collective action in agricultural development, which often explains the performance of FBOs and related organisations based on their membership size and the extent of homogeneity or heterogeneity among the members. In the remainder of this concluding chapter of the thesis, I highlight the above findings and arguments in detail. I begin by focusing on the questions of whether, and to what extent, FBO membership improves smallholder farmers' access to extension services, inputs and credit, as well as the factors that shape the performance of FBOs (Section 8.2). Next, I discuss the implications of the findings for both theory (Section 8.3) and policy (Section 8.4). The theoretical discussions highlight how the key findings of this thesis relate to the broader conceptual and theoretical debates on the role of collective action in smallholder agricultural development. In particular, I discuss the underlying political, cultural, social and economic factors that shape FBO outcomes. The policy implications highlight the need for investments in building the management and governance capacities of FBOs. The thesis is then rounded off with some suggestions for possible future research.

8.2 Improving smallholders' access to extension services, inputs and credit: the role of FBOs

The main empirical findings of this study are contained in Chapters 4–7. This section ties together the empirical findings on the question of whether, and to what extent, FBOs improve smallholder farmers' access to extension services, inputs and credit. The analysis in the thesis has shown that FBOs do lead to improvements. Figure 8.1 brings together data that I have already discussed in Chapters 5–7. In particular, it pulls together the proportions of smallholder farmers who accessed extension services, inputs and credit based on whether they are FBO members or non-members.

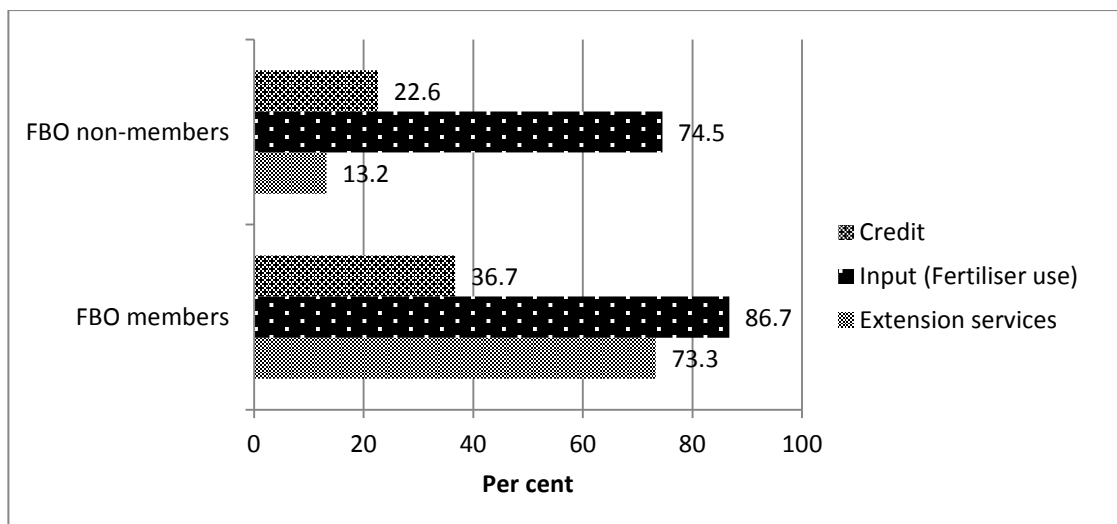


Figure 8.1. Access to extension services, fertiliser and credit

Source: Author's calculation from fieldwork data

Figure 8.1 shows that about 73% of the FBO members surveyed accessed extension services in the 2012 farming season (April–October), compared to 23% for FBO non-members. It also shows that about 87% of FBO members surveyed used fertiliser in their farms in the 2012 farming season, compared to 75% of FBO non-members. Finally, while about 37% of FBO members surveyed had accessed credit within the 3 years immediately preceding this study, only about 23% of FBO non-members had done so. These percentages suggest that FBOs are better at improving smallholder farmers' access to extension services and inputs (fertiliser), as compared to credit. While the majority of FBO members accessed extension services and inputs, this thesis argued that their access is limited. I examine this argument in detail in the following subsections.

8.2.1 Improving access to extension services

With reference to the roles of FBOs in improving smallholder farmers' access to extension services, the study first explored the question of how frequently smallholder farmers receive extension services from agricultural extension agents (AEAs). A key conclusion from such an analysis was that the majority of smallholder farmers receive extension services that fall short of their expectations; for example, approximately 76% of all surveyed smallholder farmers indicated that they either sometimes (about 39%) or

never (about 37%) received extension services. It is important to note that all the farmers who indicated that they had never received extension services were FBO non-members, which shows that FBO membership is an important step in accessing extension services (Chapter 5). This supports Bratton's (1986a) finding in Zimbabwe that farmers' membership of farmer organisations is a major factor in explaining their high level of contact with AEAs.

While FBO membership is important for smallholder farmers' access to extension services, the study has shown that FBO membership does not guarantee optimum access to extension services. Indeed, more than half of the surveyed FBO members (about 54%) indicated that they sometimes get services, which implies that they receive extension services that fall short of their expectations. Regarding the actual number of times AEAs visited all of the surveyed smallholder farmers, the findings showed an average of one visit during the 2012 farming season (April–October). While visiting farmers only once during a season may appear inadequate, a recent study has shown that receiving at least one extension visit per year reduces the likelihood of being poor by 10% (Dercon *et al.* 2009). However, the study has shown that the AEA visits to smallholder farmers favour those who belong to FBOs. The study indicated a sharp difference between FBO members and non-members regarding the average number AEA visits they get in the farming season (0.2 visits for FBO non-members and 2.71 visits for FBO members).

In view of the large difference between FBO members and non-members in terms of the average number of visits they get from AEAs, the study has further examined three important issues. First, it has explored the differences among FBO members regarding their frequencies of extension access and revealed that FBO leaders get more extension services as compared to the ordinary members. The thesis has offered at least two main explanations for the unequal excess to extension services among FBO members. It has argued that the majority of FBOs have weak leadership, who find it difficult to organise their members to participate in extension meetings. The advantage that FBO leaders have over the other members is that the leaders are usually the first contact for AEAs

when providing extension services. Due to weak leadership and poor organisational skills, the leaders would often have their extension meetings with AEAs alone, as they had failed to organise their members to participate. This weak leadership in FBOs is exacerbated by the fact that FBO leaders are often not rewarded (either in kind or cash) for services they provide to their organisations, thereby providing little or no incentive to mobilise their members for collective activities (see Chapter 4). The other explanation given for the disproportionate access to extension services among FBO members is the over-reliance of AEAs on FBO leaders to implement extension-related projects, which results in frequent visits to the leaders (see Chapter 5).

Second, the thesis has examined whether participating in FBOs ensures optimal access to extension services, and concludes that FBO membership does not necessarily lead to adequate access even among FBO leaders (see Chapter 5). As observed, when AEAs are assigned to farming villages, they are expected to visit each village on a fortnightly basis during the farming season, but the analysis in this study showed that their visits to FBO members in those villages fall far short of expectations. It is important to explain this shortfall, especially as about 96% of the surveyed FBO members indicated that they know at least one AEA from whom they can request extension advice. The thesis explains this shortfall largely in relation to the capacity of FBOs and AEAs. A key argument here is that as most FBOs have weak leaders, they are disadvantaged in their ability to organise themselves and demand extension services from AEAs. These features of FBOs imply that they are several steps away from becoming independent institutions that generate and deliver extension service for their members (GOG 2010). This is particularly the case given that smallholder farmers largely perceived FBOs as institutions with opportunities to receive extension services, inputs and credit from government and NGOs, rather than institutions that would enable them to make a collective effort to acquire or demand them. The evidence in the study has also shown that the majority of AEAs have limited resources to organise regular extension meetings with FBOs. Most AEAs use their personal motorbikes to make extension visits to

farming villages and this limits the number of visits they make to FBO members (see Chapter 5). Here, the analysis indicates the need for effective government – what Green (2008) has called the ‘effective state’ – to facilitate the provision of adequate resources to AEAs, as they are pivotal in the delivery of extension services to smallholder farmers.

Third, I have examined the factors that influence smallholder farmers’ access to extension services beyond FBOs through regression analysis, and have found that the number of AEAs smallholders know, on whom they can rely for extension advice, is significant in explaining the intensity of smallholder farmers’ access to extension. The findings show that non-FBO smallholder farmers are more likely to intensify their access to extension services if the community has an AEA, which implies the need to increase both the number of FBOs and AEAs to achieve effective extension delivery. Other factors that have a strong and significant impact on access to extension services include access to TV, farmers’ years of education and the distance of farmers from extension centres (see Chapter 5).

8.2.2 Improving access to inputs

This thesis has also recognised that smallholder farmers’ access to extension services alone is not enough to ensure sustained productivity-led agricultural growth. They also need, among others, inputs such as seeds and fertiliser to realise the full potential of the extension services that they have received or learnt from AEAs (Norton 2004). As many consider FBOs as local organisations with a great potential to improve smallholder farmers’ access to inputs in developing countries (GOG 2007; World Bank 2007), the study has examined the question of whether FBOs improve smallholder farmers’ access to inputs and has found the following. First, the majority of the FBOs surveyed (about 80%) were unable to purchase inputs collectively for their members, a situation that is contrary to the belief that when smallholder farmers participate in FBOs, they are more likely to jointly purchase inputs (GOG 2007; World Bank 2007). As noted earlier in Section 8.2.1, the majority of the FBOs could not undertake joint purchase of inputs because of weak leadership and lack of active participation of their members.

Smallholder farmers mainly perceived FBOs as institutions through which to receive free inputs from external agencies rather than institutions that would ensure cost-effective and timely acquisition of inputs. Similarly, the argument that FBOs can provide collateral to their members to purchase inputs on credit from private-sector input dealers (World Bank 2007; Birner & Resnick 2010) is not common among the surveyed FBOs. This is because there is a general ‘lack of trust between FBOs and input dealers due to inadequate repayment of credit’.¹²²

Second, we should note that FBO members may receive inputs (such as seeds, fertiliser, herbicide and insecticides) from outsiders, as about 62% of the FBO members surveyed indicated that they received at least one form of input from government and NGOs, either as grants or credit (see Chapter 6). On the contrary, none of the FBO non-members I surveyed received any form of inputs from government and NGOs, which means that smallholder farmers have little or no chance of receiving inputs from external organisations such as government and NGOs if they do not belong to FBOs. In spite of the above advantage that FBO members have over their non-FBO counterparts, the study has pursued further enquiries in order to understand the intensity of use of inputs between FBO members and non-members, with a focus on seeds, fertiliser and herbicides, which are the most common inputs.

In relation to the use of certified seeds, the study has found that the likelihood of using certified seeds among FBO members (55%) is more than twice that for FBO non-members (25%). The thesis has argued that this difference between them is due largely to the fact that when distributing certified seeds under government and NGO projects, AEAs tend to target FBO members (Ragasa *et al.* 2013a). Nonetheless, this research maintains that the relatively low use of certified seeds among smallholder farmers is constrained by their low level of awareness of seed availability, their unwillingness to change to new seeds, the relatively high prices of the seeds and inadequate credit available to purchase them, as well as the existence of poor seed production and

¹²² Interview with NGO in the Northern Region, 12/06/2013.

distribution systems (Langyintuo *et al.* 2010). Thus, FBOs would not necessarily improve smallholder farmers' access to, and use of, certified seeds within a framework of poor seed production and distribution systems.

With reference to fertiliser, the evidence has shown that fertiliser use is relatively high among both FBO members (88%) and FBO non-members (77%). The thesis has argued that the relatively high level of fertiliser use among smallholder farmers is due to the high importance farmers attach to fertiliser for increasing their yields. However, it should be noted that the fact that the majority of smallholder farmers indicate that they use fertiliser does not necessarily suggest a high intensity of usage; the study has therefore examined whether there are variations in the intensity of fertiliser use between FBO members and non-members. The results show a significant difference between FBO members and non-members regarding the average quantities of fertiliser they used per hectare in the 2012 farming season (see Section 6.3.3). While FBO members used on average about 41 kilograms of fertiliser per hectare, their non-FBO counterparts used 30 kilograms per hectare. This study has argued that the difference in the intensity of fertiliser use between FBO members and non-members is largely due to the preference of government and NGOs to implement their fertiliser programs through FBOs (see Section 6.2). Under such programs, the price of a bag of fertiliser (50 kilograms) is lower than the prices on the open market (see Section 6.3.3).

This implies that the high intensity of fertiliser use among FBO members is not necessarily the outcome of their internal collective activities, but occurs mainly because outsiders use FBOs to implement their programs. When outsiders target FBOs in their fertiliser programs, they not only improve FBO members' access to fertiliser but it also affords them the opportunity to buy the fertiliser at relatively cheaper prices and some cases on a credit basis. Results from regression analysis suggest that beyond membership of FBOs, smallholder farmers with more years of education are likely to use more fertiliser, compared to farmers with fewer years in education. This finding corroborates the available empirical evidence that shows years of education to have a

positive association with levels of adoption of technology (see, e.g., Foster & Rosenzweig 1996; Abdulai & Huffman 2005).

Regarding herbicides, the analysis has shown that the use of herbicides was high in both FBO members (93%) and FBO non-members (81%). The study has noted that the high use of herbicides is explained by smallholder farmers' easy access to cheap herbicides from China (Ragasa *et al.* 2013a). Herbicides are also more affordable for farmers compared to fertiliser (see Section 6.3.3). The study has found no significant difference between FBO members and non-members concerning the average quantity of herbicide used per hectare. This is not surprising, as herbicides are relatively accessible and affordable for both FBO members and non-members. This suggests that FBOs would be less significant in improving smallholder farmers to inputs, if all inputs were accessible and affordable like the herbicide. Here, regression analysis also suggests that smallholder farmers with more years in education are likely to intensify herbicide use, compared to farmers with fewer years of education. The analysis further suggested that a low price for herbicides would intensify their usage.

8.2.3 Improving adoption of technology

In addition to the above, the study has explored whether membership in FBOs enhances smallholder farmers' adoption of appropriate technology with a focus on row planning, recommended fertiliser and the application of herbicides. This line of analysis was necessary as low adoption of technologies is frequently mentioned as a major reason for low yields among smallholder farmers (Benin *et al.* 2013; Ragasa *et al.* 2013a). In addition, such analysis may provide us with insights regarding the extent to which FBO members pass on technologies they have learnt to FBO non-members, as one of the classic justifications for using FBOs to provide extension services is the belief that information about appropriate technologies is likely to filter from FBO members to FBO non-members (GOG 2007).

With reference to row planting, the results show a high level of adoption among FBO members (about 81%) as compared to FBO non-members (only 31%), which suggests

that the rate at which FBO members may pass on such knowledge to FBO non-members is low. This empirical evidence supports other studies in developing countries (e.g. Matuschke & Qaim 2009; Schipmann & Qaim 2010; Wollni *et al.* 2010) showing that group membership will lead to a high level of adoption of technologies. Among the FBO members, the results show that the adoption of row planting is higher among FBO leaders (95%) compared to ordinary members (74%). Here, the main argument is that as FBO leaders have more access to extension services as compared to the ordinary members (see Section 8.2.1), one would expect them to be more adaptable to technologies.

In relation to recommended fertiliser application, the results reveal that FBO members apply an average of two bags (50 kilograms per bag) of fertiliser per acre, which falls short of the recommended three bags. Even among the FBO leaders who have a higher intensity of fertiliser use, their application of 2.2 bags per acre also falls short of the recommended three bags. The explanation for this shortfall is not because FBO members are not aware of the recommended quantities to apply per acre, but largely due to inadequate financial resources to purchase the right quantity of fertiliser. As we have shown in this study, the majority of FBOs unfortunately do not have the capacity to improve their members' access to fertiliser beyond that offered by family relations, government and NGOs.

Finally, regarding the recommended application of herbicides, the analysis shows no significant difference between FBO members (1.26 litres) and FBO non-members (1.25 litres). The study has argued that FBOs do not make a difference in the adoption of the recommended application of herbicides among smallholder farmers because herbicides are relatively affordable and readily available on the market, compared to seeds and fertiliser.

8.2.4 Improving access to credit

This thesis has also acknowledged that access to financial resources is critical for smallholder farmers to improve their access to inputs and fully adopt agricultural

technologies (see Chapter 6; see also Norton 2004; Chang 2012). Many have argued that FBOs have a great potential to improve their members' access to credit (GOG 2007; World Bank 2007). Others have argued that FBOs would serve as collateral for their members to borrow from financial institutions, and that when lenders deliver agricultural credit through FBOs, it reduces the unit cost of loan administration and improves loan repayment through peer pressure (Tinsley 2004; World Bank 2007; Birner & Resnick 2010). Here, the study has examined three main issues.

The first concerned whether membership in FBOs improves smallholder farmers' access to credit. Of the 40 FBOs surveyed, less than half of them (about 40%) indicated that their members had received credit from external sources such as government and NGOs within the 3 years immediately preceding the survey. While many of the smallholder farmers were unwilling to provide credit information, partly for fear of undermining their own chances of securing credit if full disclosures were made, the study found that FBO members and non-members differed significantly in many respects (see Chapter 7). First, while family relations (relatives) are the most important source of credit for FBO non-members, banks tend to be the main source for FBO members. Unsurprisingly, whereas only 24% of FBO non-members held bank accounts, a remarkable 55% of FBO members did, which indicates an appreciable level of awareness among FBO members on the need to open bank accounts to improve their chances of accessing credit in the formal financial sector. Second, the results show that smallholder farmers can access credit from government and NGO programs if they belong to FBOs, as no single FBO non-member surveyed received credit from such sources. Third, more than two thirds of FBO non-members (74%) had no knowledge of the procedures for accessing formal credit, while about half of the FBO members (54%) had no such knowledge. Several FBO members reported unavailability of collateral and high interest rate charges as the reasons why they could not access credit, although it has often been argued that FBOs can guarantee for loans for their members (World Bank 2007). This thesis has argued that obtaining formal credit (e.g. from banks) goes beyond FBO membership, as many

banks have minimum deposit requirements that are too high for many FBOs to meet (see Section 7.4).

The second major issue explored in the study in relation to credit was the view that FBOs can lend to their members from income internally generated through collective activities (World Bank 2007). The study has found that the majority of the surveyed FBOs do not provide internal credit to their members. Of the 40 FBOs surveyed, only 20% offered credit services to their members on an *ad hoc* basis. Credit to FBO members is not only *ad hoc* but, also, the amounts of money involved are small, and may only be enough to purchase a bag (50 kilograms) of fertiliser or pay for the cost of ploughing an acre (see Chapter 7). I have argued that relying on FBOs' internally generated funds as a main source of credit for members is not a viable option for improving smallholder farmers' access to credit, since many cannot generate income through internal collective activities.

The final issue examined was in relation to the conditions that shape the performance of FBOs in improving credit delivery among smallholder farmers. In particular, the study has examined whether FBOs have the capacity to reduce loan default rates, as loan recovery from smallholder farmers has been disappointing in the past few decades (Bratton 1986b; World Bank 2007). Here, the thesis has argued that the ways in which FBOs are used for credit delivery – that is, whether through government or NGO programs – matters in credit recovery. The analysis shows that there is a high rate of loan repayment default among FBO members under government credit programs compared with NGO programs.

In relation to government credit programs with FBOs, while recognising the negative effects of bad weather, the thesis has argued that systematic political interference results in a low level of loan repayment, as farmers regard the loans as gifts, especially when the FBO members support the ruling party (see Section 7.5.1). In Zambia, Tinsley (2004) also observed that politicians seeking votes would often inform farmers that they

simply did not have to repay loans if they were elected into office, because the loans would be gifted by the government. In addition, the finding in Chapter 7 shows that the late release of credit to FBO members by government agencies accounts for poor loan repayment. This is partly because the majority of the FBOs that were studied did not have the capacity to facilitate the timely delivery of credit to their members. In addition, the study has revealed that government agencies in charge of FBO credit schemes do not undertake adequate supervision and monitoring. The study maintains that, at their current level of development, the majority of the FBOs do not have effective leadership to manage the use of credit and enforce strict sanctions for members who default (see Chapters 4 and 7). This therefore requires credit providers to participate actively in monitoring and supervising loan investment.

Indeed, the evidence in Chapter 7 has shown that NGO credit programs with FBOs are relatively successful with loan repayment for at least three important reasons. First, NGOs pay special attention to educating FBO members in the understanding that loans are not free. This is particularly important, as one of the primary motivations for smallholder farmers who participate in FBOs is to access grants or gifts. Second, the study has found that compared with government programs, NGO credit programs deliver credit on a timely basis because of less bureaucracy. Third, unlike government credit programs, NGOs recognise the weak leadership in FBOs and therefore pay special attention to supervising and monitoring loan use as well as credit recovery. The main argument is that because FBOs have weak leadership and little in the way of internal collective activities, loan recovery requires the effective participation of the loan providers in educating the FBO members, ensuring timely delivery of loans, supervising and monitoring loan use, undertaking recovery itself and punishing loan defaulters. Here, the thesis has argued that the effective participation of loan providers is necessary in the early stages of FBO development to nurture them into strong local institutions that will take up those responsibilities when they mature.

8.3 Theoretical and conceptual implications

In this section, I highlight how the key findings of this thesis relate to the broader conceptual and theoretical debates on the role of collective action in agricultural development, especially smallholder agriculture. The discussion here also reflects the usefulness of the conceptual framework outlined in Chapter 2 to the broad literature. This section begins with a discussion on how the research findings can shape our understanding on forming FBOs and nurturing them into sustainable organisations. Next, the section relates the findings to key arguments about the characteristics of membership-based farmer organisations and their likelihood of influencing outcomes in collective action. The central focus here is to evaluate theories that emphasise that the membership size of farmer organisations, and how the homogeneity and heterogeneity of the membership shapes their collective activities.

8.3.1 Forming FBOs and nurturing their capacity for sustainable development

In Chapters 1 and 2, I pointed out that many governments, donors and NGOs set up FBOs to deliver services to smallholder farmers in a more cost-effective way (Uphoff & Wijararatna 2000; World Bank 2007). However, those in favour of minimising the cost of service delivery to smallholder farmers through FBOs appear to neglect the fact that considerable effort is needed to establish effective FBOs that are not passive receivers of services but, rather, organisations that can undertake internal collective activities to facilitate the delivery of cost-effective services.

This study argues that the approaches that many external agencies use to recruit smallholder farmers to participate in FBOs leave farmers with the impression that FBOs are mainly passive institutions to receive external support, rather than institutions that provide avenues for internal collective activities. The findings in this study have shown that when forming FBOs, many external agencies spend little time on training and building the skills of the members, because these agencies are often under pressure to form FBOs quickly to meet project objectives (see Chapter 4). This results in the formation of FBOs whose members largely perceive them as passive institutions for

receiving external support. In addition, FBOs that are formed hastily, with inadequate attention to the underlying patterns of the social, economic and cultural conditions of smallholder farmers, will be short-lived (Stringfellow *et al.* 1997). This thesis therefore contends that external agencies that pay attention to building the collective capabilities of FBOs during their formation stage are likely to help to develop organisations that will survive and work for their members beyond the lifespan of the projects. This argument is in line with Cook and Chambers (2007), who argued that FBOs are likely to be short-lived if they rely largely on external support for their activities and not on their internal investment and resources.

The discussions in this study have also shown that the majority of FBOs are formed through government and NGO projects, which often have predetermined goals. The problem with this approach is that when external agencies set up FBOs to achieve their predetermined goals (Rondot & Collion 2001), they are most likely to form FBOs that lack clearly defined objectives, especially if the FBOs rely on the external agents to act collectively.

The thesis has further explained that when external agencies form FBOs, they automatically create a series of internal costs (such as skills, time and money) within the FBOs, which the members must bear. When the external agencies fail to recognise that smallholder farmers do not have the experience and skill to work collectively on a regular basis to achieve their common interests, the FBOs formed may disappear when the agencies leave (Stockbridge, Dorward & Kydd 2003). Uphoff and Wijararatna (2000) and Pretty and Ward (2001) therefore remind us that external agencies that seek to incorporate farmers' knowledge in the formation of FBOs are more likely to sustain the activities of FBOs after the end of projects. In view of the above, this thesis has argued that successful collective action in FBOs is associated with their governance and managerial capacity. This line of argument is consistent with the finding of Ostrom (1990), Ostrom and Varughese (2001) and Bernard *et al.* (2008), who show a link between governance styles and the success of FBOs.

The evidence in this study has shown that FBO leaders are crucial for the effective performance of FBOs. They must possess the technical expertise, drive and managerial skills (World Bank 2007) to be able to mobilise their members for internal collective activities and link them to service providers at the local, district, regional and national levels. This study has shown rather weak leadership and poor rule enforcement in FBOs (see Chapter 4). This is partly because the majority of the leaders I studied did not have any formal education (see Chapter 4). Similar studies in SSA attribute the weak leadership in FBOs to a low level of formal education (Barham & Chitemi 2009; Bernard *et al.* 2008), although Poulton, Dorward and Kydd (2010) reminds us that leaders with no formal education will perform better in FBOs if they receive suitable training. The thesis has emphasised that weak leadership in FBOs affects their members' access to extension services, inputs and credit. In particular, I argue that FBO members' limited access to these services is partly due to their leaders' inability to mobilise their members to undertake collective activities. Without effective leaders who can communicate and mobilise their members, the notion that organised groups of smallholder farmers will have greater credibility in seeking for external support such as financial services and extension services (Penrose-Buckley 2007) will continue to be a mirage. As Day and Schyns (2010) note, good exchange and agreements between leaders and their members are more likely to lead to the attainment of organisational goals.

As discussed in Chapter 4, the enforcement of FBO rules and regulations is poor. Yet, strict enforcement of these rules is critical for effective collective action (Ostrom 1990; World Bank 2001; Poteete, Janssen & Ostrom 2010). The study argues that rule enforcement is poor in FBOs largely because the rules are often alien to them. External agents often write up rules for FBOs without actively engaging their members in the process. The problem with this approach is that FBOs operate with rules that their members do not understand and own. They mainly accept such rules because they want to receive support. This line of thinking is evident in Ostrom's extensive work on

common-pool resources, when she argues that group members are better able to understand and adapt rules that they create themselves than those that outsiders impose on them (see, e.g., Ostrom 1990, 1995). External agencies must help FBO members to create their own rules. Meinzen-Dick *et al.* (2002) argue for outsiders to strike a balance between modern and traditional styles of governance in FBOs in rural communities.

The key point to note here is that while external agencies are important in the development of FBOs, they may not help much in the development of sustainable FBOs if little effort is put into building the skills and interests of the FBO members to participate actively in internal collective activities – what Green (2008) has called the ‘effective citizens’. This is because FBOs and their members may have little or no stake in maintaining their organisational structures through collective activities after external intervention ends (Cooke & Kothari 2001; Upton 2008). External agencies could stimulate internal collective action in FBOs in two ways at the very least. First, they must pay attention to developing the collective capabilities of FBOs and their members by involving them in the acquisition of services rather than making FBOs passive receivers of services. FBOs with active collective activities are likely to engage well with external agencies for services and assume some degree of responsibility for their members. Second, they must realise that FBOs need considerable support at the early stage of their development and have to be nurtured over a longer period until they have matured in order to engage in active collective activities on a sustainable basis. The effectiveness of FBOs in helping smallholder farmers should be based on the slow building of their members’ skills and capabilities, as well as fostering changes in their attitudes and beliefs.

8.3.2 Does FBO membership size and composition matter?

In Chapter 2, I reviewed arguments about how FBO membership size and composition influence the outcome of collective action (see, e.g., Olson 1965; Rondot & Collion 2001; Kaganzi *et al.* 2009). In this section, I highlight the contribution of the thesis to

this ongoing debate, with a focus on FBO membership size and the homogeneity/heterogeneity of their members.

8.3.2.1 FBO membership size

Contrary to the widespread conclusion in the literature on collective action – that farmer groups with small memberships are more likely to be effective and have positive outcomes (Olson 1965, 1990; Coulter *et al.* 1999) – this thesis contends that the size of farmer groups does not matter unless the group has an effective governance and management structure in place. However, the regression analysis in Chapter 6 suggests that an increase in membership size of FBOs is likely to increase their members' intensity of fertiliser use.

While there is ongoing debate as to what constitutes a small membership, Wanyama *et al.* (2014) suggest a group size of 20–40 members as most suitable for successful collective action in agricultural marketing. The average membership size for the FBOs I studied ranges from 33 to 36 (see Chapter 4).¹²³ Approximately 52% of the FBOs surveyed in this study have membership numbers of no more than 30, yet the research findings from Chapters 4 to 7 point to key limitations regarding the performance of FBOs in improving their members' access to extension services, inputs and credit. The evidence in this study does not support the argument that rule enforcement will be easier in smaller groups because these groups have higher internal cohesion and therefore find it easier to organise for collective action (Coulter *et al.* 1999; Wanyama *et al.* 2014). While the transaction costs of organising FBO members would be lower in smaller groups (Stockbridge, Dorward & Kydd 2003), this thesis maintains that rule enforcement will be poor in FBOs with a small membership if they have weak leadership as well as the existence of rules that are alien to the members.

¹²³ Fieldwork data for this study and the 2010 IFPRI survey put the average size of FBOs at 33 and 36 members, respectively.

This implies that management inefficiencies are not limited to just larger FBOs, as Wanyama *et al.* (2014) suggested. If small-sized FBOs do not undertake collective activities such as the joint purchase of farm inputs, regular meetings and regular payment of membership dues (see Chapter 4), they are unlikely to become strong organisations to improve the wellbeing of their members. Thus, no matter how small the FBO membership may be, the members will not initiate internal collective activities for their own benefit if they perceive their organisation as a passive one through which government and NGOs deliver support such as inputs, credit and extension services to them. Similarly, it is often argued that FBOs with a small membership will have homogenous members and that this can ensure effective collective action (Ostrom 1990, 2000), which I discuss further in the section below.

8.3.2.2 Heterogeneity or homogeneity of members

Again, the review in Chapter 2 has shown contrasting empirical and theoretical views about the role that homogeneity or heterogeneity of FBO membership plays in successful collective action. Principal elements in this debate have been the composition of FBOs in relation to age, wealth and ethnicity or family relations.

For instance, Meinzen-Dick and colleagues have observed in India that rule enforcement is easier for organisations whose membership comes from the same neighbourhood or other social sphere, and conclude that social heterogeneity makes communication, cooperation and the enforcement of rules more difficult (Meinzen-Dick, Raju & Gulati 2002). In contrast, this study has shown in Chapter 4 that the FBOs studied largely had homogenous membership in relation to age, ethnicity or kinship and economic activity, and yet this did not lead to effective rule enforcement and collective action. Homogenous FBO membership will be ineffective in their collective activities if they have a weak organisational structure, weak leaders and rules that are alien to them. In contrast with Meinzen-Dick *et al.* (2002), Berdegue (2002) observed in Chile that close

and homogenous social relations prevented FBO members from enforcing rules for fear of alienating friends and neighbours.

In addition, the findings in Chapter 4 have shown that FBOs are largely male-dominated, have relatively elderly membership (average age of 48 years) and consist of people from the same kinship, and that the members mainly cultivate food crops such as cereals. However, this did not lead to effective collective action, which supports Ostrom and Varughese (2001) when they argue that heterogeneity of group membership does not affect collective action. This study finds that what is important for effective collective action is good institutional design, such as timely investment and creating better rules for collective activities. If FBOs have good institutional design, one can overcome the issue of heterogeneity in the membership. Although the FBOs in this study largely have homogenous membership, their performance is below optimum levels regarding improving their members' access to extension services, inputs and credit, because they suffer from bad institutional design.

8.4 Policy implications

The empirical findings and theoretical arguments presented in this thesis have important implications for the development of FBOs to improve smallholder agriculture in Ghana and other developing countries. This section highlights some key policy implications of the research findings.

First, although policy documents in Ghana and elsewhere have hailed FBOs as instrumental in improving smallholder farmers' access to extension services, inputs and credit (GOG 2007; World Bank 2007), evidence from this thesis points to the fact that their development in Ghana in terms of the policy and legislative frameworks is still in its infancy (see Chapter 4). While some have cautioned that over-regulation could affect the development of FBOs (Shiferaw, Obare & Muricho 2008), in the case of Ghana, there are no clear legal and policy frameworks as to who should establish FBOs, what is required to establish them and how they should function. The seven-decade-old 1968 Cooperative Societies Decree is still the main legislation that guides the activities of

FBOs, but this piece of legislation is outdated, as it gives the Registrar of the Department of Cooperatives (DOC) substantial powers that impede the development of autonomous FBOs (Salifu, Francesconi & Kolavalli 2010). Today, government agencies, NGOs and farmers themselves can establish FBOs without any recourse to the current legislation (see Chapter 4). This may not only result in the establishment of weak FBOs, but it also becomes difficult to harmonise, monitor and supervise their activities, and thereby to evaluate their performance. I describe the current structure of FBOs from the village to the national level as a loosely structured network of convenience (see Chapter 4), as such a structure is not borne out of strategic planning and implementation.

Second, the analyses in this thesis also show that most FBOs were initiated through government and NGO projects (see Chapters 5–7). The majority of the FBOs, however, do not appear to survive well beyond the lifespan of the projects (see Chapter 4), which means that they are largely agents of outsiders, rather than institutions that represent the true interests of smallholder farmers. The effect of this is that we are only witnessing the establishment of FBOs, but not necessarily developing them into stronger local institutions with strong governance structures and effective internal collective activities that will improve their members' access to the inputs and outputs markets. In this regard, long-term programs are needed, that have a strong focus on nurturing the collective capabilities of FBOs. Instead of establishing FBOs as passive institutions to receive support, we should develop them to engage in internal collective activities (such as joint purchase of inputs, production and marketing) that would make them sustainable as well as link their members to the inputs and outputs markets. For instance, in relation to inputs, the evidence shows that FBOs largely do not have the capacity to acquire inputs collectively from input dealers. Their reliance on government and NGOs to provide them with inputs will not lead to sustainable access to inputs and adoption of technology (Adesina *et al.* 2014). We should note that government and NGOs often provide such inputs through various projects to improve smallholder farmers' use of inputs within a relatively short period. Continued membership of such FBOs after the exit of the

projects will not lead to improved access to inputs if the FBOs are not linked to inputs markets, such as private-sector and commercial inputs dealers.

Third, the analysis has also demonstrated that agricultural extension agents (AEAs) play a pivotal role in the development of FBOs. However, AEAs are not only limited in number but also have inadequate resources to discharge their duties. This points to the need to increase the number of AEAs and the resources they need as well as improve their knowledge and skills to develop sustainable FBOs, which are oriented towards collective action. While the government or state has an important role to play in this respect, it should work in collaboration with NGOs and private-sector organisations.

Fourth, evidence in this research (see Chapters 4 and 7) shows that politicisation of the formation and activities of FBOs significantly affects their performance. In the case of credit, for example, we observed that when there is political colouration in credit disbursement through FBOs, it leads to high default rates. While the government (the state) should still play a pivotal role in the provision of credit to FBOs and their members, government credit programs must be devoid of political colouration. Government should collaborate with NGOs and private-sector organisations to implement their credit programs in such a way that FBOs will not regard credit as a gift or a reward for votes. As this study has shown, when NGOs implement credit programs, FBOs and their members rarely default, largely because they recognise them as non-political institutions. The NGOs also actively monitor and supervise the investment of credit by the farmers (see Chapter 7). Efforts should be made to change the mindsets of smallholder farmers to the effect that support through FBOs is not free.

Fifth, the evidence in the research has shown that FBOs have become the main channels through which government and NGOs provide extension services, inputs and credit to smallholder farmers, and that smallholder farmers who do not participate in FBOs are largely constrained from accessing such services. This points to the need to encourage

broad-based participation of smallholder farmers in FBOs, particularly in relation to accessing extension services.

Finally, it is important we recognise that in the foreseeable future, smallholder agriculture will continue to be the major source of livelihood for the majority of people in Ghana and many developing countries in SSA. Smallholder farmers will continue to be the primary producers of food. Transforming smallholder agriculture will therefore be a major step towards poverty reduction as well as ensuring food security and economic growth. While developing FBOs is a key option to transform the smallholder agriculture – as this study has shown that collective action among smallholder farmers improve their access to extension services, inputs and credit – it is important to note that FBOs' effectiveness requires 'effective state' and 'active citizenship' (Green 2008). This is because FBOs at their current level of development can neither generate agricultural knowledge through research nor transmit the knowledge to smallholder farmers to propel productivity-led growth without the active involvement of the state through effective extension services, among others. Similarly, the limited level of education among FBO members, their limited access to financial services as well as their inadequate access to, and affordability of, inputs needs effective state that will facilitate active participation of relevant stakeholders. The limited level of collective activities in FBOs implies the need for measures that make smallholder farmers to recognise that FBOs are not merely institutions to receive 'handouts' but rather institutions that provide opportunities for active collective actions. Smallholder farmers' active participation in FBOs is critical to improve significantly their access to extension services, inputs and credit, which will ultimately lead to improved productivity, poverty reduction and food security among them.

8.5 Directions for future research and conclusions

While the findings of this study are important for both theoretical or conceptual development as well as policy formulation, the scale of this study was limited to two out the ten administrative regions of Ghana, largely due to time and funding limitations

associated with doctoral research. The number of FBOs and smallholder farmers studied in those two regions were also somewhat limited. Therefore, future research could expand the scale of the research to include more FBOs and smallholder farmers as well as more administrative regions.

In addition, as discussed in Chapter 4, FBOs in Ghana take a variety of forms, ranging from informal to formal FBOs, village-level to national-level FBOs, and production to multipurpose FBOs, as well as those formed by farmers themselves, to those formed by external agencies. This research has focused on village-level FBOs, whose members' primary activity is the production of food crops such as cereals. It is therefore significant for future research to consider the performance of other types of FBOs, such as marketing FBOs, agro-processing FBOs, district-level FBOs, regional-level FBOs and national-level FBOs. Like many studies in SSA, future research in Ghana may also examine the performance of FBOs in high-value and cash crops such as cocoa.

Chapter 7 of this research has also shown that credit recovery among FBO members is better under NGOs' credit programs as compared to government programs. It would be useful for future research to compare in detail the general performance of FBOs created by governments and NGOs and the factors that shape their performance. Another area identified for future research involves comparing the performance of male-only FBOs to female-member FBOs, to understand the extent to which gender shapes performance.

Finally, an avenue for future research could be to examine whether FBO membership improves the productivity of smallholder farmers. Although improved access to extension services, inputs and credit is likely to improve productivity, research that incorporates measuring the productivity of FBO members is essential.

In conclusion, this thesis has shown that while smallholder farmers' participation in FBOs improves their access to extension services, inputs and credit, their access to these services is rather limited. The thesis has argued that the limited roles that FBOs play in improving smallholder farmers' access relate largely to their governance and

management structure and the internal collective capabilities of the members, as well as their motivations for participating in FBOs. The study argues that when external institutions that form FBOs pay little attention to building their organisational structures and leadership capacities, this results in FBOs that are passive, with weak leadership and no clear objectives. The thesis maintains that collective activities such as demanding extension services will remain limited in FBOs if their leaders do not have the experience and skills to mobilise their members to undertake collective activities, irrespective of how small or how homogenous the membership may be. Organisational structures such as good rules that ensure that FBOs invest time in collective activities are important for their success.

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APPENDICES

Appendix 1: List of interviewees (government and NBO officials)

No.	Name	Designation and Institution
1.	Mr. Alhassan Mahama	Deputy Programmes Manager of the Presby Agricultural Station, Mile 7, Tamale
2.	Mr. Edward Agbomlie	Agricultural Extension Agent of Akuapim North District, Eastern Region
3.	Mr. Habib Haruna	General Manager, SEND FiNGO at Salaga in Northern Region
4.	Mr. Ibrahim Abudu	Agricultural Extension Agent at Walewale in the West Mamprusi District, Northern Region
5.	Mr. Gabriel Owusu	FBO Coordinator at the Directorate of Agricultural Extension Services, MOFA
6.	Mr. Wekem Raymond Avatim	Program Officer, Eastern Corridor Livelihood Security Promotion Programme (ECLSPP), SEND-Ghana at Salaga, Northern Region
7.	Mr. Imoro Ziblim	Agricultural Extension Agent in East Gonja District, Northern Region
8.	Mr. Issac Amissah	Agriculture Extension Officer at New Tafo in the East Akim District, Eastern Region
9.	Mr. Issahaku Mohammed Haadi	Project Officer of Care International at Tamale in the Northern Region
10.	Mr. Jerry Bismark Wuver	Agricultural Extension Officer in the Akwapim South District at Nsawam, Northern Region

11.	Mr. Joseph Oliver Nkansa	Agricultural Extension Agent at Nkurankan in the Yilo Krobo District, Eastern Region
12.	Mr. Luke Nayi	Desk Officer in Charge of FBO Development at the Northern Regional Agricultural Development Unit (RADU)
13.	Mr. Michael Asomani-Adem	Project Manager, Commercialisation of Agriculture, Millennium Development Authority,
14.	Ms. Ogechi Mbah	Agricultural Extension Agent in the Tolon-Kumbungu District, Northern Region
15.	Mr. Razak Zakaria	Agricultural Extension Agent at Tamale in the Tamale Metropolis, Northern Region
16.	Mr. Theophilus Osei Owusu	Deputy Director, Agricultural Extension, Communication and Development Management, MOFA at Accra

Appendix 2: Surveys/questionnaires

Appendix 2.1: Survey for leaders of FBOs

ID: Questionnaire identification

Name	
ID1. NAME OF FBO	
ID2. REGION	
ID3. DISTRICT	
ID4. TOWN/VILLAGE	
ID5. DATE	

CR: Characteristics of respondent

Name		
CR1. RESPONDENT		
CR2. GENDER		[Code 1]
CR3. POSITION		[Code 2]
CR4. EDUCATION		[Code 3]
CR5. OCCUPATION OTHER FARMER		
CR6. AGE		

Code 1: Gender	Code 2: Position	Code 3: Education	Code 4: Literacy level
1. Male	1. Chairperson	1. None	1. Can't read, write or speak
2. Female	2. Secretary	2. Primary	2. Can speak
	3. Treasurer	3. Middle/JSS	3. Can write
	4. Organiser	4. Vocational	4. Can write
	5. Vice-chairperson	5. 'O' Level/SSS	
	6. Ordinary member	6. 'A' Level	
		7. Training College	
		8. Technical/Professional	
		9. Tertiary	

CR7	How many years of farming experience do you have?				
CR8	Do you have access to radio?				<i>I = Yes, 0 = No</i>
CR9	Do you own a mobile phone?				<i>I = Yes, 0 = No</i>
CR1	Do you have access to TV?				<i>I = Yes, 0 = No</i>
CR1	Are you a household head?				<i>I = Yes, 0 = No</i>
CR1	What is your level of literacy in English Language?				<i>[Code 4]</i>

FC: FBO characteristics and activities (purpose and activities of FBO)

FC1	What year was your FBO established?				<i>Year</i>
FC2	Is the FBO registered?				<i>I = Yes, 0 = No</i>
FC3	If yes, which year was it registered?				<i>Year</i>
FC4	If yes, which institution is your FBO registered with?				<i>[Code 5]</i>
FC5	If yes, why did you register it?				<i>[Code 6]</i>
FC6	Does your FBO have a bank account?				<i>I = Yes, 0 = No</i>
FC7	How much money is in the bank account?				<i>GHC</i>
FC8	What are the main sources of income for your FBO bank account? 1. Entrance fee 2. Membership dues 3. Profit from group activities 4. External support 5. _____ 6. _____				
FC9	What is the current total membership of your FBO?				
FC10	How many of the current members are females?				
FC11	On whose initiative was the FBO established?				<i>[Code 7]</i>
FC12	What was the main/original purpose for which your FBO was formed?				<i>[Code 8]</i>
FC13	What are the current collective activities undertaken by your FBO?				<i>[Code 9]</i>
FC14	Which of the collective activities has your FBO stopped doing?				<i>[Code 9]</i>
FC15	What is the main reason why the FBO stopped doing such collective activities?				<i>[Code 12]</i>
FC16	Do non-members participate in any of the collective activities?				<i>I = Yes, 0 = No</i>
FC17	If yes, which activities?				<i>[Code 9]</i>
FC18	Has the FBO received any external support in the past 3 years?				<i>I = Yes, 0 = No</i>
FC19	If yes, from whom?				<i>[Code 10]</i>
FC20	List the names of all organisations or individuals the FBO has received support from: 1. _____				

	2. _____
	3. _____
	4. _____
FC21	If yes, which type of external support? [Code 11]

Code 5: Institution FBO is registered

- 1 MOFA
- 2 DOC
- 3 Registrar General's Department
- 4 District Assembly
- 5 Union/Apex body
- 6 Other
(specify: _____)

Code 6: Main reasons for registering FBO

- 1 To access to credit
- 2 For opening bank account
- 3 Requirement of government
- 4 NGO/donor requirement
- 5 Other
(specify: _____)

Code 7: Initiative to establish FBO

- 1 Member (s)
- 2 Agricultural Extension office
- 3 NGOs/donors
- 4 DOC
- 5 Chief/traditional leader
- 6 Political leader
- 7 Other
(specify: _____)

Code 8: Main reason for establishing FBO

- 1 To get access to grants
- 2 To get access to credit
- 3 To get access to market
- 4 To get access to extension service
- 5 Joint production
- 6 labour sharing
- 7 Other (specify: _____)

Code 12: Reasons for halting a collective activity

1. Not beneficial to members
2. Disagreements in the FBO
3. No more external support
4. Don't have the expertise
5. Other (specify: _____)

Code 9: Collective activities of FBO

- 1 Joint production
- 2 Joint processing
- 3 Joint marketing
- 4 Joint inputs purchase
- 5 Labor exchange
- 6 Micro-credit scheme
- 7 Welfare services
- 8 Community development
- 9 Other
(specify: _____)

Code 10: Provider of external support

- 1 Government agency
- 2 NGO/donor
- 3 Private-sector organisation/individual
- 4 Other
(specify: _____)

Code 11: Type of support

- 1 Training in FBO management
- 2 Extension (training in production and storage)
- 3 Grant (cash)
- 4 Credit (cash/kind)
- 5 Free access to farm inputs
- 6 Free access to equipment
- 7 Market services (certification)
- 7 Other (specify: _____)

I now want to know the assets owned by your FBO. Write zero if the FBO does not own a particular item

	Item	No. of items	Source of items [Code 13]
FC22	Office		
FC23	Chairs		
FC24	Hoe		
FC25	Cutlass		
FC26	Mattocks		
FC27	Dibbler		
FC28	Sickle		
FC29	Head pan/basket		
FC30	Pots for storage		
FC31	Cribs/barns		
FC32	Room storage		
FC33	Sacks		
FC34	Knapsacks		
FC35	Motorised spraying machine		
FC36	Water pump		
FC37	Tractor		
FC38	Carts		
FC39	Planter		
FC40	Harvester		
FC41	Rice mill		
FC42	Corn mill		
FC43	Palm extractor		
FC44	Other (specify: _____)		
FC45	Other (specify: _____)		

Code 13: FBO source of item

1. Bought by FBO
2. Rented by FBO
3. Provided by government
4. Provided by NGO
5. Provided by a private individual
6. Other (specify _____)

Section A. Members' landholdings and reasons for joining FBO

I would like to ask you a few questions about your landholdings and crops

A	How do you get land for agricultural purposes?				[Code 14]
A	What is your total landholding size?				Acres
A	What is the total size of your land currently under cultivation?				Acres
A	Have you increased your total land size for cultivation over the past 3 years?				I = Yes, 0 = No

A	If yes, what was the total size of your land before you increased it?				Acres
A	If yes, why did you increase your land size?				[Code 15]
A	What are the three major crops you cultivated in the last season?				[Code 16]

Code 14: FBO source of land	Code 15: Reason for increasing farm size	Code 16: Main crop
1. Rent/lease 2. Buy	1. Had more free land 2. Had access to more credit	1. Maize 2. Rice
3. Sharecropping 4. Family owned	3. Because I acquired new technologies 4. To make more profit	3. Sorghum 4. Pineapple
5. Community land	5. Other (specify: _____)	5. Cassava
6. Government land		6. Plantain
7. Other (specify _____)		7. Cocoa
		8. Yams
		9. Other (specify _____)

I would like to ask you a few questions about the reasons why you joined this FBO

A8	For how many years have you been a member of this FBO?				
A9	How much did you pay before joining the group? (Write zero if you paid nothing)				GHC
A10	Do you pay dues?				1 = Yes, 0 = No
A11	How much dues?				
A12	How often do you pay dues? 1. Once a week 2. Once a month 3. One a year 4. Irregular (pay due if FBO needs to do something) 5. Other _____				
A13	What were the main reasons why you joined the FBO?				[Code 17]
A14	Have you received any personal external support since you joined the group?				1 = Yes, 0 = No
A15	If yes, what kind of external support have you received?				[Code 18]
A16	Are you a member of other groups apart from the FBO?				1 = Yes, 0 = No
A17	If yes, what kind of groups?				[Code 19]

A18	How often do you participate in the activities of the FBOs? 1. Once a week 2. Once a month 3. Once every 3 months 4. Other (Specify _____)	
A19	How many times have you participated in the activities of the group in the past 4 months?	

Code 17: Main reason for joining the FBO 1. To get access to grants 2. To get access to fertiliser, seeds and agrochemicals 3. To get access to credit 4. To get access to market 5. To get access to extension service 6. Joint production 7. Labour sharing 7. Other (specify: _____)	Code 18: Type of support 1. Extension services 2. Fertiliser, seeds and agrochemicals 3. Grant (cash) 4. Credit (cash/kind) 5. Subsidised inputs 6. Free access to equipment 7. Other (specify: _____)	Code 19: Members of other groups 1. Religious groups 2. Labour groups 3. Micro-finance groups 4. <i>Susu</i> groups 5. Other (specify: _____)
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Section B. Access to extension services

I would now like to know about your access to agricultural extension in your community

B1	Is there an agricultural extension centre in your community?			<i>1 = Yes, 0 = No</i>
B2	Is there an agricultural extension officer in your community?			<i>1 = Yes, 0 = No</i>
B3	How far is the closest agriculture extension centre from your community?			<i>Miles</i>
B4	How many agriculture extension officers do you know in your community from whom you can get support?			
B5	Did you have contact with any extension officer over the last season?			<i>1 = Yes, 0 = No</i>
B6	If yes, how many personnel?			
B7	If yes, how many times have you met the extension personnel in the last season?			
B8	In which way does an extension personnel contact you?			<i>[Code 20]</i>
B9	What is your mode of meeting an extension officer for training?			<i>[Code 21]</i>
B10	Mention three main services that extension officers provide to you			<i>[Code 22]</i>
B11	Which of the following best describes your situation regarding the provision of extension services?			<i>[Code 23]</i>

Code 20: Mode of meeting extension officer	Code 21: Meeting place of extension officer	Code 22: Main service officer provides	Code 23: Assessment of extension service
1. Meet me alone at my farm	1. At my farm	1. Row planting	1. Always get services
2. Meet the FBO members	2. FBO farm	2. Record keeping	2. Usually get services
3. Meet any group of farmers in the community	3. Farm of any FBO member	3. Use of herbicides	3. Sometimes get services
4. Other (specify _____)	4. Extension office	4. Use of pesticides	4. Never get services
	5. Any member of the community farm	5. Fertiliser application	
	6. At community centre	6. Harvesting techniques	
	7. Other (specify: _____)	7. Post-harvest techniques	
		8. Investigate a specific problem	
		9. Information on new technology	
		10. Use of high-yielding variety	
		11. Other (specify: _____)	

Section C. Adoption of technology and input use

I would like to know your use of the following inputs over the past season (write 0 if no use)

	Items	List crops	No. of acres	Quantity used	Source of item (code 24)	Amount spent (GHC)
C1	Certified seeds/high yield varieties					
C2	Improved planting materials					
C3	Inorganic fertiliser					
C4	Manure					
C5	Pesticides/insecticides					
C6	Herbicides					

Code 24: Member source of inputs

1. Bought by myself
2. Family property

3. Acquired through the FBO
4. Provided by government
5. Provided by NGO
6. Provided by a private individual
7. Other (specify _____)

I would like to know the extent to which you used the following technology over the last season

	Items	No. of times	No. of acres
C11	Planting techniques (rows)		
C12	Recommended plant population		
C13	Recommended fertiliser application		
C14	Recommended pesticide application		
C15	Recommendation herbicide application		
C16	Use of organic manure		
C17	Harvesting techniques		
C18	Post-harvest storage and handling		

I would now like to know your record keeping strategies regarding farming activities

C19	Do you keep farm records?		<i>1 = Yes, 0 = No</i>
C20	If yes, why do you keep records?		<i>[Code 25]</i>
C21	What kind of records do you keep?		<i>[Code 26]</i>
C22	How do you keep your records?		<i>[Code 27]</i>

Code 25: Reasons for keeping records	Code 26: Types of records	Code 27: Ways of keeping records
1. To keep track of expenditure	1. Calendar (e.g. time of planting)	1. Simple book keeping
2. To keep track of revenues	2. Expenditure on inputs	2. Recording on walls
3. To know whether I make a profit	3. Expenditure on land preparation	3. Someone keeps records for me
4. Extension officer requirement	4. Yields on farms	4. FBO member keeps records
5. Other (specify _____)	5. Other _____	5. Other _____

Code 28: Reasons for not accessing credit	Code 29: Sources of credit	Code 30: Use of credit
1. Do not have access to bank	1. Bank	1. Buy inputs (fertiliser, chemicals)
2. Do know the procedure to get credit	2. Government project	2. Rent or buy land
3. No collateral	3. NGO project	3. Cost of land preparation
4. High interest rate	4. Relatives	4. Saved in my bank account
	5. <i>Susu</i> group	5. Buy food and clothing
	7. FBO	6. Petty trade
	8. Rotation savings	7. Pay ward's school fee
	9. Trader/inputs dealer	8. Organise wedding/funeral
5. Other _____	10. Others _____	9. Other _____ _____

I would now like to know about your access to grants (in kind) over the past 3 years

D15	In the past 3 years have you received any grant in kind?	
D16	If yes, what was the source of the grant?	
D17	If yes, what did you use the grant for?	
D18	If yes, what type of grant did you receive?	
	Year1 _____ item _____ quantity _____	
	Year2 _____ item _____ quantity _____	
	Year3 _____ item _____ quantity _____	

1 = Yes, 0 = No

[Code 31]

[Code 33]

GHC

Code 31: Source of grant	Code 32: Use of grant (cash)	Code 33: Use of grant (kind)
1. Government project 2. NGO project 3. Private individual 4. Other _____	1. Buy inputs (fertiliser, chemicals) 2. Rent or buy land 3. Cost of land preparation 4. Saved in my bank account 5. Buy food and clothing 6. Petty trade 7. Pay ward's school fee 8. Organise wedding/funeral 9. Other _____	1. Cultivating crops 2. Rearing animals 3. Trading 4. Home consumption 5. Other _____

Section E. General question

E1	Overall, how would you describe your access to extension services and inputs? 1. Worse 2. Better 3. Best 4. No change	
E2	As an FBO member, among the following, which one would say you benefit from most? 1. Access to credit 2. Access to grants 3. Access to extension services 4. Access to fertiliser 5. Access to improved seeds 6. Access to agrochemicals	

Appendix 2.2: Survey for ordinary members of FBOs

ID: Questionnaire identification

Name	
ID1. NAME OF FBO	
ID2. REGION	
ID3. DISTRICT	
ID4. TOWN/VILLAGE	
ID5. DATE	

CR: Characteristics of respondent

Name	
CR1. RESPONDENT	
CR2. GENDER	
CR4. EDUCATION	
CR5. OCCUPATION OTHER FARMER	
CR6. AGE	

[Code 1]

[Code 2]

CR7	How many years of farming experience do you have?	
CR8	Do you have access to radio?	
CR9	Do you own a mobile phone?	
CR10	Do you have access to TV?	
CR11	Are you a household head?	
CR12	What is your level of literacy in English Language?	

1 = Yes, 0 = No

1 = Yes, 0 = No

1 = Yes, 0 = No

1 = Yes, 0 = No

[Code 3]

Code 1: Gender	Code 2: Education	Code 3: Literacy level
1. Male 2. Female	1. None 2. Primary 3. Middle/JSS 4. Vocational 5. 'O' Level/SSS 6. 'A' Level 7. Training college 8. Technical/professional 9. Tertiary	1. Can't read, write or speak 2. Can speak 3. Can write 4. Can write

Section A. Members' landholdings and reasons for joining FBO

I would like to ask you a few questions about your landholdings and crops

A1	How do you get land for agricultural purposes?				[Code 4]
A2	What is your total landholding size?				Acres
A3	What is the total size of your land currently under cultivation?				Acres
A4	Have you increased your total land size for cultivation over the past 3 years?				1 = Yes, 0 = No
A5	If yes, what was the total size of your land before you increased it?				Acres
A6	If yes, why did you increase your land size?				[Code 5]
A7	What are the three major crops you cultivated in the last season?				[Code 6]

Code 4: FBO source of land	Code 5: Reason for increasing farm size	Code 6: Main crop
1. Rent/lease 2. Buy 3. Sharecropping 4. Family owned 5. Community land 6. Government land 7. Other (specify _____)	1. Had more free land 2. Had access to more credit 3. Because I acquired new technologies 4. To make more profit 5. Other (specify: _____)	1. Maize 2. Rice 3. Sorghum 4. Pineapple 5. Cassava 6. Plantain 7. Cocoa 8. Yams 9. Other (specify _____))

I would like to ask you a few questions about the reasons why you joined this FBO

A8	For how many years have you been a member of this FBO?			
A9	How much did you pay before joining the group? (Write 0 if you paid nothing)			
A10	Do you pay dues?			
A11	How much dues?			
A12	How often do you pay dues? 6. Once a week 7. Once a month 8. One a year 9. Irregular (pay dues if FBO needs to do something) 10. Other _____			
A13	What were the main reasons why you joined the FBO?			
A14	Have you received any personal external support since you joined the group?			
A15	If yes, what kind of external support have you received?			
A16	Are you a member of other groups apart from the FBO?			
A17	If yes, what kind of groups?			
A18	How often do you participate in the activities of the FBOs? 5. Once a week 6. Once a month 7. Once every 3 months 8. Other (Specify _____)			
A19	How many times have you participated in the activities of the group in the past 4 months			

GHC
1 = Yes, 0 = No

[Code 7]
1 = Yes, 0 = No

[Code 8]
1 = Yes, 0 = No

[Code 9]

Code 7: Main reason for joining the FBO	Code 8: Type of support	Code 9: Members of other groups
1. To get access to grants	1. Extension services	1. Religious groups
2. To get access to fertiliser, seeds and agrochemicals	2. Fertiliser, seeds and agrochemicals	2. Labour groups
3. To get access to credit	3. Grant (cash)	3. Micro-finance groups
4. To get access to market	4. Credit (cash/in kind)	4. <i>Susu</i> groups
5. To get access to extension service	5. Subsidised inputs	5. Other (specify: _____)
6. Joint production	6. Free access to equipment	_____)
7. Labour sharing	7. Other (specify: _____)	
7. Other (specify: _____)		

Section B. Access to extension services

I would now like to know about your access to agricultural extension in your community

B1	Is there an agricultural extension centre in your community?				<i>1 = Yes, 0 = No</i>
B2	Is there an agricultural extension officer in your community?				<i>1 = Yes, 0 = No</i>
B3	How far is the closest agriculture extension centre from your community?				<i>Miles</i>
B4	How many agriculture extension officers do you know in your community from whom you can get support?				
B5	Did you have contact with any extension officer over the last season?				<i>1 = Yes, 0 = No</i>
B6	If yes, how many personnel?				
B7	If yes, how many times have you met the extension personnel in the last season?				
B8	In which way does an extension personnel contact you?				<i>[Code 10]</i>
B9	What is your mode of meeting an extension officer for training?				<i>[Code 11]</i>
B10	Mention three main services extension officers provide to you				<i>[Code 12]</i>
B11	Which of the following best describes your situation regarding the provision of extension services?				<i>[Code 13]</i>

Code 10: Mode of meeting extension officer	Code 11: Meeting place of extension officer	Code 12: Main service officer provides	Code 13: Assessment of extension service
1. Meet me alone at my farm	1. At my farm	1. Row planting	1. Always get services
2. Meet the FBO members	2. FBO farm	2. Record keeping	2. Usually get services
3. Meet any group of farmers in the community	3. Farmer of any FBO member	3. Use of herbicides	3. Sometimes get services
4. Other (specify _____)	4. Extension office	4. Use of pesticides	4. Never get services
	5. Any member of the community farm	5. Fertiliser application	
	6. At community centre	6. Harvesting techniques	
	7. Other (specify: _____)	7. Post-harvest techniques	
		8. Investigate a specific problem	
		9. Information on new technology	
		10. Use of high-yielding variety	
		11. Other (specify: _____)	

Section C. Adoption of technology and input use

I would like to know your use of the following inputs over the past season (write 0 if no use)

	Items	List crops	No. of acres	Quantity used	Source of item (code 14)	Amount spent (GHC)
C1	Certified seeds/high yield varieties					
C2	Improved planting materials					
C3	Inorganic fertiliser					
C4	Manure					
C5	Pesticides/insecticides					
C6	Herbicides					

Code 14: Member source of inputs

1. Bought by myself
2. Family property
3. Acquired through the FBO
4. Provided by government
5. Provided by NGO
6. Provided by a private individual
7. Other (specify _____)

I would like to know the extent to which you used the following technology over the last season

	Items	No. of times	No. of acres
C11	Planting techniques (rows)		
C12	Recommended plant population		
C13	Recommended fertiliser application		
C14	Recommended pesticide application		
C15	Recommended herbicide application		
C16	Use of organic manure		
C17	Harvesting techniques		
C18	Post-harvest storage and handling		

I would now like to know your record keeping strategies regarding farming activities

C19	Do you keep farm records?		<i>1 = Yes, 0 = No</i>
C20	If yes, why do you keep records?		<i>[Code 15]</i>
C21	What kind of records do you keep?		<i>[Code 16]</i>
C22	How do you keep your records?		<i>[Code 17]</i>

Code 15: Reasons for keeping records	Code 16: Types of records	Code 17: Ways of keeping records
1. To keep track of expenditure	1. Calendar (e.g. time of planting)	1. Simple book keeping
2. To keep track of revenues	2. Expenditure on inputs	2. Recording on walls
3. To know whether I make a profit	3. Expenditure on land preparation	3. Someone keeps records for me
4. Extension officer requirement	4. Yields on farms	4. FBO member keeps records
5. Other (specify _____)	5. Other _____	5. Other _____

Section D. Farmers' access to credit and grants

I would now like to know about your access to credit over the past 3 years

D1	Do you have a bank in your community?		<i>1 = Yes, 0 = No</i>
D2	How far is the closest bank in your community?		<i>Miles</i>
D3	Do you have a personal bank account?		
D4	In the past 3 years have you received any credit in cash?		<i>1 = Yes, 0 = No</i>
D5	If no, why are you unable to access credit?		<i>[Code 18]</i>
D6	If yes what was the source of the credit?		<i>[Code 19]</i>
D7	If yes, how much credit did you receive? Year1 _____ Year2 _____ Year3 _____		<i>GHC</i>
D8	If yes, what did you use the credit for? Year1 _____ Year2 _____ Year3 _____		<i>[Code 20]</i>
D9	How much was the interest rate (%)? Year1 _____ Year2 _____ Year3 _____		

D10	What was the duration of the credit repayment?		<i>Months</i>
	Year1 _____		
	Year2 _____		
	Year3 _____		

Code 18: Reasons for not accessing credit	Code 19: Sources of credit	Code 20: Use of credit
1. Do not have access to bank	1. Bank	1. Buy inputs (fertiliser, chemicals)
2. Do know the procedure to get credit	2. Government project	2. Rent or buy land
3. No collateral	3. NGO project	3. Cost of land preparation
4. High interest rate	4. Relatives	4. Saved in my bank account
	5. <i>Susu</i> group	5. Buy food and clothing
	7. FBO	6. Petty trade
	8. Rotation savings	7. Pay ward's school fee
	9. Trader/inputs dealer	8. Organise wedding/funeral
5. Other _____	10. Others _____	9. Other _____

I would now like to know about your access to grant (cash) over the past 3 years

D11	In the past 3 years have you received any grant in cash?				<i>1 = Yes, 0 = No</i>
D12	If yes, what was the source of the grant?				<i>[Code 21]</i>
D13	If yes, what did you use the grant for?				<i>[Code 22]</i>
D14	If yes, how much grant did you receive?				<i>GHC</i>
	Year1 _____				
	Year2 _____				
	Year3 _____				

I would now like to know about your access to grants (in kind) over the past 3 years

D15	In the past 3 years have you received any grant in kind?		<i>I = Yes, 0 = No</i> <i>[Code 21]</i> <i>[Code 23]</i> <i>GHC</i>
D16	If yes, what was the source of the grant?		
D17	If yes, what did you use the grant for?		
D18	If yes, what type of grant did you receive?		
	Year1 _____ item _____ quantity _____		
	Year2 _____ item _____ quantity _____		
	Year3 _____ item _____ quantity _____		

Code 21: Source of grant	Code 22: Use of grant (cash)	Code 23: Use of grant (kind)
1. Government project	1. Buy inputs (fertiliser, chemicals)	1. Cultivating crops
2. NGO project	2. Rent or buy land	2. Rearing animals
3. Private individual	3. Cost of land preparation	3. Trading
4. Other _____	4. Saved in my bank account	4. Home consumption
	5. Buy food and clothing	5. Other _____
	6. Petty trade	
	7. Pay ward's school fee	
	8. Organise wedding/funeral	
	9. Other _____	

Section E. General question

E1	Overall, how would you describe your access to extension services and inputs?	
	<ol style="list-style-type: none"> 1. Worse 2. Better 3. Best 4. No change 	
E2	As an FBO member, among the following, which one would you say you benefit from most?	
	<ol style="list-style-type: none"> 1. Access to credit 2. Access to grants 3. Access to extension services 4. Access to fertiliser 5. Access to improved seeds 6. Access to agrochemicals 	

Appendix 2.3: Survey for non-members of FBOs

ID: Questionnaire identification

Name	
ID2. REGION	
ID3. DISTRICT	
ID4. TOWN/VILLAGE	
ID5. DATE	

CR: Characteristics of respondent

Name	
CR1. RESPONDENT	
CR2. GENDER	
CR3. EDUCATION	
CR5. OCCUPATION OTHER FARMER	
CR6. AGE	

[Code 1]

[Code 2]

Code 1: Gender	Code 2: Education	Code 3: Literacy level
1. Male 2. Female	1. None 2. Primary 3. Middle/JSS 4. Vocational 5. 'O' Level/SSS 6. 'A' Level 7. Training college 8. Technical/professional 9. Tertiary	1. Can't read, write or speak 2. Can speak 3. Can write 4. Can write

CR7	How many years of farming experience do you have?	
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CR8	Do you have access to radio?		<i>1 = Yes, 0 = No</i>
CR9	Do you own a mobile phone?		<i>1 = Yes, 0 = No</i>
CR10	Do you have access to TV?		<i>1 = Yes, 0 = No</i>
CR11	Are you a household head?		<i>1 = Yes, 0 = No</i>
CR12	What is your level of literacy in the English language?		<i>[Code 3]</i>

Section A. Farmers' landholdings

I would like to ask you a few questions about your landholdings and crops

A1	How do you get land for agricultural purposes?		<i>[Code 4]</i>
A2	What is your total landholding size?		<i>Acres</i>
A3	What is the total size of your land currently under cultivation?		<i>Acres</i>
A4	Have you increased your total land size for cultivation over the past 3 years?		<i>1 = Yes, 0 = No</i>
A5	If yes, what was the total size of your land before you increased it?		<i>Acres</i>
A6	If yes, why did you increase your land size?		<i>[Code 5]</i>
A7	What are the three major crops you cultivated in the last season?		<i>[Code 6]</i>

Code 4: FBO source of land	Code 5: Reason for increasing farm size	Code 6: Main crop
1. Rent/lease 2. Buy 3. Sharecropping 4. Family owned 5. Community land 6. Government land 7. Other (specify _____)	1. Had more free land 2. Had access to more credit 3. Because I acquired new technologies 4. To make more profit 5. Other (specify: _____)	1. Maize 2. Rice 3. Sorghum 4. Pineapple 5. Cassava 6. Plantain 7. Cocoa 8. Yams 9. Other (specify _____)

I would like to know if you belong to any form of group or network

A16	You said you are not a member of any FBO; do you belong to any other group?		<i>1 = Yes, 0 = No</i>
A17	If yes, what kind of groups?		<i>[Code 7]</i>

Code 7: Members of other groups

1. Religious groups
2. Labour groups
3. Micro-finance groups
4. *Susu* groups
5. Other (specify: _____)

Section B. Access to extension services

Code 8: Mode of meeting extension officer	Code 9: Meeting place of extension officer	Code 10: Main service officer provides	Code 11: Assessment of extension service
<ol style="list-style-type: none"> 1. Meet me alone at my farm 2. Meet the FBO members 3. Meet any group of farmers in the community 4. Other (specify _____) 	<ol style="list-style-type: none"> 1. At my farm 2. FBO farm 3. Farm of any FBO member 4. Extension office 5. Any member of the community farm 6. At community centre 7. Other (specify: _____) 	<ol style="list-style-type: none"> 1. Row planting 2. Record keeping 3. Use of herbicides 4. Use of pesticides 5. Fertiliser application 6. Harvesting techniques 7. Post-harvest techniques 8. Investigating a specific problem 9. Information on new technology 10. Use of high-yielding variety 11. Other (specify: _____) 	<ol style="list-style-type: none"> 1. Always get services 2. Usually get services 3. Sometimes get services 4. Never get services

I would now like to know about your access to agricultural extension in your community

B1	Is there an agricultural extension centre in your community?				<i>I = Yes, 0 = No</i>
B2	Is there an agricultural extension officer in your community?				<i>I = Yes, 0 = No</i>
B3	How far is the closest agriculture extension centre from your community?				<i>Miles</i>
B4	How many agriculture extension officers do you know in your community from whom you can get support?				
B5	Did you have contact with any extension officer over the last season?				<i>I = Yes, 0 = No</i>
B6	If yes, how many personnel?				
B7	If yes, how many times have you met the extension personnel in the last season?				
B8	In which way does an extension personnel contact you?				<i>[Code 8]</i>
B9	What is your mode of meeting an extension officer for training?				<i>[Code 9]</i>
B10	Mention three main services extension officers provide to you				<i>[Code 10]</i>
B11	Which of the following best describes your situation regarding the provision of extension services?				<i>[Code 11]</i>

Section C. Adoption of technology and input use

I would like to know your use of the following inputs over the past season (write 0 if no use)

	Items	List crops	No. of acres	Quantity used	Source of item (code 12)	Amount spent (GHC)
C1	Certified seeds/high yield varieties					
C2	Improved planting materials					
C3	Inorganic fertiliser					
C4	Manure					
C5	Pesticides/insecticides					
C6	Herbicides					

Code 12: Source of inputs

1. Bought by myself
2. Family property
3. Acquired through an FBO
4. Provided by government
5. Provided by NGO
6. Provided by a private individual
7. Other (specify _____)

I would like to know the extent to which you used the following technology over the last season

	Items	No. of times	No. of acres
C7	Planting techniques (rows)		

C8	Recommended plant population		
C9	Recommended fertiliser application		
C10	Recommended pesticide application		
C11	Recommended herbicide application		
C12	Use of organic manure		
C13	Harvesting techniques		
C14	Post-harvest storage and handling		

I would now like to know your record keeping strategies regarding farming activities

C15	Do you keep farm records?		<i>1 = Yes, 0 = No</i>
C16	If yes, why do you keep records?		<i>[Code 13]</i>
C17	What kind of records do you keep?		<i>[Code 14]</i>
C18	How do you keep your records?		<i>[Code 15]</i>

Code 13: Reasons for keeping records	Code 14: Types of records	Code 15: Ways of keeping records
1. To keep track of expenditure	1. Calendar (e.g. time of planting)	1. Simple book keeping
2. To keep track of revenues	2. Expenditure on inputs	2. Recording on walls
3. To know whether I make a profit	3. Expenditure on land preparation	3. Someone keeps records for me
4. Extension officer requirement	4. Yields on farms	4. FBO member keeps records
5. Other (specify _____)	5. Other _____	5. Other _____

Section D. Farmers' access to credit and grants

I would now like to know about your access to credit over the past 3 years

D1	Do you have a bank in your community?		<i>1 = Yes, 0 = No</i>
D2	How far is the closest bank in your community?		<i>Miles</i>
D3	Do you have a personal bank account?		
D4	In the past 3 years have you received any credit in cash?		<i>1 = Yes, 0 = No</i>
D5	If no, why are you unable to access credit?		<i>[Code 16]</i>
D6	If yes what was the source of the credit?		<i>[Code 17]</i>
D7	If yes, how much credit did you receive?		<i>GHC</i>
	Year1 _____		
	Year2 _____		

	Year3 _____	
D8	If yes, what did you use the credit for? Year1 _____ Year2 _____ Year3 _____	[Code 18]
D9	How much was the interest rate (%)? Year1 _____ Year2 _____ Year3 _____	
D10	What was duration of the credit repayment? Year1 _____ Year2 _____ Year3 _____	Months

Code 16: Reasons for not accessing credit	Code 17: Sources of credit	Code 18: Use of credit
1. Do not have access to bank	1. Bank	1. Buy inputs (fertiliser, chemicals)
2. Do know the procedure to get credit	2. Government project 3. NGO project	2. Rent or buy land 3. Cost of land preparation
3. No collateral	4. Relatives	4. Saved in my bank account
4. High interest rate	5. <i>Susu</i> group 7. FBO	5. Buy food and clothing 6. Petty trade
5. Other _____	8. Rotation savings 9. Trader/inputs dealer	7. Pay ward's school fee 8. Organise wedding/funeral
	10. Others _____	9. Other _____

I would now like to know about your access to grant (cash) over the past 3 years

D11	In the past 3 years have you received any grant in cash?			
D12	If yes, what was the source of the grant?			
D13	If yes, what did you use the grant for?			
D14	If yes, how much grant did you receive? Year1 _____ Year2 _____ Year3 _____			

1 = Yes, 0 = No
[Code 19]
[Code 20]
GHC

Code 19: Source of grant	Code 20: Use of grant (cash)	Code 21: Use of grant (kind)
1. Government project	1. Buy inputs (fertiliser, chemicals)	1. Cultivating crops
2. NGO project	2. Rent or buy land	2. Rearing animals
3. Private individual	3. Cost of land preparation	3. Trading
4. Other _____	4. Saved in my bank account	4. Home consumption
	5. Buy food and clothing	5. Other _____
	6. Petty trade	
	7. Pay ward's school fee	
	8. Organise wedding/funeral	
	9. Other _____	

I would now like to know about your access to grants (in kind) over the past 3 years

D15	In the past 3 years have you received any grant in kind?	
D16	If yes, what was the source of the grant?	
D17	If yes, what did you use the grant for?	
D18	If yes, what type of grant did you receive? Year1 _____ item _____ quantity _____ Year2 _____ item _____ quantity _____	

1 = Yes, 0 = No
[Code 19]
[Code 21]
GHC

Section E. General question

I1	<p>Overall, how would you describe your access to extension services and inputs?</p> <ol style="list-style-type: none">1. Worse2. Better3. Best4. No change	
I2	<p>Among the following, which one would you say you have benefited from most as a farmer?</p> <ol style="list-style-type: none">1. Access to credit2. Access to grants3. Access to extension services4. Access to fertiliser5. Access to improved seeds6. Access to agrochemicals	

Appendix 3: Semi-structured Interviews

Appendix 3.1: Semi-structured interviews: interview schedule for leaders of FBOs

1. Historical development/evolution of FBO

I would like to understand briefly the history of your FBO; could you start by telling me when and how you became a leader?

What are your roles and responsibilities in your FBO as a leader?

Could you now tell me how your **FBO was established** (the main stakeholders that were involved in the process and their roles)?

What about the **roles of its founding** members?

What were the **reason(s)** for forming the FBO?

Since the establishment of your FBO, what exactly do you do as a group?

Prompt: Under this this question, explore **the areas** on which the FBO has focused its operations as well as **the nature of the operations; roles and responsibilities of members; different kinds of support it has received from external agencies.**

2. Benefits of the FBO (with a focus on extension services and inputs)

In your opinion, is it important and useful to be part of an FBO? If so, why; if not, why not?

Prompt: Explore benefits regarding material, financial resources and training.

A. Extension services

What is your experience of extension services in your community?

Prompt: Explore who provides extension services; how the services are acquired; and what types of services are provided.

What benefits do you feel you gain by accessing extension services?

Prompt: Do you gain any **knowledge** from extension services? If so, what knowledge?

Since you joined your FBO, what roles has it played with regard to the way you access extension services?

Prompt: Explore any changes regarding how often they get extension services; the **types of services provided**; the **quality of the services (knowledge)** provided; who provides the services; **how the services** are acquired including the **cost of accessing** the services.

Has the FBO made any difference to how you farm? If yes, how so? If no, why has it not?

B. Inputs (seeds, fertiliser, agrochemicals and credit)

How do you go about getting:

- a. Improved seeds
- b. Fertiliser
- c. Agrochemicals
- d. Credit

Prompt: Explore **who provides** the inputs; **the procedures/bureaucracies for acquiring the inputs.**

Does belonging to an FBO make it easier to access the following inputs? If so, in what ways does it improve access?
If not, why not?

- a. Improved seeds
- b. Fertiliser
- c. Agrochemicals
- d. Credit

Prompt: Explore any changes on **how often they access** the inputs; **sources of accessing** the inputs; **the cost of** accessing inputs.

3. Determinants of successful collective action in an FBO

I now want to understand the ingredients that you think make for a successful FBO.

First of all, I'm keen to know about the leadership of your FBO; what are the roles and responsibilities of the other leaders of your FBO?

Prompt: Explore the roles of leaders in coordinating FBO's activities (e.g. accessing extension services and inputs); their roles with external agencies.

Does your FBO interact with MOFA? If so, how is MOFA involved with your FBO?

Prompt: Explore the role of MOFA in organising and providing technical advice, financial resources (including credit), material resources (e.g. seed, fertiliser).

Do you think there are any obstacles your FBO faces in interacting with MoFA? If so, what are they?

(i.e. is it easy to interact and do business with MoFA)

Are you aware of NGOs? Are they involved with your FBO? How are they involved?

Prompt: Explore the role of NGOs in organising and providing technical advice, financial resources (including credit) and material resources (e.g. seed, fertiliser).

Do you think there are any obstacles your FBO faces in interacting with NGOs? If so, what are they?

In your view, what do you think your FBO has been successful at doing and why?

Prompt: Explore the different activities that the FBO do.

Do you feel your members are committed to the purpose and course of the FBO? If so, in what ways are they committed? If not, why not?

How do you work as a team?

Prompt: Explore how internal funds are raised and the challenges involved; how rules are crafted and implemented and the challenges involved.

Does the attitude of your FBO members affect your access to extension services? If yes, in what ways does their attitude affect access?

Does the attitude of your FBO members affect how you access/acquire the following? If so, in what ways does their attitude affect access?

- a. Improved seeds
- b. Fertiliser
- c. Agrochemicals
- d. credit

Do you have contact with MOFA at all? When and why?

How supportive do you find MOFA?

In your opinion, does your FBO's interaction with MOFA influence the way you access the following? If so, in what ways does the interaction influence access? If not, why not?

- a. Extension services
- b. Improved seeds
- c. Fertiliser
- d. Agrochemicals
- e. Credit

Prompt: Explore issues such as ability **to locate MoFA offices and interact with officials** for support, the **ability** to get MOFA's support such as extension services and inputs.

Do you have contact with NGOs at all? When and why?

How supportive do you find NGOs?

In your opinion, does your FBO's interaction with NGOs influence the way you access the following? If so, in what ways does the interaction influence access? If not, why not?

- a. Extension services
- b. Improved seeds
- c. Fertiliser
- d. Agrochemicals
- e. Credit

Prompt: Explore issues such as ability **to locate NGOs and interact with officials** for support, the **ability** to get NGOs' support such as extension services and inputs.

In your opinion, what are the key obstacles **that prevent/confront your FBO in accessing extension services?**

In your opinion, what are the key obstacles **that prevent/confront your FBO in accessing inputs?**

4. Strengthening the FBO

Is there anything the leaders of your FBO could do to improve the operations of your FBO? If so, what?

Prompt: Explore this question with a focus on how the FBO is organised to access extension and the inputs.

Is there anything that ordinary members could do to improve the operations of your FBO? If so, what?

Prompt: Explore this question with a focus on how the FBO is organised to access extension and the inputs.

Is there anything that MoFA could do better to strengthen how your FBO operates? If so, what?

Prompt: Explore this question with a focus on how the FBO is organised to access extension and the inputs.

Is there anything NGOs could do better to strengthen the way your FBO operates? If so, what?

Prompt: Explore this question with a focus on how the FBO is organised to access extension and inputs.

5. Documents to be collected from leaders of FBOs

- FBO's activities record book;
- Constitution of FBO;
- Letters indicating support from government and NGOs; and
- Any other relevant document the FBO might have.

Appendix 3.2: Semi-structured interviews: interview schedule for ordinary FBO members

1. Overview of the operations of the FBO

Could you start by telling me when and why you joined your FBO?

Do you have any particular roles or responsibilities in the FBO? If so, what are they? If not, why not?

What exactly do you as a group since you became a member?

Prompt: Under this this question, explore **the areas** the on which FBO has focused its operations as well as **the nature of the operations; roles and responsibilities of members; different kinds of support it has received from external agencies.**

2. Benefits of FBO (with a focus on extension services and inputs)

In your opinion, is it important and useful to be part of an FBO? If so, why; if not, why not?

Prompt: Explore the benefits regarding materials, financial resources and training.

A. Extension services

What is your experience of extension services in your community?

Prompt: Explore who provides extension services; how the services are acquired; and what type of services are provided.

Do you think you have gained any useful knowledge from extension services? If so, what knowledge?

Has it made any difference to how you access extension services since you joined your FBO?

Prompt: Explore any changes regarding how often they get extension services; the **types of services provided**; the **quality of the services (knowledge)** provided; who provides the services; **how the services** are acquired, including the **cost of accessing** the services.

Has the FBO made any difference to how you farm? If yes, how so? If no, why has it not?

B. Inputs (seeds, fertiliser, agrochemicals and credit)

How do you go about getting the following?

- e. Improved seeds
- f. Fertiliser
- g. Agrochemicals
- h. Credit

Prompt: Explore **who provides** the inputs; **how the inputs** are acquired.

Does belonging to an FBO make it easier to access the following inputs? If so, in what ways does it improve access? If not, why not?

- e. Improved seeds
- f. Fertiliser
- g. Agrochemicals
- h. Credit

Prompt: Explore any changes on **how often they access** the inputs; **sources of accessing** the inputs; **the cost of accessing** inputs.

Since you joined your FBO, what roles has it played with regard to the way you access and acquire the following inputs, if at all?

- i. Improved seeds
- j. Fertiliser
- k. Agrochemicals
- l. Credit

Prompt: Tell me about any changes regarding the **frequency** of getting the inputs, the **sources** of the inputs and the associated **cost of accessing** the inputs.

3. Determinants of successful collective action in an FBO

I am keen to know about the leaders of your FBO; what are the roles and responsibilities of the leaders of your FBO?

Prompt: Explore the roles of leaders in coordinating the FBO's activities, such as accessing extension services and inputs; their roles with external agencies.

Are you satisfied with roles of your leaders? If yes, in what ways? If no, why not?

Does your FBO interact with MOFA? If so, how is MoFA involved with your FBO?

Prompt: Explore the role of MOFA in organising and providing technical advice, financial resources (including credit), material resources (e.g. seed, fertiliser).

Do you think there are any obstacles your FBO faces in interacting with MOFA? If so, what are they?

Are you aware of NGOs? Are they involved with your FBO? How are they involved?

Prompt: Explore the role of NGOs in organising and providing technical advice, financial resources (including credit), material resources (e.g. seed, fertiliser).

Do you think there are any obstacles your FBO faces in interacting with NGOs? If so, what are they?

In your view, what do you think your FBO has been successful at doing and why?

Prompt: Explore the different activities that the FBO undertakes.

Do you feel your members are committed to the purpose and course of the FBO? If so, in what ways are they committed? If not, why not?

How do you work as a team?

Prompt: Explore how internal funds are raised and the challenges involved; how rules are crafted and implemented and the challenges involved.

Does the behaviour of members of your FBO affect your access to extension services? If yes, in what ways does their behaviour affect access?

Does the behaviour of members of your FBO affect how you access/acquire the following? If yes, in what ways does their behaviour affect access?

- e. Improved seeds
- f. Fertiliser
- g. Agrochemicals
- h. credit

In your opinion, does the way MOFA relates with your FBO affect the way you access the following? If so, in what ways does their relation affect access? If not, why not?

- f. Extension services
- g. Improved seeds
- h. Fertiliser
- i. Agrochemicals
- j. Credit

Prompt: Explore issues such as ability to locate MOFA offices and interact with officials for support, the ability to get MOFA's support such as extension services and inputs.

In your opinion, does the way NGOs relate with your FBO affect the way you access the following? If so, in what ways does their relation affect access? If not, why not?

- f. Extension services
- g. Improved seeds
- h. Fertiliser
- i. Agrochemicals
- j. Credit

Prompt: Explore issues such as ability to locate NGOs and interact with officials for support, the ability to get NGOs' support such as extension services and inputs.

In your opinion, what are the key obstacles **that confront your FBO in accessing extension services?**

In your opinion, what are the key obstacles **that confront your FBO in accessing inputs?**

4. Strengthening the FBO

Is there anything the leaders of your FBO could do to better the operations of your FBO? If so what?

Prompt: Explore this question with a focus on how the FBO is organised to access extension and the inputs.

Is there anything ordinary members could do to better the operations of your FBO? If so, what?

Prompt: Explore this question with a focus on how the FBO is organised to access extension and the inputs.

Is there anything MoFA could do better to strengthen your FBO operates? If so, what?

Prompt: Explore this question with a focus on how the FBO is organised to access extension and the inputs.

Is there anything NGOs could do better to strengthen the way your FBO operates? If so, what?

Prompt: Explore this question with a focus on how the FBO is organised to access extension and the inputs.

Appendix 3.3: Semi-structured interviews: interview schedule for FBO non-members

1. Perceptions of FBOs

I note that you are not a member of an FBO; can you tell me your decision not to become a member of an FBO?

Have you ever been a member of any FBO? If so, why did you leave?

Do you see any advantages of being a member of an FBO? If so, explain.

Do you see any disadvantages of being a member of an FBO? If so, explain.

Do you hear of any, or do you observe any, problems regarding those farmers who are members of FBOs? If so, explain.

Do you know much about how FBOs are governed or run? If so, explain.

Prompt: Explore how they are set up; how they function.

Do you feel that members of FBOs are committed to the purpose and course of the FBO? If so, in what ways are they committed? If not, why are they not committed?

2. Access to extension services and inputs

So now we have discussed perceptions regarding FBOs, I'm now keen to understand about how you access extension services and inputs such as fertiliser, credit, improved seeds and agrochemicals.

Extension

What is your experience of extension services in your community?

Prompt: Explore who provides extension services to them; how they go about acquiring extension services; and what type of services are provided.

Do you gain any knowledge from extension services? If so, what knowledge?

Are there any obstacles or problems you face in accessing extension? If so, what are they?

Prompt: Explore this issue in terms of frequency (how often) of access, location of service, processes and cost associated with access.

In your opinion, in what ways can your access to extension services be improved?

Prompt: Are FBOs among the options you are considering and why?

Inputs

How do you go about getting:

- a. Improved seeds
- b. Fertiliser
- c. Agrochemicals
- d. Credit

Prompt: Explore **who provides** the inputs; procedures/bureaucracies for acquiring **inputs**.

So can you tell me about any problems you face when trying to access the inputs?

Prompt: Explore this issue in terms of frequency of access, location, processes and cost associated with access.

In your opinion, what would make it easier to gain access to these inputs?

Prompt: Are FBOs among the options you are considering and why?

Appendix 3.4: Semi-structured interviews: interview schedule for government/NGO officials

1. Determinants for success in an FBO

Introduction: job qualification; job roles and responsibilities

We know that there are many FBOs in Ghana; some may work better than others, so I'm keen to know why this may be so.

What do you think are the main ingredients of a successful FBO?

Prompt: Explore the structure of the FBOs, including the characteristics of leaders and members, rules governing the FBO, ability to generate internal funds, ability of FBO to contact external agencies.

What makes an FBO successful?

What do you think are the common mistakes in the way FBOs operate or are governed?

What do you consider as the main issues that hinder the development of strong FBOs?

Prompt: Explore the major **internal issues** within FBOs that affect their operations; and the major **external issues** that affect their operations.

2. Benefits of FBOs (with a focus on extension services and inputs)

Generally speaking, what would you say are the main ways in which FBOs are contributing to smallholder agriculture?

Prompt: explore how beneficial they are to farmers, government/NGOs or even agricultural production as a whole.

Extension services

Specifically, what are the roles of FBOs in the delivery of extension services to farmers?

Prompt: Explore how providers of extension services contact FBOs, how the services are delivered through FBOs?

What kind of extension services are provided to FBOs?

Prompt: Explore the knowledge and types of messages provided to farmers.

How do you get your extension knowledge and messages?

In what ways, if any, does extension service delivery through FBOs differ from other approaches to extension?

Prompt: Explore the advantages and disadvantages **of FBOs** over other approaches to extension.

Are there any differences between farmers who belong to FBOs and those without FBOs in relation to their access to extension services? If so, what are the differences?

Prompt: Explore differences in terms of frequency of access to extension, the types and quality of services provided, and the processes involved in accessing extension services.

Inputs

Specifically, in what ways do FBOs assist farmers in acquiring the following inputs?

- a. Improved seeds
- b. Fertiliser
- c. Agrochemicals
- d. Credit

What are the main ways in which you deliver the above inputs to FBOs?

Prompt: Explore how FBOs are contacted; the sources of the inputs.

What are the main ways in which FBOs acquire the above inputs?

Prompt: Explore how input providers are contacted; the types of input providers and processes involved in acquiring the inputs.

Do you feel that FBOs improve farmers' access to the inputs? If so, in what ways do they improve access? If not, why not?

Do you think there are any differences between farmers who belong to FBOs and those who are not members in the way they access the inputs? If so, what are they?

Prompt: Explore differences in terms of the types of inputs; quality of inputs provided, and the processes involved in accessing the inputs.

3. Development of FBOs

Briefly describe to me the processes you go through when setting up or supporting FBOs.

Prompt: Explore what government/NGO needs to know about the farmers, and what resources they must possess; the requirements farmers should meet; all the relevant stakeholders involved in the process.

In your opinion, are there any useful policy interventions to improve the operation of FBOs?

Could the government do more to help FBOs? If so, what?

Could NGOs do more to help FBOs? If so, what?

In your view, what are the main collective activities that FBOs are very successful at doing? Why are they successful in such collective activities?

Specifically, what types of strategies do you put in place to ensure that FBOs are able to access extension services?

Could you explain how the leaders are chosen and trained?

Could you explain how the FBOs are monitored?

Could you explain how the FBOs are financed?

Specifically, what types of strategies do you put in place to ensure that FBOs are able to access inputs?

Could you explain how the leaders are chosen and trained?

Could you explain how the FBOs are monitored?

Could you explain how the FBOs are financed?

4. Policy context

Could you tell me any policies/strategies you know that are put in place for FBO development?

Prompt: Explore the **reasons** why FBOs are set up or supported; the different **forms of support** (i.e. technical, financial and material) with which FBOs are provided.

Are you aware of future FBO policy? If yes, when and what is likely to change? Why do you think there should be a change in FBO policy?

5. Documents to be collected from government and NGOs official (if available)

- Statistics of FBOs in the Districts;
- Various reports on FBO projects that have been implemented by government and NGOs such as progress and completion reports.

Appendix 4: Propensity score matching analysis

Case Processing Summary

Unweighted Cases ^a		N	Percent
Selected Cases	Included in Analysis	240	100.0
	Missing Cases	0	.0
	Total	240	100.0
Unselected Cases		0	.0
	Total	240	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
Non-FBO Member	0
FBO Member	1

Classification Table^{a,b}

Observed		Predicted		Percentage Correct
		Whether farmer belongs to FBO Member	FBO Member	
Step 0	Whether farmer belongs to FBO Member	0	120	.0
Overall Percentage		0	120	100.0
				50.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	.000	.129	.000	1	1.000	1.000

Variables not in the Equation

Step 0	Variables	Score	df	Sig.
	Gender	5.386	1	.020
	Age	12.151	1	.000
	Yrsoffarming	3.228	1	.072
	Ownmobile	4.262	1	.039
	headHH	5.253	1	.022
	Little12	17.094	1	.000
	Little13	16.536	1	.000
	Little14	18.694	1	.000
	Totalandsize	1.024	1	.312
	Landcultivation	3.214	1	.073
	Overall Statistics	33.426	10	.000

Omnibus Tests of Model Coefficients

Step	Step	Chi-square	df	Sig.
1	Step	36.449	10	.000
	Block	36.449	10	.000
	Model	36.449	10	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	296.261 ^a	.141	.188

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found.

Classification Table^a

Observed		Predicted		Percentage Correct
		Whether farmer belongs to FBO Member	FBO Member	
Step 1	Whether farmer belongs to FBO Member	89	31	74.2
Overall Percentage		50	70	58.3
				66.3

a. The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a Gender	.468	.499	.879	1	.348	1.597
Age	-.057	.019	9.331	1	.002	1.059
Yrsoffarming	-.024	.020	1.404	1	.236	.977
Ownmobile	-.199	.336	.352	1	.553	1.221
headHH	-.134	.444	.092	1	.762	.874
Little12	.288	.461	.391	1	.532	1.334
Little13	-19.969	28412.545	.000	1	.999	.000
Little14	21.044	28412.545	.000	1	.999	1378793352
Totalandsize	-.008	.016	.234	1	.629	.992
Landcultivation	-.032	.059	.294	1	.587	1.032
Constant	-2.930	.758	14.930	1	.000	.053

a. Variable(s) entered on step 1: Gender, Age, Yrsoffarming, Ownmobile, headHH, Little12, Little13, Little14, Totalandsize, Landcultivation.

Case Control Matching Statistics

Match Type	Count
Exact Matches	0
Fuzzy Matches	106
Unmatched Including Missing Keys	14
Unmatched with Valid Keys	14
Sampling	without replacement
Log file	none
Maximize Matching Performance	yes

Case Control Match Tolerances

Match Variables	Value	Fuzzy Match Tries	Incremental Rejection Percentage
Exact (All Variables)	.	1379.000	100.000
Proscore	.200	1379.000	92.313

Tries is the number of match comparisons before drawing. Rejection percentage shows the match rejection rate. Rejections are attributed to the first variable in the BY list that causes rejection.

Appendix 5: Coding framework for qualitative data collected

Hierarchical Code Name	Code Name	Code Description
Nodes\AEAs perspective		
	AEAs perspective	How AEAs work with FBOs and what they think about their performance
Nodes\AEAs perspective\Challenges		
	Challenges	Key challenges in FBO development
Nodes\AEAs perspective\Collective activities		
	Collective activities	The nature and extent of collective activities in FBOs
Nodes\AEAs perspective\Extension policy		
	Extension policy	Exploring current extension policies
Nodes\AEAs perspective\FBOs contributions		
	FBOs contributions	The overall contribution of FBOs to smallholder agriculture
Nodes\AEAs perspective\Setting up FBOs		
	Setting up FBOs	Understanding how FBOs are set up
Nodes\AEAs perspective\Setting up FBOs\How to set up		
	How to set up	How do FBOs come into existence
Nodes\AEAs perspective\Setting up FBOs\Mistakes in setting up		
	Mistakes in setting up	Perceived mistakes in setting up FBOs
Nodes\AEAs perspective\Strengthening FBOs		
	Strengthening FBOs	Different ways to strengthen or make FBOs more effective in helping their members
Nodes\AEAs perspective\Successful FBOs		
	Successful FBOs	What makes FBOs successful in improving their members' access to services?

Hierarchical Code Name	Name	Description
Nodes\AEAs perspective\Types of support	Types of support	Different kinds of support AEAs provide to FBOs and their members
Nodes\AEAs perspective\Types of support\Credit support	Credit support	The nature and type of credit FBOs and their members received
Nodes\AEAs perspective\Types of support\Credit support\Credit recover	Credit recover	Understanding the challenges in recovering credit from FBOs and their members
Nodes\AEAs perspective\Types of support\Input support	Input support	The nature and type of inputs FBOs and their members received
Nodes\AEAs perspective\Types of support\Market support	Market support	The nature of support to FBOs and their members to improving the marketing of their farm produce
Nodes\AEAs perspective\Types of support\Technical support	Technical support	How FBOs are set up and supporting FBOs to develop their governance and management structures
Nodes\AEAs perspective\Types of support\Technical support\Ext challenges	Ext challenges	Challenges extension agents face in delivering their services
Nodes\AEAs perspective\Weak FBOs	Weak FBOs	Factors that contribute to having weak FBOs
Nodes\FBO leaders	FBO leaders	The views of FBO leaders about their participation in FBOs and the performance of FBOs in general

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO leaders\Benefits of FBO	Benefits of FBO	Key benefits of FBOs to leaders
Nodes\FBO leaders\Collective activities	Collective activities	The nature and extent of collective activities in FBOs
Nodes\FBO leaders\Collective activities\challenges in collective activities	Challenges in collective activities	Factors that influence collective activities in FBOs
Nodes\FBO leaders\demand services	Demand services	The extent to which FBO leaders demand services for their members
Nodes\FBO leaders\leadership	Leadership	Understanding the role of leaders in FBOs
Nodes\FBO leaders\Monetary contributions	Monetary contributions	Internal income generation in FBOs
Nodes\FBO leaders\Rules	Rules	Understanding rule making and enforcement from FBOs leaders
Nodes\FBO leaders\Setting up FBOs	Setting up FBOs	Understanding how FBOs are set up from leaders
Nodes\FBO leaders\Setting up FBOs\Challenges in setting up	Challenges in setting up	Challenges faced when setting up FBOs
Nodes\FBO leaders\Strengthening FBOs	Strengthening FBOs	Different ways to strengthen or make FBOs more effective in helping their members

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO leaders\Successful FBOs		
	Successful FBOs	What makes FBOs successful in improving their members' access to services?
Nodes\FBO leaders\Support received		
	Support received	The nature and different types of support FBO leaders received
Nodes\FBO leaders\Support received\Credit support		
	Credit support	The nature and extent of credit received
Nodes\FBO leaders\Support received\Credit support\Improve recovery		
	Improve recovery	Understanding the challenges in recovering credit from FBOs and their members
Nodes\FBO leaders\Support received\Credit support\Why less support		
	Why less support	Reasons for low access to credit
Nodes\FBO leaders\Support received\Input support		
	Input support	The nature and type of inputs FBOs leaders received
Nodes\FBO leaders\Support received\Input support\Implementation challenges		
	Implementation challenges	Challenges in accessing inputs
Nodes\FBO leaders\Support received\Market support		
	Market support	The extent to which FBO leaders are supported to market their farm produce

Hierarchical Code Name	Name	Description
Nodes\FBO leaders\Support received\Market support\Implementation challenges	Implementation challenges	Challenges FBOs face in marketing their farm produce
Nodes\FBO leaders\Support received\nature of support	Nature of support	The nature and types of support FBO leaders received
Nodes\FBO leaders\Support received\nature of support\Credit	Credit	The nature and the extent to which FBO leader received credit
Nodes\FBO leaders\Support received\nature of support\extension	Extension	The nature and the extent to which FBO leaders received extension services
Nodes\FBO leaders\Support received\nature of support\Inputs	Inputs	The nature and types of inputs received
Nodes\FBO leaders\Support received\Technical support	Technical support	The nature and extent of improved technologies received
Nodes\FBO leaders\Support received\Technical support\Implementation challenges	Implementation challenges	Factors that influence the adoption of improved technologies
Nodes\FBO leaders\Weak FBOs	Weak FBOs	Factors that contribute to having weak FBOs

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO leaders\Why member		
	Why member	Reasons for becoming an FBO member and leader
Nodes\FBO ordinary member perspective		
	FBO ordinary member perspective	The views of FBO ordinary members about their participation in FBOs and the performance of FBOs in general
Nodes\FBO ordinary member perspective\Benefits of FBOs		
	Benefits of FBOs	Key benefits of FBOs to ordinary members
Nodes\FBO ordinary member perspective\Collective activities		
	Collective activities	The nature and extent of collective activities in FBOs
Nodes\FBO ordinary member perspective\Collective activities\Challenges in collective activities		
	Challenges in collective activities	Factors that influence collective activities in FBOs
Nodes\FBO ordinary member perspective\Monetary contribution		
	Monetary contribution	Internal income generation in FBOs
Nodes\FBO ordinary member perspective\Rules		
	Rules	Understanding rule making and enforcement from FBO ordinary members

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO ordinary member perspective\Setting up FBOs	Setting up FBOs	Understanding how FBOs are set up from ordinary members
Nodes\FBO ordinary member perspective\Setting up FBOs\Challenges in setting up	Challenges in setting up	Challenges faced when setting up FBOs
Nodes\FBO ordinary member perspective\Strengthening FBOs	Strengthening FBOs	Different ways to strengthen or make FBOs more effective in helping their members
Nodes\FBO ordinary member perspective\Successful FBOs	Successful FBOs	What makes FBOs successful in improving their members' access to services?
Nodes\FBO ordinary member perspective\Support received	Support received	The nature and different types of support FBO ordinary members received
Nodes\FBO ordinary member perspective\Support received\Credit support	Credit support	The nature and extent of credit received
Nodes\FBO ordinary member perspective\Support received\Credit support\Improve recovery	Improve recovery	Understanding the challenges in recovering credit from FBOs and their members

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO ordinary member perspective\Support received\Credit support\Why less support	Why less support	Reasons for low access to credit
Nodes\FBO ordinary member perspective\Support received\Input support	Input support	The nature and types of inputs FBO ordinary members received
Nodes\FBO ordinary member perspective\Support received\Input support\Implementation challenges	Implementation challenges	Challenges in accessing inputs
Nodes\FBO ordinary member perspective\Support received\Market support	Market support	The extent to which FBO ordinary members are supported to market their farm produce
Nodes\FBO ordinary member perspective\Support received\Market support\Implementation challenges	Implementation challenges	Challenges FBOs face in marketing their farm produce
Nodes\FBO ordinary member perspective\Support received\Nature of support	Nature of support	The nature and types of support ordinary FBO members received
Nodes\FBO ordinary member perspective\Support received\Nature of support\Credit	Credit	The nature and the extent to which ordinary FBO members received credit

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO ordinary member perspective\Support received\Nature of support\Extension	Extension	The nature and the extent to which ordinary FBO members received extension services
Nodes\FBO ordinary member perspective\Support received\Nature of support\Inputs	Inputs	The nature and types of inputs received
Nodes\FBO ordinary member perspective\Support received\Technical support	Technical support	The nature and extent of improved technologies received
Nodes\FBO ordinary member perspective\Support received\Technical support\Implementation challenges	Implementation challenges	Factors that influence the adoption of improved technologies
Nodes\FBO ordinary member perspective\Weak FBOs	Weak FBOs	Factors that contribute to having weak FBOs
Nodes\FBO ordinary member perspective\Why member	Why member	Reasons for becoming an FBO member
Nodes\Government perspective	Government perspective	How governments support FBOs and what they think about their performance
Nodes\Government perspective\Challenges	Challenges	Key challenges in FBOs development

Hierarchical Code Name	Code Name	Code Description
Nodes\Government perspective\Collective activities	Collective activities	The nature and extent of collective activities in FBOs
Nodes\Government perspective\FBOs contributions	FBOs contributions	The overall contribution of FBOs to smallholder agriculture
Nodes\Government perspective\Setting up FBOs	Setting up FBOs	The way government agencies set up FBOs
Nodes\Government perspective\Setting up FBOs\How to set up	How to set up	The different ways FBOs are established
Nodes\Government perspective\Setting up FBOs\Mistakes in setting up	Mistakes in setting up	Perceived mistakes in setting up FBOs
Nodes\Government perspective\Strengthening and sustainability FBOs	Strengthening and sustainability FBOs	Different ways to strengthen or make FBOs more effective in helping their members
Nodes\Government perspective\Successful FBOs	Successful FBOs	What makes FBOs successful in improving their members' access to services?
Nodes\Government perspective\Types of support	Types of support	
Nodes\Government perspective\Types of support\Credit support	Credit support	The nature and type of credit FBOs and their members received

Hierarchical Code Name	Code Name	Code Description
Nodes\Government perspective\Types of support\Credit support\Credit recover	Credit recover	Understanding the challenges in recovering credit from FBOs and their members
Nodes\Government perspective\Types of support\Input support	Input support	The nature and type of inputs FBOs and their members received
Nodes\Government perspective\Types of support\Market support	Market support	The nature of support to FBOs and their members to improving the marketing of their farm produce
Nodes\Government perspective\Types of support\Technical support	Technical support	How FBOs are set up and supporting FBOs to develop their governance and management structures
Nodes\Government perspective\Weak FBOs	Weak FBOs	Factors that contribute to having weak FBOs
Nodes\History of FBOs	History of FBOs	Brief history on how the FBOs started
Nodes\History of FBOs\Achievements	Achievements	The achievements FBOs have achieved
Nodes\History of FBOs\Achievements\credit	credit	The extent to which FBOs improve their members' access to credit

Hierarchical Name	Name	Description
	Improved access to inputs	The extent to which FBOs improve their access to inputs
Nodes\\History of FBOs\\Achievements\\Knowledge and yields		
	Knowledge and yields	The extent to which FBOs improve smallholder access to technical knowledge and improving the crop yields of members
Nodes\\History of FBOs\\Achievements\\Market		
	Market	The extent to which FBOs improve the marketing of smallholders farm produce
Nodes\\History of FBOs\\challenges of FBOs		
	Challenges of FBOs	Key challenges FBOs face
Nodes\\History of FBOs\\Collapse of FBOs		
	Collapse of FBOs	Factors accounting for the collapse of FBOs
Nodes\\History of FBOs\\collective activities		
	collective activities	The nature and extent of collective activities in the FBOs

Hierarchical Code Name	Code Name	Code Description
Nodes\History of FBOs\Establishment of FBOs		
	Establishment of FBOs	Who established the FBOs and how were they established
Nodes\History of FBOs\Funds in group		
	Funds in group	Money available in FBOs
Nodes\History of FBOs\leaders background		
	leaders background	Leadership composition in FBOs
Nodes\NGOs perspectives		
	NGOs perspectives	How NGOs support FBOs and what they think about their performance
Nodes\NGOs perspectives\Challenges		
	Challenges	Key challenges in FBOs development
Nodes\NGOs perspectives\Collective activities		
	Collective activities	The nature and extent of collective activities in FBOs
Nodes\NGOs perspectives\FBO contributions		
	FBO contributions	The overall contribution of FBOs to smallholder agriculture
Nodes\NGOs perspectives\Setting up FBOs		
	Setting up FBOs	The different ways FBOs are established
Nodes\NGOs perspectives\Setting up FBOs\How to set up		
	How to set up	The different ways FBOs are established
Nodes\NGOs perspectives\Setting up FBOs\Mistakes in setting up		
	Mistakes in setting up	Perceived mistakes in setting up FBOs

Hierarchical Code Name	Code Name	Code Description
Nodes\NGOs perspectives\Strengthening FBOs	Strengthening FBOs	Different ways to strengthen or make FBOs more effective in helping their members
Nodes\NGOs perspectives\Successful FBO	Successful FBO	What makes FBOs successful in improving their members' access to services?
Nodes\NGOs perspectives\Types of support	Types of support	Different kinds of support NGOs provide to FBOs and their members
Nodes\NGOs perspectives\Types of support\Credit support	Credit support	The nature and type of credit FBOs and their members received
Nodes\NGOs perspectives\Types of support\Credit support\Credit Recovery	Credit Recovery	Understanding the challenges in recovering credit from FBOs and their members
Nodes\NGOs perspectives\Types of support\Inputs support	Inputs support	Different types of support NGOs provide to FBOs and their members
Nodes\NGOs perspectives\Types of support\Market support	Market support	The nature of support to FBOs and their members to improving the marketing of their farm produce
Nodes\NGOs perspectives\Types of support\Technical support	Technical support	How FBOs are set up and supporting FBOs to develop their governance and management structures

Hierarchical Code Name	Code Name	Code Description
Nodes\NGOs perspectives\Weak FBOs		
	Weak FBOs	Factors that contribute to having weak FBOs
Nodes\FBO non-member perspective		
	FBO non-member perspective	Smallholder farmers who are not members of FBOs
Nodes\FBO non-member perspective\FBO community		
	FBO community	Villages or towns where there is an FBO
Nodes\FBO non-member perspective\FBO community\Challenges in groups		
	Challenges in groups	What non-FBO smallholder farmers know about challenges/problems in FBOs
Nodes\FBO non-member perspective\FBO community\Challenges in groups\Collectivity		
	Collectivity	What non-FBO smallholder farmers know about challenges in FBOs regarding collective activities
Nodes\FBO non-member perspective\FBO community\Challenges in groups\Leadership		
	Leadership	What non-FBO smallholder farmers know about challenges in FBOs leadership
Nodes\FBO non-member perspective\FBO community\Challenges in groups\Politics		
	Politics	What non-FBO smallholder farmers know about challenges in FBOs regarding political interference
Nodes\FBO non-member perspective\FBO community\Challenges in groups\Rules		
	Rules	What non-FBO smallholder farmers know about challenges FBOs face in making and implementing rules

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO non-member perspective\FBO community\Challenges in groups\Support	Support	What non-FBO smallholder farmers know about challenges FBOs face in getting support
Nodes\FBO non-member perspective\FBO community\Knowledge about FBO formation	Knowledge about FBO formation	What non-FBO smallholder farmers know about how FBOs are formed as well as how they function
Nodes\FBO non-member perspective\FBO community\Perceived benefits	Perceived benefits	The perception of non-FBO smallholder farmers on the benefits of FBOs
Nodes\FBO non-member perspective\FBO community\Support received	Support received	Different forms of support non-FBO smallholder farmer received from external agencies such as government and NGOs
Nodes\FBO non-member perspective\FBO community\Support received\Credit	Credit	The nature and kinds of credit non-FBO smallholder farmers received
Nodes\FBO non-member perspective\FBO community\Support received\Extension	Extension	The nature and kinds of extension services non-FBO smallholder farmers received

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO non-member perspective\FBO community\Support received\Inputs	Inputs	The nature and kinds of inputs non-FBO smallholder farmers received
Nodes\FBO non-member perspective\FBO community\Why not member	Why not member	Reasons why smallholder farmers are not members of FBOs even though there is an FBO in the community
Nodes\FBO non-member perspective\Non-FBO community	Non-FBO community	Villages or towns where there is no FBO
Nodes\FBO non-member perspective\Non-FBO community\Challenges in groups	Challenges in groups	What non-FBO smallholder farmers know about challenges/problems in FBOs
Nodes\FBO non-member perspective\Non-FBO community\Knowledge about FBO formation	Knowledge about FBO formation	What non-FBO smallholder farmers know about how FBOs are formed as well as how they function
Nodes\FBO non-member perspective\Non-FBO community\perceived benefits	Perceived benefits	The perception of non-FBO smallholder farmers on the benefits of FBOs

Hierarchical Code Name	Code Name	Code Description
Nodes\FBO non-member perspective\Non-FBO community\Support received	Support received	Different forms of support non-FBO smallholder farmers received from external agencies such as government and NGOs
Nodes\FBO non-member perspective\Non-FBO community\Support received\Credit	Credit	The nature and kinds of credit non-FBO smallholder farmers received
Nodes\FBO non-member perspective\Non-FBO community\Support received\Extension	Extension	The nature and kinds of extension services non-FBO smallholder farmers received
Nodes\FBO non-member perspective\Non-FBO community\Support received\Inputs	Inputs	The nature and kinds of inputs non-FBO smallholder farmers received
Nodes\FBO non-member perspective\Non-FBO community\Why not member	Why not member	Reasons why smallholder farmers are not members of FBOs