



FAKULTÄT II: INFORMATIK, WIRTSCHAFTS UND RECHTSWISSENSCHAFTEN

**Commercial Farming Models, Smallholder Farmers' Choices and Sustainability in the
Highlands Agro-Ecological Zone in Njombe District, Tanzania**

Thesis

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DECLARATION

I, **Musa Nkuba Shelembi** hereby declare that this thesis titled “**Commercial Farming Models, Smallholder Farmers’ Choices and Sustainability in the Highlands Agro-Ecological Zone in Njombe District, Tanzania**” submitted to the Faculty of Computing Sciences, Business Administration, Economics and Law of Carl von Ossietzky University of Oldenburg, as a requirement for the award of Doctor of Philosophy (PhD), is my own original work and has not been submitted by me for any academic award at this or any other tertiary institution before. All sources cited or quoted in this thesis are indicated and acknowledged with a comprehensive list of references.

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Hiermit erkläre ich an Eides statt, daß ich die vorgelegte Dissertation mit dem Titel
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ABSTRACT

Sustainability outcomes that emerge from smallholder commercial farming practices in developing economies are worthy investigating. This is due to the growing emphasis and initiatives for transforming subsistence farming to commercial farming in these countries. Growth in smallholder commercial farming investments are causing sustainability impacts which are worth to be understood. This study intended to meet this aspiration by investigating on drivers for smallholder farmers' choices of commercial farming models and sustainability considerations in the Highlands Agro-Ecological Zone in Njombe District in Tanzania. Being founded on the conceptual grounds of the Institutional Theory, the study adopted the combined Institutional Analysis and Development and Social-Ecological Systems (IAD-SES) Framework as its structure for guiding the conceptual and empirical inquiries of the study.

The study selected the convergent parallel mixed-methods design in which both qualitative and quantitative means of data inquiry and analyses were used. The study used multiple cases of purposively selected smallholder commercial farmer groups for empirical data inquiries. Purposively selected smallholder commercial farmer groups that engage in commercial farming with agribusiness companies or firms or initiatives were used for the study. In-depth interviews and focus group discussion techniques were used for qualitative data collection. Simple random sampling method was used in getting representatives from smallholder farmer groups for a quantitative data inquiries. Smallholder farmer representatives were randomly selected amongst members of smallholder commercial farmer groups to be administered with questionnaires.

The study adopted the thematic tool for analyzing qualitative data whereas quantitative data was descriptively analyzed. MAXQDA Analytics Pro 2018 Software aided the qualitative analysis and SPSS Statistics 25 Software aided the quantitative analysis.

The study found four types of commercial farming models in the study area as it was conceptualized. The study found out that economic factors, other factors and land use governance factors have strong influences on farmers' choices of commercial farming models. While social factors are found to have a moderate influence, actors conditions, ecological factors and political factors indicate low influences on farmers' choices of commercial farming models in the study area. Moreover, smallholder farmers' considerations of sustainability criteria is found to be higher in an order of ecological, social and economic criteria in commercial farming models. Yet, smallholder farmers perceive higher performances of models in sustainability in an

order of ecological, social and economic criteria in commercial farming models. However, the observed social and economic considerations and performances indicate to rely on individual and group-based mechanisms that are not institutionalized and are not captivated by partner actors in the models.

Recommendations to strengthening rural land and environmental governance, incentivize rural youths and other groups for commercial farming, facilitate captivation of farmers' social, legal and financial services and strengthen rural credit mechanisms are made to policy and decision makers. Agribusiness companies or initiatives that work with smallholder farmers are advised to incorporate ecological and social concerns in their business endeavours, captivate smallholder farmers' social and financial services, incentivize rural youths and other groups for commercial farming and venture in farmer capacity enhancement. Furthermore, smallholder commercial farmers are advised to serve for ecological and social concerns in their commercial farming endeavours, partner with actors for their social security needs, strive to upgrade their local credit facilities and develop venture orientations to commercial farming.

ZUSAMMENFASSUNG

Die Ergebnisse der Nachhaltigkeit, die sich aus den kommerziellen landwirtschaftlichen Praktiken von Kleinbauern in Entwicklungsländern ergeben, sind eine Untersuchung wert. Dies ist auf die wachsende Bedeutung und die Initiativen zur Umwandlung der Subsistenzlandwirtschaft in eine kommerzielle Landwirtschaft in diesen Ländern zurückzuführen. Das Wachstum der Investitionen in die kommerzielle Landwirtschaft von Kleinbauern führt zu Auswirkungen auf die Nachhaltigkeit, die es wert sind, verstanden zu werden. Die vorliegende Studie soll diesem Anspruch gerecht werden, indem sie die Triebkräfte für die Wahl kommerzieller Landwirtschaftsmodelle durch Kleinbauern und Nachhaltigkeitsüberlegungen in der agro-ökologischen Hochland-Zone im Distrikt Njombe in Tansania untersucht. Die Studie basiert auf den konzeptionellen Grundlagen der Institutionellen Theorie und hat das kombinierte Rahmenwerk für institutionelle Analyse und Entwicklung und sozial-ökologische Systeme (IAD-SES) als Struktur für die konzeptionellen und empirischen Untersuchungen der Studie übernommen.

Die Studie wählte das konvergente parallele Mischmethodendesign, bei dem sowohl qualitative als auch quantitative Mittel der Datenerhebung und -analyse eingesetzt wurden. Die Studie verwendete mehrere Fälle gezielt ausgewählter kommerzieller Kleinbauerngruppen für empirische Datenerhebungen. Für die Studie wurde gezielt ausgewählte kommerzielle Kleinbauern-Gruppen verwendet, die kommerzielle Landwirtschaft mit Unternehmen oder Initiativen der Agrarindustrie betreiben. Für die qualitative Datenerhebung wurden Tiefeninterviews und Diskussionstechniken der Fokusgruppen eingesetzt. Eine einfache Stichprobenmethode wurde verwendet, um Vertreter von Kleinbauern-Gruppen für eine quantitative Datenerhebung zu gewinnen. Die Vertreter der Kleinbauern wurden nach dem Zufallsprinzip unter den Mitgliedern der kommerziellen Kleinbauern-Gruppen ausgewählt und mit Fragebögen versorgt.

Die Studie nahm das thematische Instrument zur Analyse qualitativer Daten an, während quantitative Daten deskriptiv analysiert wurden. Die Software MAXQDA Analytics Pro 2018 unterstützte die qualitative Analyse, und die Software SPSS Statistics 25 unterstützte die quantitative Analyse.

Die Studie fand vier Arten kommerzieller Landwirtschaftsmodelle im Untersuchungsgebiet, wie sie konzeptuell erfasst wurde. Die Studie fand heraus, dass wirtschaftliche Faktoren, andere

Faktoren und Faktoren der Landnutzungssteuerung die Wahl der Landwirte für kommerzielle Landwirtschaftsmodelle stark beeinflussen. Während soziale Faktoren einen mäßigen Einfluss haben, weisen die Bedingungen der Akteure, ökologische Faktoren und politische Faktoren auf einen geringen Einfluss auf die Wahl der Landwirte für kommerzielle Landwirtschaftsmodelle im Untersuchungsgebiet hin. Darüber hinaus wird festgestellt, dass die Berücksichtigung von Nachhaltigkeitskriterien durch die Kleinbauern in der Reihenfolge der ökologischen, sozialen und wirtschaftlichen Kriterien in kommerziellen Landwirtschaftsmodellen höher ist. Dennoch nehmen Kleinbauern in kommerziellen Landwirtschaftsmodellen höhere Leistungen von Modellen in Bezug auf Nachhaltigkeit in einer Reihenfolge von ökologischen, sozialen und ökonomischen Kriterien wahr. Die beobachteten sozialen und wirtschaftlichen Überlegungen und Leistungen deuten jedoch darauf hin, dass sie sich auf individuelle und gruppenbasierte Mechanismen stützen, die nicht institutionalisiert sind und von den Partnerakteuren in den Modellen nicht gefesselt werden.

An die Politik und die Entscheidungsträger werden Empfehlungen zur Stärkung der ländlichen Land- und Umweltpolitik, zur Schaffung von Anreizen für Jugendliche und andere Gruppen in der kommerziellen Landwirtschaft, zur Erleichterung der Inanspruchnahme sozialer, rechtlicher und finanzieller Dienstleistungen der Bauern und zur Stärkung der ländlichen Kreditmechanismen gerichtet. Agribusiness-Firmen oder Initiativen, die mit Kleinbauern arbeiten, werden empfohlen, ökologische und soziale Belange in ihre Geschäftsbemühungen einzubeziehen, die sozialen und finanziellen Dienstleistungen von Kleinbauern zu fesseln, Anreize für Jugendliche auf dem Land und andere Gruppen für die kommerzielle Landwirtschaft zu schaffen und die Kapazitäten der Landwirte zu verbessern. Darüber hinaus wird den kommerziellen Kleinbauern empfohlen, ökologische und soziale Belange in ihre kommerziellen Landwirtschaftsbemühungen einzubeziehen, Partnerschaften mit den Akteuren für ihre Bedürfnisse im Bereich der sozialen Sicherheit einzugehen, sich um die Verbesserung ihrer lokalen Kreditfazilitäten zu bemühen und Risikobereitschaft in der kommerziellen Landwirtschaft zu entwickeln.

TABLE OF CONTENTS

ACKNOWLEDGEMENT	i
ABSTRACT	iii
ZUSAMMENFASSUNG	v
TABLE OF CONTENTS.....	vii
LIST OF TABLES	xiii
LIST OF FIGURES	xv
LIST OF ABBREVIATIONS	xvii
CHAPTER ONE: INTRODUCTION TO THE STUDY, REVIEW OF LITERATURE AND IDENTIFICATION OF THE RESEARCH PROBLEM	1
1.1 Introduction	1
1.2 Introduction and background information	1
1.3 Transformation from subsistence farming to commercial farming.....	2
1.4 Sustainable smallholder commercial farming.....	3
1.5 Smallholder commercial farming practices in developing countries	5
1.6 Statement of the problem.....	6
1.7 Conceptual and empirical reviews on smallholder commercial farming and sustainability	7
1.7.1 Smallholder commercial farming: Practices, processes and challenges in the developing economies context	7
1.7.2 Critiques on practicability of sustainability concept.....	9
1.7.3 Adoption of sustainability practices.....	10
1.7.4 Smallholder commercial farming and sustainability: Empirical perspectives in developing economies.....	10
1.8 Literature synthesis.....	12
1.9 The main research question	13
1.10 Specific research questions.....	14
1.11 Scope of the study.....	14
1.12 Significance of the study	15
1.13 Outlines of thesis chapters	16
1.14 Summary on the chapter	18

CHAPTER TWO: CONCEPTUAL REVIEWS, THEORETICAL FRAMEWORK AND OPERATIONALIZATION OF THE STUDY CONSTRUCTS	19
2.1 Introduction	19
2.2 Key study terms, concepts and contexts	19
2.2.1 Smallholder farmer/farming.....	19
2.2.2 Subsistence farming.....	20
2.2.3 Smallholder commercial farming	20
2.2.4 Smallholder commercial farming models	21
2.2.5 Sustainability concept.....	22
2.2.6 Sustainability pillars	22
2.2.7 Adoption of the Triple Bottom Line (TBL) sustainability model	23
2.3 Smallholder commercial farming concepts, mechanisms and models.....	24
2.3.1 Commercial farming organizational forms	24
2.3.2 Commercial farming contractual mechanisms.....	25
2.3.3 Commercial farming systems	26
2.4 Synthesizing commercial farming mechanisms to commercial farming models	27
2.4.1 A conceptual model for deriving smallholder commercial farming models	28
2.4.2 A specific model for selecting smallholder commercial farming models.....	30
2.5 Theoretical Framework.....	32
2.5.1 The Institutional Theory	32
2.5.2 The Institutional Analysis and Development (IAD) Framework	33
2.5.3 The Social-Ecological System (SES) Framework	34
2.5.4 The combined IAD-SES Framework.....	36
2.5.5 Relevance of the combined IAD-SES Framework to the study	37
2.5.6 Adoption of the combined IAD-SES Framework in empirical research.....	38
2.6 Conceptual Framework for the study.....	39
2.7 Operationalization of research constructs.....	41
2.7.1 The Common Pool Resources (CPR): Its conception and reality in the study.....	41
2.7.2 Definition of a social ecological system	42
2.7.3 The Action Situation of the study	42
2.7.4 Diagnosing the Social Ecological System (SES), commercial farming models and interactions	43
2.7.5 Diagnosing drivers for SHFs choices of CFMs, consideration of sustainability criteria and perceived performance of CFMs with respect to sustainability criteria.....	43
2.8 Summary on the chapter	47

CHAPTER THREE: RESEARCH METHODOLOGY	48
3.1 Introduction	48
3.2 Research philosophy	48
3.3 Research design	50
3.4 The scope of the research.....	51
3.5 Data types and sources.....	51
3.6 Qualitative data collection techniques and procedures	52
3.6.1 In-depth interview instruments and their administration	52
3.6.2 Focus Group Discussions (FGDs) and their administration.....	53
3.7 Quantitative data collection techniques and procedures	54
3.7.1 Sampling procedures.....	55
3.7.2 Quantitative data collection techniques	55
3.8 Ethical considerations.....	57
3.8.1 Research ethical clearance	59
3.8.2 Research permits and acceptance letters	59
3.9 Validity and reliability	60
3.10 Limitations in study methodology	62
3.11 Data organization, processing and analysis	63
3.11.1 Data organization and processing	63
3.11.2 Data analysis.....	64
3.12 Summary on the chapter	64
CHAPTER FOUR: THE STUDY AREA AND SMALLHOLDER FARMING INSTITUTIONAL AND SOCIAL ECOLOGICAL SYSTEM ASPECTS.....	66
4.1 Introduction	66
4.2 Tanzania: Location, demographic and economic overview.....	66
4.3 The study area.....	69
4.3.1 Njombe District	69
4.3.2 The Highlands Agro-Ecological Zone in Njombe District	73
4.4 Action situation in the Highlands Agro-Ecological Zone as a social ecological system	76
4.4.1 The zone as a resource system (RS).....	76
4.4.2 Agricultural land use system as a resource unit (RU) in the zone.....	77
4.4.3 Agricultural land use governance system (GS).....	78
4.4.4 Agricultural land users' conditions (AC) in the zone	80
4.4.5 Agricultural land use and social, economic and political conditions (SEP) in the zone	81

4.4.6	Agricultural land use and ecological/environmental conditions (ECO) in the zone	82
4.5	Interactions in the Highlands Agro-Ecological Zone in Njombe District	83
4.5.1	Agricultural land harvesting mechanisms in the zone	83
4.5.2	Agricultural land and related resources use conflicts in the zone	84
4.5.3	Smallholder farming investment activities in the zone	84
4.5.4	Smallholder self-organizing activities in the zone	85
4.5.5	Agricultural land use monitoring and evaluative activities in the zone	86
4.6	Conclusion and discussions on institutional and social ecological system aspects in the Highlands Agro-Ecological Zone in Njombe District	86
4.7	Summary on the chapter	90
CHAPTER FIVE: SMALLHOLDER COMMERCIAL FARMING MODELS PRACTICED IN THE HIGHLANDS AGRO-ECOLOGICAL ZONE IN NJOMBE DISTRICT.....		91
5.1	Introduction	91
5.2	Bases for identification of smallholder commercial farming models in the study area	91
5.3	Smallholder commercial farming models that are practiced in the study area.....	92
5.4	Contracted Conventional Farming Model.....	93
5.4.1	Njombe District Agriculture, Irrigation and Cooperatives Department.....	94
5.4.2	Isoliwaya Agricultural Markets Cooperative Society (AMCOS)	94
5.4.3	Lupembe Agricultural Markets Cooperative Society (AMCOS).....	95
5.4.4	Njombe Out-growers Services Company (NOSC)	96
5.4.5	Iboya Tea Farm Block	97
5.4.6	Lwangu Tea Farm Block	98
5.5	Contracted Organic Farming Model	99
5.5.1	Tanzanice Agrofoods Limited (Tanzanice)	100
5.5.2	Itulike Smallholder Organic Farmers Group.....	101
5.5.3	Wikichi Smallholder Organic Farmers Group	102
5.6	Non-contracted Conventional Farming Model	103
5.6.1	Njombe District Agriculture, Irrigation and Cooperatives Department.....	104
5.6.2	Ninga Agricultural Markets Cooperative Society (AMCOS)	104
5.6.3	Matembwe Agricultural Markets Cooperative Society (AMCOS).....	105
5.6.4	Njombe Development Office (NDO) with CARITAS.....	106
5.6.5	Kichiwa Agricultural Markets Cooperative Society (AMCOS)	108
5.6.6	Igongolo Agricultural Markets Cooperative Society (AMCOS)	109
5.6.7	Njombe Agricultural Development Organization (NADO) initiative.....	110

5.6.8	Matiganjola Agricultural Markets Cooperative Society (AMCOS).....	111
5.6.9	Itunduma Agricultural Markets Cooperative Society (AMCOS).....	112
5.7	Non-Contracted Organic Farming Model.....	113
5.7.1	Njombe District Agriculture, Irrigation and Cooperatives Department.....	114
5.7.2	Madeke Organic and Horticulture Agricultural Producers Cooperative Society	114
5.8	Discussions and conclusion on commercial farming models.....	118
5.9	Summary on the chapter	120
CHAPTER SIX: DRIVERS FOR SMALLHOLDER FARMERS' CHOICES OF SPECIFIC COMMERCIAL FARMING MODELS		
		121
6.1	Introduction	121
6.2	Descriptive characteristics in smallholder commercial farming groups	121
6.2.1	Age characteristics.....	121
6.2.2	Gender (sex) characteristics.....	122
6.2.3	Levels of education.....	123
6.2.4	Main livelihood activities	123
6.2.5	Main commercial crops	124
6.2.6	Land sizes, land access and tenure systems	125
6.2.7	Smallholder farmer groups in commercial farming models.....	127
6.2.8	Smallholder farmers collaborations with actors for access of agricultural services.....	128
6.2.9	Structures of managing and enforcing contracts or partnerships	128
6.3	Themes and categories of drivers for smallholder farmers' choices of farming models.....	129
6.4	Drivers for smallholder farmers' choice of contracted conventional farming model	130
6.4.1	Data analysis and explanations of findings under the model	130
6.4.2	Reconciliation of diverging results under the model	134
6.5	Drivers for smallholder farmers' choice of contracted organic farming model.....	135
6.5.1	Data analysis and explanations of findings under the model	135
6.5.2	Reconciliation of diverging results under the model	139
6.6	Drivers for smallholders' choice of non-contracted conventional farming model.....	140
6.6.1	Data analysis and explanations of findings under the model	140
6.6.2	Reconciliation of diverging findings.....	143
6.7	Drivers for smallholder farmers' choices of non-contracted organic farming model	144
6.7.1	Data analysis and explanations of findings under the model	144
6.7.2	Reconciliation of diverging findings.....	147
6.8	Discussions and conclusions on the overall results on the question	149

6.9	Summary on the chapter	153
CHAPTER SEVEN: SMALLHOLDER FARMERS’ CONSIDERATIONS OF SUSTAINABILITY CRITERIA IN COMMERCIAL FARMING MODELS		
7.1	Introduction	155
7.2	Reflections on the use of the term “consideration” in the study	155
7.3	Sustainability dimensions adopted in empirical explanations of the research question	156
7.4	Findings from the contracted conventional farming model	157
7.4.1	Data analysis and explanations of findings under the model	157
7.4.2	Reconciliation of diverging results under the model	160
7.5	Findings from the contracted organic farming model	161
7.5.1	Data analysis and explanations of findings under the model	161
7.5.2	Reconciliation of diverging results under the model	164
7.6	Findings from the non-contracted conventional farming model	164
7.6.1	Data analysis and explanations of findings under the model	164
7.6.2	Reconciliation of diverging results under the model	168
7.7	Findings from the non-contracted organic farming model	169
7.7.1	Data analysis and explanations of findings under the model	169
7.7.2	Reconciliation of diverging results under the model	172
7.8	Discussions and conclusions on overall findings on the question	173
7.9	Summary on the chapter	177
CHAPTER EIGHT: SMALLHOLDER FARMERS’ PERCEPTIONS ON THE PERFORMANCE OF COMMERCIAL FARMING MODELS WITH RESPECT TO SUSTAINABILITY CRITERIA		
8.1	Introduction	179
8.2	Impression on the use of the term “performance” in the study	179
8.3	Sustainability dimensions adopted in empirical explanations of the research question	180
8.4	Findings from the contracted conventional farming model	181
8.4.1	Data analysis and explanations of findings under the model	181
8.4.2	Reconciliation of diverging results under the model	184
8.5	Findings from the contracted organic farming model	185
8.5.1	Data analysis and explanations of findings under the model	185
8.5.2	Reconciliation of diverging results under the model	188
8.6	Findings from the non-contracted conventional farming model	189
8.6.1	Data analysis and explanations of findings under the model	189
8.6.2	Reconciliation of diverging results under the model	193

8.7	Findings from the non-contracted organic farming model.....	193
8.7.1	Data analysis and explanations of findings under the model	193
8.7.2	Reconciliation of findings under the model.....	197
8.8	Discussions and conclusions on overall findings on the question.....	198
8.9	Summary on the chapter	204
CHAPTER NINE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS, CONTRIBUTIONS AND POLICY RECOMMENDATIONS.....		206
9.1	Introduction	206
9.2	Summary, discussions and conclusions of research findings.....	206
9.2.1	Summary on the main theme and research questions of the study.....	206
9.2.2	Summary of findings, discussions and conclusion on research question one	207
9.2.3	Summary of findings, discussions and conclusion on research question two	210
9.2.4	Summary of findings, discussions and conclusion on research question three	214
9.2.5	Summary of findings, discussions and conclusion on research question four	218
9.3	General conclusions on the overall research problem.....	223
9.4	Theoretical and empirical contributions of the study.....	224
9.5	Contribution of the study to future research	226
9.6	Recommendations	227
9.6.1	Recommendations to policy and decision makers	227
9.6.2	Recommendations to agribusinesses, NGOs and private farmer support initiatives.....	228
9.6.3	Recommendations to smallholder farmers, smallholder farmer groups and societies	229
9.7	Limitations of the study	230
9.8	Summary on the chapter	231
REFERENCES.....		232
APPENDICES.....		249
Appendix 1: Research instrument for empirical data collection.....		249
Appendix 2: Clearance letters and research permits used in empirical data collection		263
Appendix 3: Ethical clearance information sheets and forms used in empirical data collection in Njombe District		270

LIST OF TABLES

Table 2. 1: Basis of the conceptual model for deriving smallholder commercial farming models	30
Table 2. 2: The basis of smallholder commercial farming models selected for the study	31
Table 2. 3: Summary of research questions, variables, operational and methodological plans	45
Table 3. 1: Summary of data sources and data gathered through focus group discussions and questionnaires in selected smallholder commercial farmer groups	56
Table 3. 2: A summary of key methodological aspects used in the study	58
Table 5. 1: Summary of information on smallholder commercial farming models in the study area	117
Table 5. 2: Summary of information on smallholder commercial farming groups selected for the study	118
Table 5. 3: Distributions of commercial farming models that are practiced in the study area	119
Table 6. 1: Age distribution of smallholder farmers in selected farmer groups	123
Table 6. 2: Gender characteristics of smallholder farmers in selected farmer groups	123
Table 6. 3: Education levels of smallholder farmers in selected farmer groups	124
Table 6. 4: Main livelihood activities of smallholder farmers in selected farmer groups	125
Table 6. 5: Distribution of main crops cultivated by smallholder farmers in selected farmer groups	125
Table 6. 6: Distribution of average land sizes owned by smallholder farmers in selected farmer groups	126
Table 6. 7: Types of land access mechanisms that smallholder farmers use in selected farmer groups	127
Table 6. 8: Land tenure systems through which smallholder farmers own land in selected farmer groups	127
Table 6. 9: Smallholder group entry characteristics and management in selected farmer groups	128
Table 6. 10: Contracted or partnered areas in selected smallholder farmer groups	129
Table 6. 11: Modes of management and enforcement of contracts/partnerships in selected farmer groups	130
Table 6. 12: Descriptive values of factors that influence choices in contracted conventional farming model	132
Table 6. 13: Descriptive values of factors that influence choices in contracted organic farming model	137
Table 6. 14: Descriptive values of factors that influence choices in non-contracted conventional farming model	141
Table 6. 15: Descriptive values of factors that influence choices in non-contracted organic farming model	145

Table 7. 1: Descriptive values on smallholder farmers’ considerations of sustainability criteria in contracted conventional farming model.....	158
Table 7. 2: Descriptive values on smallholder farmers’ considerations of sustainability criteria in contracted organic farming model	162
Table 7. 3: Descriptive values on smallholder farmers’ considerations of sustainability criteria in non-contracted conventional farming model.....	166
Table 7. 4: Descriptive values on smallholder farmers’ considerations of sustainability criteria in.....	170
Table 8. 1: Descriptive values on perceptions of smallholder farmers on the performance of contracted conventional farming model with respect to sustainability criteria	182
Table 8. 2: Descriptive values on perceptions of smallholder farmers on the performance of contracted organic farming model with respect to sustainability criteria.....	186
Table 8. 3: Descriptive values on perceptions of smallholder farmers on the performance of non-contracted conventional farming model with respect to sustainability criteria	190
Table 8. 4: Descriptive values on perceptions of smallholder farmers on the performance of non-contracted organic farming model with respect to sustainability criteria	195

LIST OF FIGURES

Figure 2. 1: A general conceptual model for deriving smallholder commercial farming models	29
Figure 2. 2: A framework of derived smallholder commercial farming models selected for the study	31
Figure 2. 3: Basic components of the Institutional Analysis and Development (IAD) Framework.....	34
Figure 2. 4: The Social-Ecological System (SES) Framework	35
Figure 2. 5: The combined Institutional Analysis and Development and Social-Ecological System (IAD-SES) Framework	37
Figure 2. 6: Conceptual framework for smallholder farmers' choices of commercial farming models and sustainability	40
Figure 3. 1: A Model of Convergent Parallel Mixed Methods Design.....	50
Figure 4. 1: Map of Tanzania showing international boundaries and location of Njombe Region	68
Figure 4. 2: Map of Njombe Region showing administrative boundaries of Njombe District.....	70
Figure 4. 3: Some major economic activities that are undertaken in Njombe District.....	72
Figure 4. 4: Map of Njombe District showing the distribution of Agro-Ecological Zones.....	74
Figure 4. 5: Map of Njombe District indicating the villages with selected smallholder farmer groups.....	75
Figure 5. 1: A conceptual representation of smallholder commercial farming models.....	93
Figure 5. 2: Tea farming under contracted conventional farming model	99
Figure 5. 3: Avocado farming under contracted organic farming model	104
Figure 5. 4: Maize farming activities under non-contracted conventional farming model	107
Figure 5. 5: Farming activities under non-contracted conventional farming model.....	111
Figure 5. 6: Pineapple farming activities under non-contracted organic farming model	116
Figure 6. 1: Factors that influence smallholders' choice of contracted conventional farming model.....	133
Figure 6. 2: Factors that influence smallholders' choice of contracted organic farming model	138
Figure 6. 3: Factors that influence smallholders' choice of non-contracted conventional farming model.....	142
Figure 6. 4: Factors that influence smallholders' choice of non-contracted organic farming model	147
Figure 6. 5: Factors that influence smallholders' choices of commercial farming models	151

Figure 7. 1: Smallholder farmers’ considerations of sustainability criteria in contracted conventional farming model.....	159
Figure 7. 2: Smallholder farmers’ considerations of sustainability criteria in contracted organic farming model.....	163
Figure 7. 3: Smallholder farmers’ considerations of sustainability criteria in non-contracted conventional farming model.....	167
Figure 7. 4: Smallholders farmers’ considerations of sustainability criteria in non-contracted organic farming model.....	171
Figure 7. 5: Smallholders farmers’ considerations of sustainability criteria in commercial farming models	175
Figure 8. 1: Smallholder farmers’ perceptions on the performance of contracted conventional farming model with respect to sustainability criteria	183
Figure 8. 2: Smallholder farmers’ perceptions on the performance of contracted organic farming model with respect to sustainability criteria	187
Figure 8. 3: Smallholder farmers’ perceptions on the performance of non-contracted conventional farming model with respect to sustainability criteria	191
Figure 8. 4: Smallholder farmers’ perceptions on the performance of non-contracted organic farming model with respect to sustainability criteria	196
Figure 8. 5: Smallholder farmers’ perceptions on the performance of commercial farming models with respect to sustainability criteria	200

LIST OF ABBREVIATIONS

AC	Actor Conditions
AGRA	Alliance for a Green Revolution in Africa
AMCOS	Agricultural Markets Cooperative Society
ARI	Agricultural Research Institute
BRELA	Business Registration and Licensing Authority
CA	The Court of Appeal
CFMs	Commercial Farming models
COSTEC	Commission for Science and Technology
CPR	Common Pool Resources
CSR	Corporate Social Responsibility
CV	Community Volunteer
DED	District Executive Director
DLHT	District Land and Housing Tribunals
ECO	Ecological/Environmental Conditions
ETG	Export Trading Group
FAO	Food and Agriculture Organization
FDT	Forest Development Trust
FGDs	Focus Group Discussions
GDP	Gross Domestic Product
GHG	Greenhouse Gas

GS	Governance System
HC-LD	The High Court - Land Division
HLPE	High Level Panel of Experts
IAD	Institutional Analysis and Development
IAD-SES	Institutional Analysis and Development and Social Ecological Systems
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IPCC	Intergovernmental Panel on Climate Change
KKKT	Kanisa la Kiinjili la Kilutheri Tanzania
KIWACHAI	Kikundi cha Wakulima wa Chai Iboya
LARRRI	Land Rights Research and Resources Institute
MIVARF	Market Infrastructure Value Addition and Rural Finance
MKURABITA	Mpango wa Kurasimisha Rasilimali na Biashara za Wanyonge Tanzania
MOHAP-COS	Madeke Organic and Horticulture Agricultural Producers Cooperative Society
MOU	Memorandum of Understanding
MVYULU	Muongano wa Vyama vya Ushirika Lupembe
NADO	Njombe Agricultural Development Organization
NBS	National Bureau of Statistics
NFRA	The National Food Reserve Agency
NDO	Njombe Development Office

NGOs	Non-Governmental Organizations
NOSC	Njombe Out-growers Services Company
PELUM	Participatory Ecological Land Use Management
PFPP	Private Forests Program
PHC	Population and Housing Census
RAS	Regional Administrative Secretary
R&D	Research and Development
RFA	Rain Forest Alliance
RS	Resource System
RU	Resource Unit
SACCOS	Savings and Credit Cooperative Societies
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
SDSN	Sustainable Development Solutions Network
SEP	Social, Economic and Political Conditions
SES	Social Ecological Systems
SHFs	Smallholder Farmers
SHFGs	Smallholder Farmer Groups
SILC	Savings and Internal Lending Communities
SPDP	Seed Potato Development Project
TADB	Tanzania Agricultural Development Bank
TanWat	Tanganyika Wattle Company

TaFF	Tanzania Forest Fund
TAHA	Tanzania Horticultural Association
TAPP	Tanzanian Agriculture Productivity Program
TARURA	Tanzania Rural Roads Agency
TASHTIDA	Tanzania Smallholder Tea Development Agency
TBL	Triple Bottom Line
TBT	Tea Board of Tanzania
TFS	Tanzania Forest Services
TPB	Tanzania Postal Bank
TPRI	Tropical Pesticides Research Institute
TRIT	Tea Research Institute of Tanzania
TTA	Tanzania Tea Authority
UMVITA	Umoja wa Vikundi vya Maendeleo Tarafa ya Mdandu
UN	United Nations
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
USDA	United States Department of Agriculture
USA	United States of America
UWAMAWI	Umoja wa Wakulima wa Matunda Wikichi
UWAMI	Umoja wa Wakulima wa Miti Ikuna
UWAMIMA	Umoja wa Wakulima wa Miti Matembwe

UWAMINYO	Umoja wa Wakulima wa Miti Nyombo
VC	Village Councils
VICOBAs	Village Community Banks
VLC	Village Land Councils
WCU	World Conservation Union
WRS	Warehouse Receipt System
WT	Ward Tribunals

CHAPTER ONE: INTRODUCTION TO THE STUDY, REVIEW OF LITERATURE AND IDENTIFICATION OF THE RESEARCH PROBLEM

1.1 Introduction

This chapter presents the introductory and background information to the study. It traces the general shift of smallholder agriculture from subsistence to commercial farming giving this state in the context of the study area. It then highlights the concept of sustainable agricultural practices by smallholder farmers. The chapter presents the research problem of the study. It then presents the conceptual and empirical reviews of literature for the study. From these reviews, the chapter provides evidence of a lack in clear link between smallholder commercial farming models and the Triple Bottom Line (TBL) sustainability criteria and hence identifies and concludes the research gap. Then the chapter presents the main and specific research questions through which answers to the problem were sought. The chapter ends by defining the scope of the study, explaining the significance of the study, outlining the contents of the chapters of the entire thesis and making a summary of what is presented in this chapter.

1.2 Introduction and background information

Sustainability outcomes that emerge from smallholder farmers' commercial farming choices and practices that exist under various commercial farming models are worthy investigating (De Schutter, 2010, p. 3; Bruinsma, 2003, p. 37). This statement is valid due to the fact that farmers choose different agricultural production and commercialization models that aim to meet the food security demands for the projected increase of the world population. The 2015-2050 world population statistics projected by the United Nations in 1997/1999 and revised in 2015 indicate an increase in population at an estimated annual rate of 1.18% changing the world population from 7.3 billion in mid-2015 to 9.7 billion people in 2050 (UN, 2015, p. 2; Bruinsma, 2003, p. 34). The increasing population trends are indications for the world at its global, regional, national and local levels to increase investments in production and distribution of agricultural food to enhance the global food security.

Global food security initiatives are attained through satisfactory food production and supply in global consumption value chains. This is facilitated by investment in small- and large-scale commercialization of agriculture as it fosters the distribution of agricultural products for global consumptions. However, in line with these investments, the emphasis on farmers' choices of

farming models that are mutual, inclusive and considerate to economic, social and environmental aspects as elements of sustainability is paramount.

In the 2015-2050 population projections, 1.3 of the 2.4 billion people projected increase indicates to be occurring in least developed countries of Africa (UN, 2015, p. 3). This state shows that least developed African countries are highly subjected to face the impacts of food demands caused by the increase in population. They expect to face the challenges in meeting the world sustainable development goal of combating hunger and malnutrition. This situation calls for a substantial increase in agricultural food production and distribution to feed the projected population growth (Martinez, et al., 2016; Alexandratos and Bruinsma, 2012). Responses to this include initiatives that call for agricultural transformations in Africa to bring forth individual, enterprises, national and regional economic growths at the same time ensuring food security (Martinez et al., 2016; Grow Africa, 2014; WEF, 2014; Byerlee and Haggblade, 2013).

1.3 Transformation from subsistence farming to commercial farming

Smallholder farming in developing countries has over time been practiced to enable farmers to meet the basic food needs for their subsistence. The notion of using agriculture as a source of farmers' income generation and poverty alleviation was over time neglected (Yaro et al., 2018, Magesa et al, 2014). Instead, smallholder commercial farming was done at a very low scale and was mainly in cash crops. Other crops that are for food or are to be processed to produce food products were mainly produced for subsistence purposes.

However, with changes that have happened and are continuing to happen in the agricultural sector and with the emergence of agri-food business and industries, smallholder farmers transform to commercialize agriculture. This is facilitated by the promotion of commercial farming as a mean for smallholder farmers to diversify their portfolios of sustaining livelihoods. Also, the emergence of high food business leading to increase in commercialization of food crops is making farmers to see the benefits and therefore transform from subsistence to commercial farming. In this sense, commercialization of agriculture entails a move from the traditional consumption production system to a system where production focuses on increasing proportions and value of produce with the intention of capturing the market demands (Timmer, 2014; Zhou et al., 2013; Kirsten et al., 2012; Gebremedhin and Jaleta, 2010; Pingali, 2010; Pingali and Rosegrant, 1995).

In line to this, there is a high emphasis for transforming smallholder agriculture to commercial farming (Grow Africa, 2014; Vanlauwe et al., 2014; Fan et al., 2013). Smallholder farmers transform their subsistence production to commercialized production. Commercialization here focuses on smallholder farmers' changing their production to focus on production for selling and earning income from farming. In response to this, smallholder farmers are evidenced to establish specific farms for products commercialization, engaging in productions that are oriented to consumer markets and producing in surplus for selling to target markets (Collier and Dercon, 2014; IFPRI, 2005; Pingali and Rosegrant, 1995). Commercializing agricultural production has been a means for increasing production, enhancing distribution and availability of food in the agri-food value chain at the same time contributing to economic growth of involved actors in agricultural value chains. Rises in agri-food businesses and increases in supply of food in such value chains are some of the indications of these agricultural transformations that smallholder farmers in developing economies capitalize (Rooyen, 2014; Nishiura, 2010). Increases in agricultural activities that have led to more land acquisitions and land grabbing by national and foreign investors in Africa are also indications of intentions for more investments in commercialization of agriculture (Jayne et al., 2014a; Jayne et al., 2014b; Kaarhus et al., 2010; Cotula et al., 2009).

1.4 Sustainable smallholder commercial farming

Smallholder farmers' responses to commercialization of farming in developing countries are widespread (Tavenner et al., 2019; Sieber et al., 2018; Muriithi and Matz, 2015; Mutabazi et al., 2015; Diao et al., 2014; Mellor, 2014; Chamisa and Mapupa, 2013; Poole, Chitundu and Msoni, 2013; Tanguy, 2012; Fischer and Qaim, 2011). This spread calls for smallholder farmers and all actors in agriculture to develop a clear understanding that unsustainable investments in commercialization of production can result into adverse environmental, social and economic impacts. Alexandratos and Bruinsma, (2012) and Connolly, (2012) argue that the globally emphasized agricultural investments are likely to bring pressure on the environment and other resources that agriculture depends on. This can create a sustainability challenge that the world is expected to face as an outcome. De Schutter, (2010) considers this transformation as a "reinvestment" questions on "how" to reinvest, worrying for it to come with methods that intend to meet human demands but are not sustainable. Emphasizing on sustainability of commercial farming, the UNDP, (2012, p. 103) warns that the predicted increases in African population can

cause pressure on land for agriculture, something that might result into pressure on environmental sustainability. Furthermore, the global expansions on land use and forest destruction for agricultural intensifications to meet the global food, feed, fiber and timber demands are contributing to the global net increase in greenhouse gas (GHG) emissions, distortion of ecosystems and biodiversity (IPCC, 2019, p. 5). The facts from these scholars embrace arguments for actors in agriculture to undertake sustainable agriculture while they endeavour for economic growth that is based on agriculture.

Commercial farming investments that are sustainably undertaken are beneficial as they contribute to ending hunger, achieving food nutrition and promoting sustainable agriculture. These are elements of the second goal in the Seventeen United Nations Development Goals (UNDP, 2015, p. 19-22). Furthermore, adoption of sustainable commercial agriculture contributes in meeting other goals that are interconnected to this second goal. Such include ending poverty, promoting economic growth and decent work, enhancing sustainable production and consumption, combating climate change and protecting ecosystems and biodiversity loss (PAGE, 2016; UNDP, 2015). Generally, practicing sustainable agriculture contributes to equitable attainment of economic, environmental/ecological and social needs for mutual benefits of the current and future generations (Flint, 2013; Hansmann et al., 2012; UN, 1987, p.1).

Smallholder farmers' consideration of economic, social and environmental sustainability aspects in their endeavours to invest in commercial agriculture in developing economies is paramount. Adoption of cost effective and proper farming methods, avoided use of harmful inputs, proper use of natural resources and concern for biodiversity and ecosystems have significant roles in enhancing sustainable smallholder commercial farming (King and Thobela, 2014; Mitsumoto et al., 2007; Ngowi et al., 2007). Institutional support for smallholder farmers' access to credit and markets (Martinez et al., 2016; HLPE, 2013) and support for local investments in climate-smart agriculture (Brandit et al., 2017; Campbell et al., 2014; Scherr et al., 2012) streamline sustainable smallholder agriculture in developing economies. Also, development of Village Land Use Plans to delineate land uses in many unplanned villages is enumerated as a means for enhancing sustainable smallholder farming (Hart, et al., 2014a).

1.5 Smallholder commercial farming practices in developing countries

Smallholder farmers hold a great share of the world agricultural production. Rural smallholder farmers contribute up to 90% of food production in Africa (Grow Africa, 2014, p. 5; Benard et al., 2014; Wiggins and Keats, 2013, p. viii; ActionAid, 2011, p. 2). Looking specifically to some African countries, rural based smallholder farmers absorb to over 80% of the working population in Tanzania (Epaphra and Mwakalasya, 2017, p. 113; Kimaro et al., 2015, p. 2; Magesa et al., 2014; Benard et al., 2014; Salami et al., 2010, p. 11; Mpagalile et al., 2008, p. 9). These facts suggest that smallholder farmers form the backbone of agricultural production in Tanzania. Since large part of farm-based production activities are done by smallholder farmers, initiatives to commercialize smallholder agriculture contributes to bringing positive impacts to global food security, economic growth of smallholder farmers, development of the country and the entire region as well. Moreover, engaging smallholder farmers in sustainable agriculture commercialization makes a great potential for positive sustainability impacts because smallholder farmers form the large part of agricultural production in the country. On the contrary, unsustainable smallholder farming activities that are left to thrive can adversely impact sustainability since farmers who are likely to engage in such practices are also many.

In moving with the pace of agricultural transformations, Tanzania has taken national, regional and local initiatives that have resulted in implementation of various programs. Examples of these programs include the Kilimo Kwanza Resolution (Agriculture First/Agricultural Transformation) that aims at green revolution of the Tanzanian agricultural sector (LARRRI, 2011; URT, 2009). There are programs to review and create an enabling environmental frameworks to support agriculture and agribusiness development (Mutabazi, et al., 2013; URT, 2004). Also, designation of specific agricultural development zones that are ecologically friendly and inclusive for agribusiness development are among the initiatives (SAGCOT, 2013; 2012; 2011). All these invite individuals, groups, small, medium, and large-scale enterprises and private initiatives from domestic, local or international levels to invest in agribusiness for fostering agricultural based economic development.

Smallholder farmers respond to these transformations by involving themselves in various commercial farming mechanisms and practices to meet their commercial goals. In this respect, smallholder farmers practice commercial farming through various practices and mechanisms. Such include practicing commercial farming individually or by using farmer groups, forming

farmer organizations, associations or societies. Other mechanisms include farming independently or using farming contracts by partnering with other actors in farming value chains; adopting conventional farming mechanisms or organic farming mechanisms among others (Martinez et al., 2016; Byerlee and Haggblade, 2013; PELUM, 2013; Smalley, 2013; URT, 2006). The variations in mechanisms imply different benefits that drive smallholder farmers to choose regardless of similarities in localities, levels of economy and nature of crops and farming types. Also, the variations in choices are thought to have different impacts on sustainability. There have been diverse arguments on sustainability costs and benefits under various commercial farming mechanisms that farmers opt (Seufert et al., 2012, De Schutter, 2010; McIntyre et al., 2009). Despite these variations, smallholder commercial farming activities take track and have brought significant transformations in smallholder farming in the country.

1.6 Statement of the problem

Prevalence in avoidance of sustainability costs together with the ineffective enforcement of sustainability institutional frameworks are factors that endanger sustainability. This assumption holds water because practicing sustainability in agriculture has always indicated not to be an easier undertaking in Tanzania. Smallholders, medium and large-scale farmers and enterprises are evidenced to cause environmental degradation, natural ecosystems distortion and human health impingement. There are cases of excessive use of natural resources and environmental degradation (Nkoya et al., 2016; Green et al., 2013; Schaafsma et al., 2012; Matsumoto et al., 2007). There is also evidence of excessive use of pesticides and insecticides in commercial farming despite the adverse impacts they cause to farmers and to the environment (Ngowi et al., 2016; Lekei et al., 2014; Nonga et al., 2011; Wagner et al., 2009; Ngowi et al., 2007). Creations of social inequalities among actors involved in smallholder commercial farming are also evident (Sulle, 2017; Ali et al., 2016; Goldman et al., 2016; Pedersen, 2015). As contended, the negative impacts from unsustainable agricultural practices, a majority of which affect smallholder farmers and their respective areas are immense and need not to be overlooked.

In response to this situation, sustainability concerns over apparent economic gains and benefits are being raised in smallholder commercial farming (Hart et al., 2014a; SAGCOT, 2012; King and Thobela, 2014; Mitsumoto et al., 2007). Practicing sustainable commercial farming among all actors in smallholder commercial farming and enforcement of institutional frameworks for governing sustainability in smallholder commercial farming are fundamental. The current local,

national, regional and global connections have aided the spreading of this knowledge to a majority of actors and stakeholders in smallholder commercial farming.

The knowledge on the importance and benefits of practicing sustainable agriculture and the costs of unsustainable agriculture practices is widespread and extensively explored (Hart et al., 2014a; King and Thobela, 2014; Flint, 2013; Hansmann et al., 2012; SAGCOT, 2012; Wagner and Marcelo, 2009). Despite this understanding, the extent to which the spread knowledge contributes in transforming smallholder commercial farming from the sole economic benefits orientation to an orientation that integrates sustainability criteria is inadequately explored. The exploration of the inadequacy considers the lack of clarity in the rewarding market mechanisms and motivating market incentives to a majority of actors in smallholder commercial farming in the study area (Hart et al., 2014b; SAGCOT, 2012). This is a fundamental element to consider especially for smallholder farmers' decisions to choose specific commercial farming models. This background led to undertaking conceptual and empirical inquiries to fill the quest. Basically, the inquiry searched for drivers of smallholder farmers' choices of specific commercial farming models and how the consideration of sustainability criteria is reflected in the chosen smallholder commercial farming models.

1.7 Conceptual and empirical reviews on smallholder commercial farming and sustainability

There is abundant scholarly work on smallholder commercial farming and sustainability. This review has focused on smallholder commercial farming practices in general, on critiques to sustainability, on adoption of smallholder sustainability practices and on empirical evidence related to the subject of this study as explained hereunder.

1.7.1 Smallholder commercial farming: Practices, processes and challenges in the developing economies context

When researching on smallholder commercial farming and sustainability in a study area located in developing economies, it is imperative to make an empirical review on smallholder commercial farming practices, processes and challenges in similar contexts. In this respect, various scholarly works have been done by researchers on the subject. Hailua et al., (2015) and Matiku, (2014) contend on low percentage of commercialization of smallholder farming in Ethiopia. They observe commercialization to be deterred by unreliable rainfall, labour shortage, farmers levels of education, costs in getting farm inputs, existence of diseases, distance to

markets, access to credit and poor road infrastructure. The former see income generation and improved farmers' livelihoods in commercialization contrary to the latter who sees no significant contribution of commercialization on farmers' poverty reduction. Mpogole et al., (2014) assert a high level of smallholder round potatoes commercialization in Tanzania. However, the sizes of cultivated land and per capita income from commercialization are very small calling for more farm extensions to meet the associated benefits.

Poole et al., (2013) pose questions and doubts on the generic concept of reduction of poverty in Africa through smallholder commercial farming. The questioned viability of a generalized conception of agriculture raises attention for decision makers to consider the question of commercialization on local contexts. Chirwa and Matita, (2012) reveal various factors that influence smallholder participation in commercialization initiatives in Malawi. These factors include age and number of family labour, family food security, access to fertilizers and farmers' business orientations to commercialization. Strengthening micro-credit support schemes, market facilitation and farmer orientation to business can have significant impacts to smallholder participation in commercialization initiatives in the area.

Access to markets indicates to be one of the major challenge to success of smallholder farmers' commercialization of farming in developing economies. Access to free and reliable markets to many farmers is very important though still these markets are not available. In many instances, smallholder farmers tend to produce more in existence of fair and reliable markets (Mutema and Chiromo, 2014; Baruani et al., 2013). Identifying markets to be a challenge, smallholder cooperative organization and collective actions can be an alternative to influencing smallholder farmers' access to markets. Smallholder farmers can adopt the approach as an intervention to markets access (Fischer and Qaim, 2011; Barham and Chitemi, 2009).

The scholarly explanations show that smallholder commercial farming in developing world is not smoothly practiced. Intentions for farmers to engage more in commercialization of farming are clear though the processes and practices encounter a number of challenges as it is also globally contended (Christiaensen, 2017; Kuivanen, et al., 2016; Collier and Dercon, 2014; IFAD, 2013). It is important to highlight the environment in which smallholder commercial farming in the developing economies is practiced to enable arriving at comprehensive conclusions that are beneficial to the entire smallholder commercial farming sector.

1.7.2 Critiques on practicability of sustainability concept

The concept of sustainability is not equally accepted in terms of meaning and practical aspects. Meaning wise, there are variations in literature on the term sustainability. Referring to its foundation, Alihadi, (2015) upholds an inconsistent use of the term sustainability in literature. The author indicates the term to refer to an integration of economic, social and environmental dimensions in one instance, referring to social dimension alone in another instance and referring to environmental dimension in another instance. The Triple Bottom Line (TBL) aspect instead, carries the integration notion as it specifies each of the three dimensions. Bateh et al., (2013) provides a notion on the complexity of the sustainability concept leading to lack of a standardized meaning. This leads managers to define and practice sustainability in their scope of performance. Moreover, the definition of sustainability is observed to be unclear and this is tied on its looseness making the concept to be holistic, elastic, attractive but imprecise (WCU, 2006, p.3). With this notion, experts in different fields such as economics, environment, business, governance, politics and others use this looseness to express varied notions on how economic, social and environmental welfare should be managed.

Scholars also critique on scales for measuring sustainability. Sustainability bears what Jacobs and Finney, (2019) identify as sheer volumes of definitions, ranking and metric systems which complicate developing a unified measure of the concept. This causes diversity in setting criteria for measuring sustainability in business performances. Janker and Mann, (2018) also express the complications in developing a systematic tool for measuring social sustainability in agriculture. With them, many measures are differently oriented to human rights, working conditions and farmers' perceived quality life. This diversity that calls for establishing a clear framework for measuring social sustainability at the farm.

The highlighted critiques explain the complexity that is attached to comprehending, adopting, applying and measuring sustainability in different areas of performance. It is imperative for this study and other related studies to understand this aspect in order to reduce the complexity associated with the concept of sustainability. However, views towards a unified meaning, common understanding and applicability of sustainability by using the framework approach are also relevant and add value in handling the raised complexities (Kurucz et al., 2017; Hahn et al., 2015; Lockley and Jarrath, 2013).

1.7.3 Adoption of sustainability practices

Despite the existence of critiques on the comprehension and practicality of sustainability practices, acceptability and practicality of the concept under the agricultural sector is upheld. Sustainable agricultural production that considers economic, social and ecological/environmental welfare of actors in developing economies' context has become a practical phenomenon. Over time, there have been practices of sustainable farming that are propagated through different approaches. Climate smart-agriculture promotes sustainable agriculture (Canfora, 2016; Tumsifu, 2014; Scherr et al., 2012). The concept focuses on consideration of the biodiversity and the environment, sustainable land use and on economic and consumer welfare among others through coordinated stakeholder efforts.

Sustainability in agriculture is also propagated through the use of sustainable agricultural approaches or solutions (SDSN, 2013). These foster reduced use of land and other resources in food production, reduced harvest loss and encourage consumption of healthier food. Sustainable intensification as another approach to sustainability fosters production of sufficient and nutritious food while equally considering economic and social development and treating people, animals and the environment with respect (Godfray and Gamett, 2014; SDSN, 2013, p.16).

Looking objectively, the explained approaches that propagate sustainability in agriculture emphasize on adoption of methods that foster inclusiveness and mutual provision of economic, social and environmental benefits to all involved stakeholders. Practices contended within these cases indicate possibilities of the existence of smallholder commercial farming mechanisms and practices that integrate economic, ecological/environmental and social aspects that are equitable and mutually beneficial to all stakeholders.

1.7.4 Smallholder commercial farming and sustainability: Empirical perspectives in developing economies

Different from the scholarly conceptual views, literature provides empirical views on impact studies within smallholder commercial farming and sustainability contexts. Researchers have explored on the impacts of different commercial farming mechanisms or models on smallholder farmers' welfare. Henningsen et al., (2015) assess the impact of a contract farming model on efficiency and productivity of smallholder sunflower farmers in Tanzania. The model is found to increase yields and productivity of farmers but decreases their technical efficiency. Mabaya and Cramer, (2014) argue on the impacts of a contracted out-grower scheme model to smallholder

fruits and vegetable farmers in Kenya. Significant economic impacts of smallholder farmers' adoption of the model are evident. Patel, (2014) contends on the consistent income earning by smallholder cereal farmers in Malawi and Mozambique who adopt a contracted value chain management model facilitated by the Export Trading Group (ETG). Using commercial cotton, maize and horticulture crops under an independently governed model of smallholder farming commercialization, Chapoto et al., (2013) identify varied outcomes of crops commercialization models to poverty reduction of smallholder farmers in Zambia.

Furthermore, a lack of environmental analyses is evident in empirical studies that analyze the impacts of various commercial farming models on smallholder farming and sustainability. Mutabazi et al., (2013) discover an independent smallholder commercial farming model where farmers use their own sources of income as capital for farm production in Central Tanzania. Income gains, existence of social and income inequalities due to differences in land ownership, sex and skills to commercialize are manifested. Dominic et al., (2014) identify a contract farming model between HomVeg Company, a horticulture company and smallholder horticulture farmers in Northern Tanzania. There are significant economic benefits to smallholder farmers obtained through exports of products among others. Despite the evidence of identification of models and discussions on sustainability impacts from these studies, specific analyses on environmental impacts resulting from commercialization of farming under these studies are insufficient.

In another instance, empirical studies make analyses on smallholder commercial farming and sustainability with deficiencies in social analyses. King and Thobela, (2014) pinpoint a smallholder contract farming model that is adopted by Woolworths Farming in South Africa. The use of scientific approaches in control and protection of the natural environment and biodiversity at very reduced costs are found out. The study does not give analysis on the social impacts of the project. Additionally, Vorley et al., (2015) highlight different frameworks that promote smallholder adoption of economic, social and environmental sustainability in Colombia, Ghana, Kenya and Ethiopia. These frameworks include the use of national standards on sustainability, national or international quality standards, minimum price mechanisms, purchase guarantee schemes, products branding and use of levies and taxes for products. Success and positive results to economic and environmental sustainability dimensions in some places are evident leaving the social dimension of sustainability unexplained. Furthermore, Mamuya, (2011) analytically compares smallholder organic contracted and conventional contracted models of

commercialization to domestic or export selling schemes and contractual agreements in Tanzania. The economic assessment of the two models are more pronounced with indication of variations in outcomes depending on models, contractual agreements and selling mechanisms. Analyses of environmental and social impacts are not given more emphasis in the study despite identification of their importance under the models.

Moreover, studies analyze smallholder commercial farming and sustainability impacts with a lack of specific models that farmers opt in their commercial farming. Smith et al., (2017) study the identification of sustainable intensification indicators in smallholder African farmers. They find a tradeoff in indicators for sustainability due to variations in indicators for measuring human wellbeing, social and environmental sustainability. The study proposes for contextual definition of indicators in which a sustainability measure is being undertaken as Tiftonell, (2014) contends. Pretty et al., (2011) who used data from 40 agricultural intensification projects developed in 20 African countries in the 2000s found the projects to have brought significant economic impacts to families and households engaged. Up to the year 2010, the projects had engaged 10.39 million farmers, 12.75 million hectares of land and 5.79 million tons of food produced per year (Pretty et al., 2011, p. 9-10). Environmental externalities were highly controlled to the extent of no pesticides use at all. In the similar direction, Sokoni, (2007) analyses the impacts of smallholder commercialization of farming on sustainable use of natural resources in Tanzania. Economic impacts of commercialization including income generation from farming, commercialization of farm labour and farm inputs are found. The mode of land ownership indicates to be changing due to commercialization of land assets. Environmental impacts include changes in cropping systems, agricultural intensification and exploitation of natural resources. The study however lacks an identification and explanations of results basing on commercial farming models that farmers adopt in commercialization of farming.

1.8 Literature synthesis

The referred body of knowledge carries different interests ranging from documenting practices, successes and challenges of smallholder commercial farming sector to ascertaining its impacts on enhancing smallholder farmers welfare in developing economies. Others assess the impact of smallholder commercial farming on sustainability. Generally, these studies show a growing research interest in smallholder commercial farming and sustainability topics. Nonetheless, what lacks most is a clear crosscutting link between various smallholder commercialization models

and sustainability in specific social ecological system settings. The conceptual literature has provided a foundation and existence of various smallholder commercial farming models that are practiced in various areas. Models are found in their own standpoints without a clear integration into sustainability agendas that smallholder commercial farmers practice in specific areas. In cases where integration is made is found to be more with economic biases.

On the other hand, empirical literature has provided cases of impact analyses of smallholder commercial farming models on sustainability. However, there is no evidence of assessments that link smallholder chosen commercialization models and sustainability under a complete set of economic, social and ecological/environmental criteria. There is also no clear evidence of assessments that are conducted in a setting that bears social-ecological system characteristics such as a specific climatic zone or an agro-ecological zone. These are the missing indications for basing the inquiry on smallholder commercial farming models and sustainability. This led to undertaking an inquiry on the extent that smallholder farmers in developing economies are transforming from making commercial farming choices basing on apparent benefits to making choices that integrate sustainability criteria despite the nature of farming commercialization. This knowledge gap has been explicitly filled by the inquiries made through this study.

1.9 The main research question

The main research question of this study asks: What are the drivers for smallholder farmers' choices of specific commercial farming models and how are sustainability criteria considered in chosen models?

The study focused on collective and group-based smallholder commercial farming models with assumptions that the farmer collective attribute has more influence on sustainability than other attributes. The study selected groups of smallholder commercial farmers who are engaged in commercial farming activities in partnership with agribusiness firms or companies or initiatives in the Highlands Agro-Ecological Zone in Njombe District in Tanzania.

1.10 Specific research questions

To realize this general objective, the study sought to answer the following questions.

- i. What are the different types of smallholder commercial farming models that are practiced in the study area?
- ii. What are the drivers that influence smallholder farmers to choose specific commercial farming models that are identified in the study area?
- iii. How do smallholder farmers consider sustainability criteria in the chosen commercial farming models in the study area?
- iv. How do smallholder farmers perceive the performance of commercial farming model with respect to sustainability criteria in the study area?
- v. Which appropriate policy and strategic recommendations are made to enhance promotion of sustainability in smallholder commercial farming in the study area?

1.11 Scope of the study

This study inquired on the factors that influence smallholder farmers to choose specific commercial farming models and how sustainability is considered in the chosen models in the study area. The factors for examining the drivers for choices are derived from conceptual/literature reviews and empirical inquiries. Theory based criteria that are used in assessment of sustainability are ecological/environmental, social and economic criteria. The study area is the Highlands Agro Ecological Zone in Njombe District in Tanzania. This is an agro-ecological zone that depicts a social ecological system (SES) with typical representation of ecological/environmental, social and economic characteristics that are suitable for a sustainability study.

The study focused on smallholder farmers who practice commercial farming in groups, unions, associations or societies and work with agribusiness firms or companies or initiatives that are based in the study area. The selected agribusiness firms or companies or initiatives that are linked to smallholder farmer groups are profit oriented and others are not-for-profit entities.

The agricultural value chain comprises a very broad range of actors and activities. Including all actors and practices in the entire agricultural value chain for the study could be very unfocused and complicated. In this understanding, the study focused on actors and commercial farming practices that base on natural and land resources use, inputs acquisition and utilization, and

production in the agricultural value chain. Still, commercial farming practices within the input and production parts of the agricultural value chain are wider. The study focused on practices that enhance common use of ecological/environmental, social and economic resources to mutually attain ecological/environmental, social and economic benefits among commercial farming actors and the target social ecological system.

1.12 Significance of the study

The significance of this study is very explicit because initiatives to realize the implementation of sustainability agenda in many sectors is currently a global concern. It is recognized that attainment of economic benefits is a primary goal in any for-profit and commercial endeavour. Notwithstanding, consideration of ecological/environmental and social criteria linked to commercial endeavours is fundamental in fostering the mutual attainment of current and future sustainability benefits (Flint, 2013; Hansmann et al., 2012; UN, 1987,p.1). Therefore, an integrative approach that considers economic, social and ecological/environmental benefits in such undertakings is very paramount.

The evident growth in initiatives to promote smallholder farmers' engagement in commercial farming in Tanzania need to be nurtured and built in integrative sustainability approaches. Engaging smallholder farmers (who form a majority of farmers in Tanzania) and other actors in such sustainability programs and initiatives brings positive impacts to building sustainability orientations to smallholder commercial farming in the country. This contributes in avoiding the costs of unsustainable practices and fosters sustainable development of smallholder farmers, other actors, the sector itself and the respective areas and regions.

Founded on this understanding, a motive was developed for an inquiry that is expected to add knowledge in the existing smallholder commercial farming and sustainability literature. The derived knowledge can be significant in the improvement of policies related to promotion and creation of enabling environment for sustainable smallholder commercial farming. There has been challenges in establishing appropriate policies and institutional frameworks in emerging ventures that relate to use of natural resources in Tanzania (Ndah et al., 2015; Hultman et al., 2012; Branca et al., 2011; Sosovele, 2010). The knowledge can add value in addressing such challenges by reorienting the policies and institutional frameworks to be actor inclusive, mutual and benefit oriented for fostering sustainability in smallholder commercial farming in the area (Schut, et al., 2015).

The derived knowledge enlightens the understanding of agribusiness firms, private initiatives and other investors on the benefits of venturing in sustainability of smallholder commercial farming. The knowledge can also be a trigger for emergence of more smallholder sustainability related agribusiness ventures and initiatives as it highlights the potential areas for such investments. Such ventures could be in areas of resources, capacity and technology enhancement, services provision and supporting access and provision of markets. Furthermore, the knowledge derived from the study contributes in creation of awareness and understanding the importance of integrating sustainability criteria in smallholder commercial farming choices and practices. The knowledge is significant to smallholder commercial farmers as it enlightens the importance of incurring the sustainability costs in their commercial farming endeavours in order to mutually attain the current and future ecological/environmental, social and economic benefits.

1.13 Outlines of thesis chapters

The structure of this thesis contains nine chapters. Chapter one presents the introductory and background information to the study. It traces the shift of smallholder agriculture from subsistence to commercial agriculture. It then highlights the concept of sustainable agricultural practices by smallholder farmers in developing countries. The chapter presents the research problem, makes the conceptual and empirical reviews of literature from which the research gap is derived and explained. Then the chapter presents the main and specific research questions, defines the scope of the study and ends by explaining the significance of the study.

Chapter two is on the conceptual reviews on the theme of the study, theoretical and conceptual framework and the operationalization of research constructs. It defines the key terms that are used in the study including the scope of sustainability to Triple Bottom Line (TBL) dimensions context. The chapter explains the conceptual model that was used in deriving smallholder commercial farming models that were adopted for the study. Furthermore, the chapter explains the theoretical framework, the conceptual framework and the ways the variables that are extracted from the models for the study are operationalized.

Chapter three is about the methodology that was employed in the study. It explains the research philosophy, the contents of the research design and approaches, the scope of the research, data sources and types, the determination of case studies, sampling methods and data collection methods. The chapter explains on the ethical procedures that were followed for data access and all requirements that were undertaken to validate the data before it was collected. The chapter

further explains on the data management and analyses processes including the methodological limitations that this study encountered.

Chapter four presents explanations of the study area in which the research was conducted. It provides an overview of Tanzania, the Njombe District and its Highlands Agro-Ecological Zone which the empirical research cases were selected for the study. It also explains on the Highlands Agro-Ecological Zone with respect to the Institutional Analysis and Development and Social Ecological Systems (IAD-SES) Framework. In this, smallholder commercial farming activities as action situations are explained in relations to the resource system, resource unit, governance system, actor conditions, social, economic, political and ecological conditions. Discussions on smallholder commercial farming action situation, interactions and sustainability in the zone are further done in the chapter.

Chapter five presents answers on types of commercial farming models that are practiced in the study area. The chapter identified and explained the contents of all the four commercial farming models that are found in the study area. The modalities in which commercial farming firms or companies or initiatives contract or partner with smallholder farmer groups in practicing commercial farming are also presented. The chapter presents further discussions on the status of the models and sustainability practices in the study area.

Chapter six presents findings on factors that influence smallholder farmers' choices of commercial farming models in the study area. Descriptive characteristics of smallholder farmers in the selected cases of farmer groups are presented. The chapter also presents the descriptive characteristics of farmer groups that were selected from the same commercial farming models. The chapter then explains the analyses and presents the specific and general findings and conclusions on drivers for smallholder farmers' choices of specific commercial farming models with their respective discussions.

Chapter seven is on smallholder commercial farmers' considerations of sustainability criteria in their commercial farming models. The chapter presents the quantitative and qualitative results on the status of smallholder farmers' considerations of sustainability criteria in their commercial farming followed by derivation of general findings and conclusions on the question. Discussions on the derived general findings are presented.

Chapter eight presents answers on perceptions of smallholder farmers on the performance of commercial farming models with respect to sustainability criteria in the study area. The chapter presents the quantitative and qualitative results on the question for every commercial farming model. The chapter further presents the derived conclusions on the findings followed by detailed discussions on the general findings.

Chapter nine makes a summary of findings with their discussions followed by making general conclusions on the research questions. The chapter also makes a general conclusion of the study. The chapter presents the general contribution of the study to the body of knowledge and proposes areas for future research. Furthermore, the chapter presents the policy and strategic recommendations to various actors who have roles to play in enhancing sustainability in smallholder commercial farming. The chapter ends by presenting the limitations to this study.

1.14 Summary on the chapter

This chapter has made the introduction to the research problem by tracing the transition of smallholder agriculture from subsistence to commercial agriculture in developing countries including the country of the study area. It has explained the link between smallholder commercial farming to the global need for undertaking sustainable agricultural practices by smallholder farmers. The chapter has also presented the research problem of this study.

Thereafter, the chapter has presented the conceptual and empirical literature reviews for the study. The conceptual review focused on the critiques, practicability and adoption of sustainability practices in agriculture in a developing economies context. The chapter has presented the empirical practicability and adoption of sustainability practices in a developing economies context despite critiques on the sustainability agenda. From these reviews, the chapter provided evidence on a lack of association between smallholder commercial farming models and the Triple Bottom Line (TBL) sustainability criteria and hence identified the research gap.

Furthermore, the chapter has presented the general and specific research questions that were used to guide the inquiries for the study. The chapter has presented the explanations on the scope of the study, the significance of the study and has highlighted the contents of all the nine chapters of this thesis. The chapter has ended with a conclusive summary of what it has entirely presented.

CHAPTER TWO: CONCEPTUAL REVIEWS, THEORETICAL FRAMEWORK AND OPERATIONALIZATION OF THE STUDY CONSTRUCTS

2.1 Introduction

This chapter begins by giving clarifications and contexts on the key terms that form the constructs of this study. It then explains the key smallholder commercial farming concepts that are linked to this study. From these concepts, the chapter presents a synthesis and formulation of a conceptual model for deriving smallholder commercial farming models for the study. The chapter further explains on the theoretical framework, the conceptual framework and the ways the variables that are extracted from the models for the study are operationalized. It begins by tracing the foundation of theories related to the study, selecting and explaining the theories and frameworks adopted for the study. Then the chapter explains on the developed conceptual framework under which the study is abstracted and presents a respective model for this abstraction. Furthermore, the chapter explains the structure through which the constructs of this study were operationalized. The chapter concludes by presenting a summary of what has been contained in the entire chapter.

2.2 Key study terms, concepts and contexts

This part provides explanations of meanings and contexts of key terms and concepts that are used in this study. The key terms and concepts are identified and their meanings and contexts are clarified with respect to the application of this study as explained below.

2.2.1 Smallholder farmer/farming

There are various criteria that are provided in the literature to define smallholder farming or small-scale farming. IFAD, (2013, p.10) defines smallholder farming on the basis of land size, number of labour force used and the amount of capital investment and gains that farmers use in farming. Literature further enumerate smallholder farming to be characterized by limited ability in terms of access to resources, information, skills, innovation and technology, capital/credit and markets and diversification (Christiaensen, 2017; Kuivanen, et al., 2016; Collier and Dercon, 2014; IFAD, 2013). Among these criteria and characteristics, land size is the criteria that is most commonly used in defining a smallholder farmer or smallholder farming. On the basis of land size, a smallholder farmer is defined as a farmer who owns a farm size to the threshold of 2 hectares of land that is used for cultivation of crops alone and not for crop farming and livestock keeping (Qiao, 2017; IFAD, 2013, p. 10).

The understanding of smallholder farming context provided by literature is not very much diverse from the above explained and it is the context that this study adopted. However, being specific to Tanzania where this study was undertaken, a smallholder farmer is defined to own a farming land to the threshold size of 1.89 hectares (FAO, 2015, <http://www.fao.org/family-farming/data-sources/dataportrait/country-details/en/?cnt=TZA>). Notwithstanding, smallholder farmers in Tanzania are characterized to be constrained in accessing resources, capital and credit, innovation, technology and markets among others despite the significant role they play in food production and contributing to food security.

2.2.2 Subsistence farming

Under this study's context, subsistence farming refers to agricultural production of crops (especially food crops) whose proportion is only for family and household consumption and self-sufficiency. It is production that involves farming a proportional amount of which greater part is consumed by the farmer without either setting the extra proportion for the market consumption or due to being constrained to access the markets for the extra food produced (Fan et al., 2013; IFPRI, 2005; Kostov and Lingard, 2004; Nyikai, 2003).

Subsistence farming is normally practiced through smallholder farming within small portions of acres of land and the family labour is the main source of labour. It is characterized by low production to meet consumption demand, lack of machinery, lack of capacity to purchase inputs and lack of capacity to supply to the market in case of surplus production. Arguing critically, Lerman, (2004) contends that, subsistence farming does not provide an ability to add value to the primary farm commodities. It does not have the capacity to increase the value that can drive consumers to increase their willingness to purchase the produce.

2.2.3 Smallholder commercial farming

Smallholder commercial farming, synonymously referred to as commercial agriculture under this study's context is understood as farming that is undertaken as a result of transformation in smallholder agriculture due to the current global economic growth. In this transformation, smallholder farmers move from the traditional consumption production system to a system where production focuses on increasing proportions and value of produce with the intention of capturing the market demands (Timmer, 2014; Zhou et al., 2013; Kirsten et al., 2012; Gebremedhin and Jaleta, 2010; Pingali, 2010; Pingali and Rosegrant, 1995).

Smallholder commercial farming has mainly been a result of global economic growth and changes in varieties of food demands resulting into emergence of agribusiness endeavours. In these endeavours, smallholder producers seek and get integrated into agribusiness markets with the intention of making income generation decisions and use the market needs to maximize profit (Carletto et al., 2017; Poole et al., 2013; IFPRI, 2005). It is within this context that this study considers smallholder farmers who have transformed their farming practices to be commercially oriented. Smallholder farmers have integrated with agribusiness firms or companies or initiatives and use their farming practices to capture economic value and enhance their economic growth.

2.2.4 Smallholder commercial farming models

Many scholarly articles in agriculture use the term “model” with different and varied meanings. In explaining the profitability of smallholder irrigation scheme uses, Mdemu et al., (2017) refer to the different financing approaches that farmers use to access funds to enhance the utilization of the schemes as financing models. Mercati, (2016) classifies organic farming as an agricultural model that indicates to be environmentally friendly and propagates for its adoption as a counter approach to conventional models. Tittonell, (2014) refers to the approaches that are used to increase agricultural production through ecological or sustainable ways as ecological agricultural intensification models. Furthermore, Wiggins, (2009) refers to the smallholder farming approach as a model that can be used to foster food security and poverty eradication in Africa. With this literature, the term model indicates to be used with reference to the context of the theme in question and is more oriented to an approach or a method that is used to attain certain goals.

In this study, the term “smallholder commercial farming models” denotes approaches that smallholder farmers use in undertaking commercial farming activities. A model refers to an approach where a smallholder farmer group partners with a commercial farming firm or company or initiative to undertake contractual or non-contractual commercial farming by using a conventional or an organic farming system. The smallholder commercial farming models in question were conceptually derived by this study through literature review. The models were derived by combining organizational mechanisms, contractual agreements and farming systems that farmers use in undertaking their commercial farming activities in partnership with agribusiness firms or companies or initiatives. There are four smallholder commercial farming

models that were derived and adopted by this study. Further explanations of these models are found in Part 2.4.1 and Part 2.4.2 of this chapter.

2.2.5 Sustainability concept

A majority of the literature has the genesis of the sustainability concept from the sustainable development aspect that featured as the main agenda of the World Commission for Environment and Development known as the Brundtland Commission, 1984. Despite arguments that indicate the vagueness and ambiguity of the concept, the Commission defines sustainable development as development that meets the needs of the present without compromising the ability of the future generations to meet their own needs (UN, 1987, p. 41). From this base, the concept of sustainability thinking under various arguments is portrayed. Arguments for sustainability as development that intends to acquire the current and future economic growth and social wellbeing while sustaining the environmental ecosystems and practicing all these within the institutional and cultural aspects are raised (Yilmaz and Bakis, 2015; Flint, 2013; Hansmann et al., 2012; WCU, 2006; Pfahl, 2005; Spangenberg et al., 2002).

From all these arguments however, the general conception of this study on sustainability involves an integration of human development initiatives that aim at achieving economic and social wellbeing while considering sustenance of ecological/environmental ecosystems within sets of institutional frameworks established in a particular area. This view is summed up by the fact that sustainability entails a new form of development engagement under which economic, ecological/environmental, social and institutional dimensions that surround the engagement initiatives are integrated together towards making mutual distributions of benefits to all involved actors in a particular community setting.

2.2.6 Sustainability pillars

There are diverse arguments on the pillars under which sustainability is classified. Many literatures argue that sustainability covers economic, environmental and social dimensions (Yilmaz and Bakis, 2015; Flint, 2013; Hansmann et al., 2012; WCU, 2006). The classification of the three dimensions is commonly referred to as the Triple Bottom Line (TBL) model of sustainability (Goel, 2010). Other literature contends sustainability to include the latter three dimensions together with cultural and institutional dimensions (Xu et al., 2013; Pfahl, 2005; Spangenberg et al., 2002).

Definitely, economic, social and ecological/environmental sustainability focus on looking on the ways human undertakings foster economic, social and environmental welfare to actors involved in these undertakings. Specific to ecological/environmental sustainability, it focuses on long term sustenance of the ecological/environment systems since these systems in many instances are overlooked in favor of the economic and social undertakings. The cultural dimension on the other hand, focuses on the role of preserving and considering cultural capital, values and identity when engaging in economic, social and environmental undertakings for reservation of culture and laying a foundation of values for the benefits of future generations (Soini and Dessein, 2016; Puhakka et al., 2009; Hawkes, 2001). Moreover, the institutional dimension bases on the fact that attainment of economic, environmental, social and cultural sustainability goals requires existence of an institutional framework. This can be in terms of a legal entity endowed with rules and regulations that support policy formulation and decision making to facilitate governance of respective sustainability practices (Xu et al., 2013; Vogelpohl and Aggestam, 2012; Pfahl, 2005; Spangenberg et al., 2002).

With these views, sustainability is observed to be classified in five dimensions of economic, ecological/environmental, social, cultural and institutional dimensions. Understanding sustainability within this discourse gives a strong and meaningful foundation despite its encountered complexity. However, dimensions to be referred in an assessment depends on a theme in a particular inquiry.

2.2.7 Adoption of the Triple Bottom Line (TBL) sustainability model

Adoption and operationalization of sustainability under the five dimensions differ between contexts. Basing on the nature of the sector under which this study was carried and on the questions that the study intended to answer, the Triple Bottom Line (TBL) model of sustainability that focuses on economic, environmental/ecological and social dimensions was adopted. The institutional dimension was adopted as a component of sustainability scanty under institutional frameworks of land use governance system factors. The model entails the integration of human development initiatives that aim at achieving economic and social wellbeing while considering sustaining of environmental or ecological ecosystems within a particular location. It is a form of development engagement under which the base line dimensions of sustainable development are integrated together towards making mutual distributions of benefits to all involved and interconnected stakeholders in a particular setting.

2.3 Smallholder commercial farming concepts, mechanisms and models

In endeavours to practice commercial farming, smallholder farmers engage in varieties of mechanisms to facilitate their business within agribusiness value chains. With concerns of this study, these mechanisms are classified as farmers' organizational forms, farmers' contractual arrangements and crop farming systems or types that smallholder farmers adopt. Basing on their specific aspirations, smallholder commercial farmers voluntarily choose to engage in varieties of mechanisms that are within their capacity as explained.

2.3.1 Commercial farming organizational forms

Smallholder farmers build their capacity to participate in agribusiness value chains by organizing themselves in various organizational forms. Through organizing, farmers improve their production capability and enhance their access to more commercialization of farming. Literature identifies smallholder commercial farmers who opt to use an independent farming approach in which a farmer acts individually in the production value chain. A farmer can individually access agro inputs, facilities and services, act individually in farming, in processing and in selling the produce at identified markets. Where necessary an individual farmer can adopt to use intermediaries in the commercial value chain to facilitate the business (Byerlee and Haggblade, 2013; Paglietti and Sabrie, 2013; Kelly, 2012).

On the other hand, commercial farmers opt to use farmer groups or unions or cooperatives in their farming activities. They organize themselves in groups for collective actions to increase efficiency and reap the benefits within the agribusiness value chain. Collective farmer actions can be intended for improving quality and quantity of agricultural produce, enhancing links with specific groups of suppliers, advisers and financial institutions. The approach provides means to counteract challenges to access inputs, supplies and expertise within the value chain. Collective farmer actions can facilitate farmers' forward linkage with large scale retailers, consumers, agro processing industries and agri-food enterprises (Ma and Abdulai, 2016; Ager, 2015; Byerlee and Haggblade, 2013; Paglietti and Sabrie, 2013; Kelly, 2012).

2.3.2 Commercial farming contractual mechanisms

Smallholder farmers may opt for commercial farming contracts to raise their capital and asset bases by partnering with other actors in agribusiness value chains. Literature provides various forms of contracts that actors may choose depending on asset-bases and service needs.

Contract farming is a mechanism in which an enterprise supports farmers to access farm supplies and other agricultural services in exchange of the purchasing right for the crop to be produced (Ragasa et al., 2018; Maertens and Verde, 2017; Wuepper and Sauer, 2016; Henningsen et al., 2015; Byerlee and Haggblade, 2013). This support is initiated through a contractual agreement. The lending enterprise may support farmers who do not access services such as financial credit, seeds, fertilizers and technical expertise. The enterprise controls the quality, quantity and standards of production, adherence to safety and certification and when to supply. Contract farming contracts between parties, legally binds and can be enforceable.

A joint venture is another form of commercial farming contractual agreements where two agribusiness parties who do not significantly differ in equity levels form a venture. It can be by sharing their equity in terms of assets, ownership, expenditures, decision making and the benefits in terms of revenues obtained from the venture (Byerlee and Haggblade, 2013; Paglietti and Sabrie, 2013). Joint ventures enhance sharing of costs, risks and benefits on equal basis among parties. It can take for example an agribusiness company entering into equity sharing with a group of smallholder farmers for production of a particular crop.

Smallholder commercial farmers may opt for a contractual mechanism by using out-grower schemes. This involves a large-scale estate that contracts with smallholder farmers in the initial costs for a crop establishment then lets the farmers to process the products management without making contracts for inputs and other services of production (Byerlee and Haggblade, 2013; Paglietti and Sabrie, 2013; Prowse, 2012). It can be operated as a nucleus farm owned by an estate and surrounding smallholder farmers cultivate the same crop in their own farms for the estate to purchase to increase the needed volume.

Commercial farming may also be contracted by a farmer through an intermediary model by either including a brokerage agency or a not-for-profit organization in the value chain. Under the agency form, an agency plays the role of brokerage between farmer(s) and the suppliers of agricultural inputs and credit or linking farmers with high level markets and agribusinesses (Paglietti and Sabrie, 2013; Prowse, 2012). Under a not for profit form, a body can be a non-

governmental organization or a development agency. This body supports smallholder farmers' initiatives to growth by providing them with services such as knowledge, skills and technical expertise to empower them to enhance their overall development (Kelly, 2012).

Smallholder farming can be practiced through a multipartite contract that includes many actors who get involved together in facilitating agribusiness processes. It can involve smallholder farmers, the government, donor agencies, financial institutions and agribusiness enterprises who work together to improve access to inputs and machinery, production and processing and linking farmers to higher markets in the value chain (Paglietti and Sabrie, 2013). In spite of many actors, the mechanism can be backed up by some contractual agreements to facilitate smallholder farmers' access to services that they lack because of their low capacity.

Last but not least, the informal contract mechanism involves smallholder farmers who make informal verbal contractual agreements with small scale agribusiness enterprises on short term or seasonal basis. The informal contract can be on provision of inputs and support of minimum processed products. Under this mechanism, the needs for other support services such as technical expertise are subsidized by donor agencies. Due to its nature, the mechanism is subjected to many risks and hence needs an independent body, normally a government agency to mediate (Paglietti and Sabrie, 2013; Prowse, 2012).

2.3.3 Commercial farming systems

Small and large scale agricultural endeavours are done by using various systems of managing cultivated crops depending on the needs of farmers. Conventional farming is a system that practices frequent cropping and use of large land fallowing to increase yield. It uses agro technologies such as synthetic fertilizers, pesticides and other food additives to improve soil quality and increase yield (Jouzi et al., 2017; Kirchmann et al., 2016; Monroy et al., 2016; Bennet and Franzel, 2013; Gomiero et al., 2011). The system serves to enhance increased quantities of food production to meet the respective domestic and international food market demands caused by population increases. Despite meeting the intended impacts for agricultural intensification, the system is the cause of negative environmental impacts such as Greenhouse Gases (GHGs) emissions, reduced soil quality, increased pest residues, distorted biodiversity among others (Kirchmann et al., 2016; Binta and Barbier, 2015).

Conversely, organic farming system focuses on use of traditional biological, agronomic and agro ecological techniques to build soils and improve yield quality and quantity without using

synthetic soil and other yield improving technologies (Jouzi et al., 2017; Qiao et al., 2017; Kirchmann et al., 2016; Mercati, 2016; Monroy et al., 2016; Wezel et al., 2014; Bennet and Franzel, 2013). Organic farming is practiced as organic-by-default practices, traditional organic practices, certified organic agriculture and organic and resources conserving agriculture (Bhan and Behera, 2014; Bennet and Franzel, 2013; Rosinger, 2013). Within this era of high growth in food safety standards and consumption of organic products worldwide, organic farming is being used as a commercial way to differentiate itself from conventional farming. It is practiced to create differentiated products that are intended for capturing niche customers in domestic and international markets (Bhatia and Jain, 2013; Seufert, 2012).

It is also practical with smallholder farmers to adopt a mixed farming system as an approach to commercial farming. This is a farming system where farmers practice either a mixture of conventional and organic farming systems or a mixture of various cropping types to suit their specific farm needs (Flanzluebbers et al., 2014a; Flanzluebbers et al., 2014b; Trewavas, 2001). In this system, farmers may opt to conventionally mix various crops in one farm or mix the use of organic manure and chemical fertilizers in one farm. The methods are adopted as means to improve nutrients and yields or are adopted by default due to either unavailability or lack of ability to access farm inputs that are used in a specific farming system.

The gathered body of literature from the reviewed commercial farming mechanisms formed a framework for reflecting and conceptualizing smallholder commercial farming models that are used in the study. The abstraction of contents of literature with respect to farmer organizational forms, farmer contractual mechanisms and farming systems that farmers adopt provided an ideal thinking of what is empirically practiced in the study area. This synthesis is further explained in the next parts of the chapter.

2.4 Synthesizing commercial farming mechanisms to commercial farming models

The conceptually reviewed commercial farming mechanisms are synthesized into a conceptual framework for deriving smallholder commercial farming models. The conceptualization derived eight possibilities of smallholder commercial farming models that farmers can adopt. The synthesized general and specific conceptual frameworks for smallholder commercial farming models are explained in the next parts of this chapter.

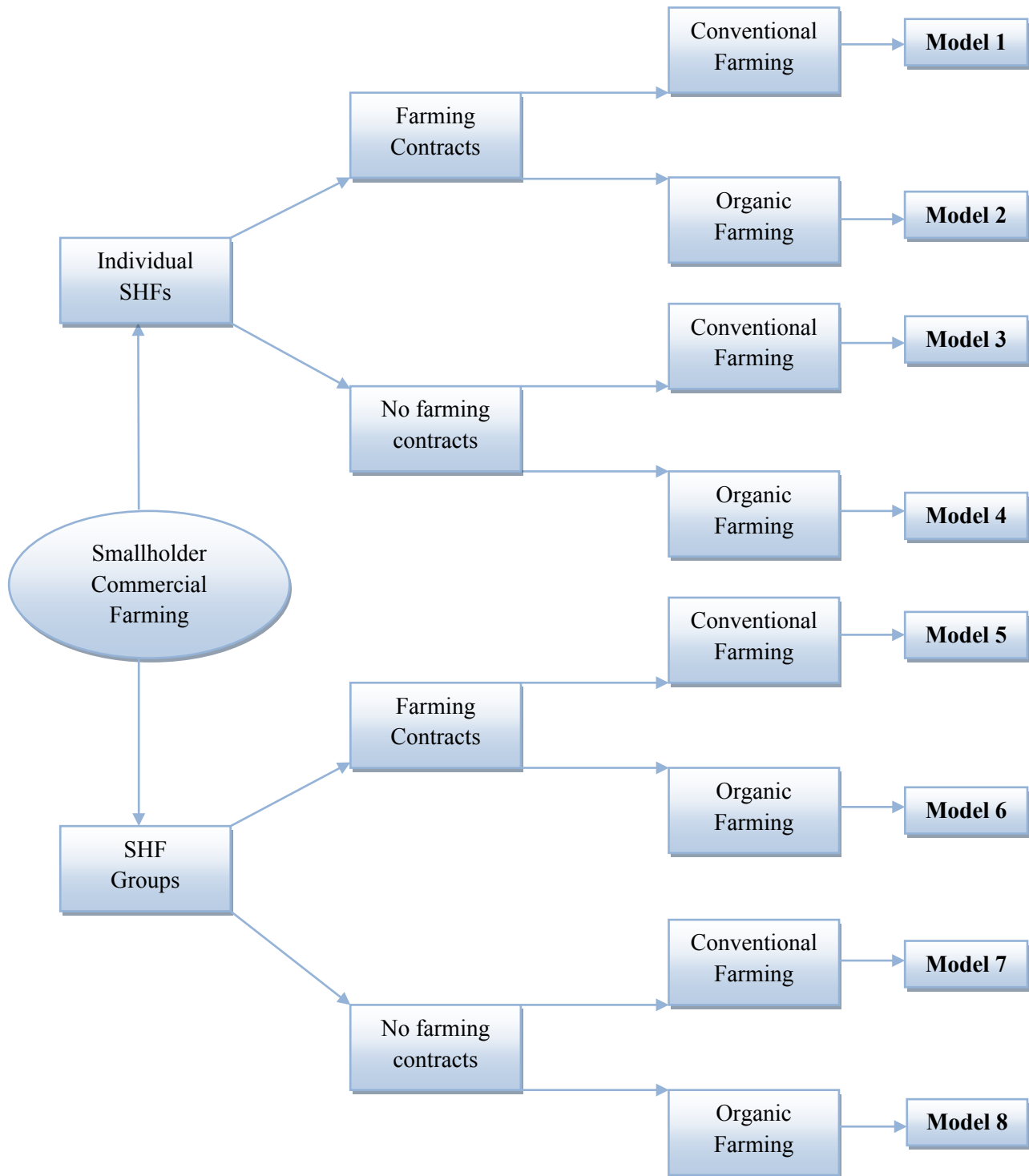
2.4.1 A conceptual model for deriving smallholder commercial farming models

The conceptual model for establishing smallholder commercial farming models is composed of eight models. The models are in two categories basing on the organizational form that farmers opt. There are individual-based models and group-based models each with four possibilities that smallholder farmers can opt for. The first model conceptualizes an individual smallholder commercial farmer who decides to opt for farming contracts and uses a conventional farming system in commercial farming. This is modeled as *Individual Smallholder Contracted Conventional Farming Model*. The second model conceptualizes an individual smallholder commercial farmer who decides to opt for farming contracts and uses an organic farming system in commercial farming. This is modeled as *Individual Smallholder Contracted Organic Farming Model*. In the third model, a smallholder commercial farmer can opt for no commercial farming contractual arrangements and use conventional system of farming. This is modeled as *Individual Smallholder Non-Contracted Conventional Farming Model*. In the fourth model, a smallholder commercial farmer can opt not to engage in any commercial farming contractual arrangements and use organic farming system in commercial farming. This is modeled as *Individual Smallholder Non-Contracted Organic Farming Model*.

Furthermore, the fifth model conceptualizes a group of smallholder commercial farmers who opt to use farming contracts and a conventional farming system in their commercial farming. This is modeled as *Smallholder Group Contracted Conventional Farming Model*. The sixth model conceptualizes a group of smallholder commercial farmers who opt to use farming contracts and an organic farming system in their commercial farming. This is modeled as *Smallholder Group Contracted Organic Farming Model*. In the seventh model, a group of smallholder commercial who undertake conventional farming can opt not to choose any contractual arrangements in their commercial farming. This is modeled as *Smallholder Group Non-Contracted Conventional Farming Model*. In the eighth model, a group of smallholder commercial who undertake organic farming can opt not to choose any contractual arrangements in their commercial farming. This is modeled as *Smallholder Group Non-Contracted Organic Farming Model*.

The explained conceptualization of a general model for deriving smallholder commercial farming models is presented in Figure 2.1. and the basis for the conceptualization is summarized in Table 2.1.

Figure 2. 1: A general conceptual model for deriving smallholder commercial farming models



Source: Researcher's construct from literature review

Key:

SHF Small Holder Farmers

Table 2. 1: Basis of the conceptual model for deriving smallholder commercial farming models

Business type	Organizational form	Contractual mechanism	Farming system	Derived model
Smallholder commercial farming	Individual farmer	Contracted	Conventional	Model 1: Individual Smallholder Contracted Conventional Farming Model
			Organic	Model 2: Individual Smallholder Contracted Organic Farming Model
		Non-contracted	Conventional	Model 3: Individual Smallholder Non-Contracted Conventional Farming Model
			Organic	Model 4: Individual Smallholder Non-Contracted Organic Farming Model
	Farming groups	Contracted	Conventional	Model 5: Smallholder Group Contracted Conventional Farming Model
			Organic	Model 6: Smallholder Group Contracted Organic Farming Model
		Non-contracted	Conventional	Model 7: Smallholder Group Non-Contracted Conventional Farming Model
			Organic	Model 8: Smallholder Group Non-Contracted Organic Farming Model

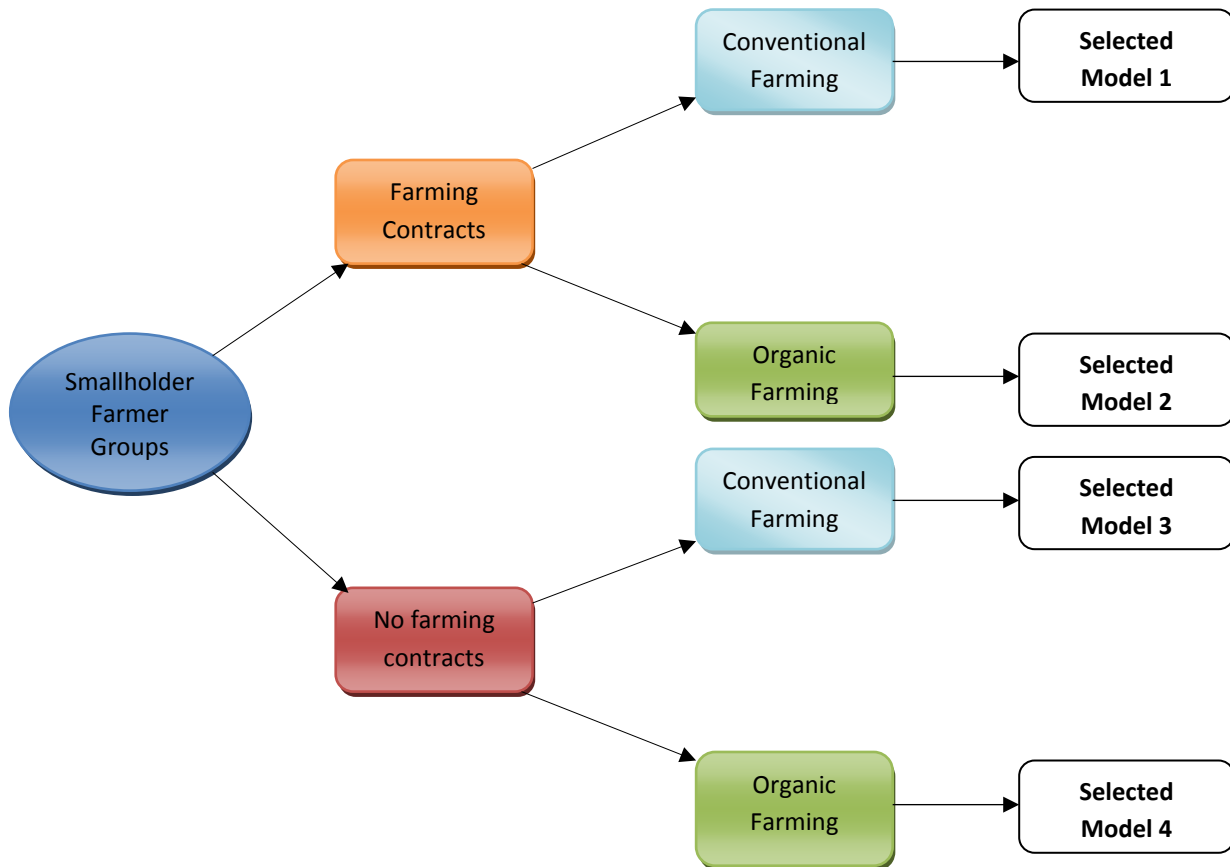
Source: Researcher's construct from literature review

2.4.2 A specific model for selecting smallholder commercial farming models

Due to the scope of the study, it could not be feasible to include all the eight derived models for the study. In this respect, smallholder group-based models were selected from the explained general conceptual model for deriving smallholder commercial farming models. The selection of the group-based models is also due to the assumption that was developed by the study. The study assumed that, group-based farmer organizational attribute has more influence on sustainability practices than individual-based attributes. It was then expected that the study would find more sustainable practices because the models that were studied are group-based. The contents of the specific model and the derived models are explained in part 2.4.1 of this chapter. From this framework, the four smallholder commercial farming models selected for the study are *Contracted Conventional Farming Model*, *Contracted Organic Farming Model*, *Non-Contracted Conventional Farming Model* and *Non-Contracted Organic Farming Model*.

The specific model for the derived smallholder commercial farming models selected for the study is presented in Figure 2.2 and the basis for the smallholder commercial farming models selected for the study is summarized in Table 2.2.

Figure 2. 2: A framework of derived smallholder commercial farming models selected for the study



Source: Researcher’s construct from literature review

Table 2. 2: The basis of smallholder commercial farming models selected for the study

Business type	Organizational form	Contractual mechanism	Farming system	Models selected for the study
Smallholder commercial farming	Farmer groups	Contracted	Conventional	Model 1: Contracted Conventional Farming Model
			Organic	Model 2: Contracted Organic Farming Model
		Non-contracted	Conventional	Model 3: Non-contracted Conventional Farming Model
			Organic	Model 4: Non-contracted Organic Farming Model

Source: Researcher’s construct from literature review

2.5 Theoretical Framework

The choice of a framework of theories to guide this research study was relevant like it is in any other research-based study. The theoretical framework for this study forms a body of theories that were found relevant and adopted to guide the realization of this study. This part explains the foundation theory and the applicable theory under which this study is guided. This study is founded on the Institutional Theory. Due to the wider scope of this theory, the study was narrowed down to a specific section of the theory and adopted the Institutional Analysis and Development (IAD) Framework which is specific to the study. Furthermore, the nature of this study intended for investigations that focus on social, economic and ecological aspects which also sought for a relevant theory. Under these aspects, the Social-Ecological Systems (SES) Framework was adopted for the study. These theories and their respective combinations are further explained hereunder.

The IAD and SES Frameworks were chosen as grounding theories for undertaking this study due to the fact that assessing sustainability of smallholder agricultural activities that are undertaken in a complex social-ecological system needs to use comprehensive tools. The theme of this research carried the contentions of complexity. The institutional, social, economic, environmental and cultural aspects that surround smallholder farming in the system can be captured only by using relevant tools. In this regards, a combination of the IAD and SES frameworks as it is explained further in Part 2.5.5 of this Chapter provided a relevant tool that served for the assessment of sustainability assessments undertaken by this study.

2.5.1 The Institutional Theory

According to the context of this study, the Institutional Theory approach focuses on the roles that institutions use in influencing behaviours and choices of organizations (Vatn, 2015; Ostrom, 2011; Heikkila and Isett, 2004; Ostrom et al., 1994; Zucker, 1987; DiMaggio and Powell, 1983). More succinctly, institutions are referred to as rules, structures, norms, standards and heuristics that are established in a particular environmental setting whereas organizations imply individuals, groups, organizations or states in that particular environment (Vatn, 2015; Ostrom, 2011; Heikkila and Isett, 2004; Ostrom et al., 1994; Zucker, 1987; DiMaggio and Powell, 1983). There is a co-existence between institutions and organizations. Institutions are crafted to allow organizations to undertake their day to day living in an order and allow for long term survival of organizations (Ostrom, 2011; Meyer, 2010; Zuker, 1987; DiMaggio and Powell, 1983).

The Institutional Theory approach is adopted for this study due to the fact that individuals, groups and organizations included in the setting of this study are not excluded from using various sets of rules, structures and norms in their undertakings. Various organizations in forms of individuals, groups and entities under this study utilize resources to enhance their livelihoods and survival in their respective areas. The use of these resources is institutionalized and guided by rules and structures and norms that are set by the organizations themselves or by superior level authorities. Reference to the theory applies with an assumption that the use of rules, structures and norms in organizations tends to effect similarity in behaviours of organizations due to the nature of pressures that is imbedded in these rules (Boxenbaum and Johnson, 2017, Heikkila and Isett, 2004; DiMaggio and Powell, 1983). The study therefore analyzed sustainability by referring to sets of rules, structures and norms that guide operations in the target organizations of study as it is relevant to the theory.

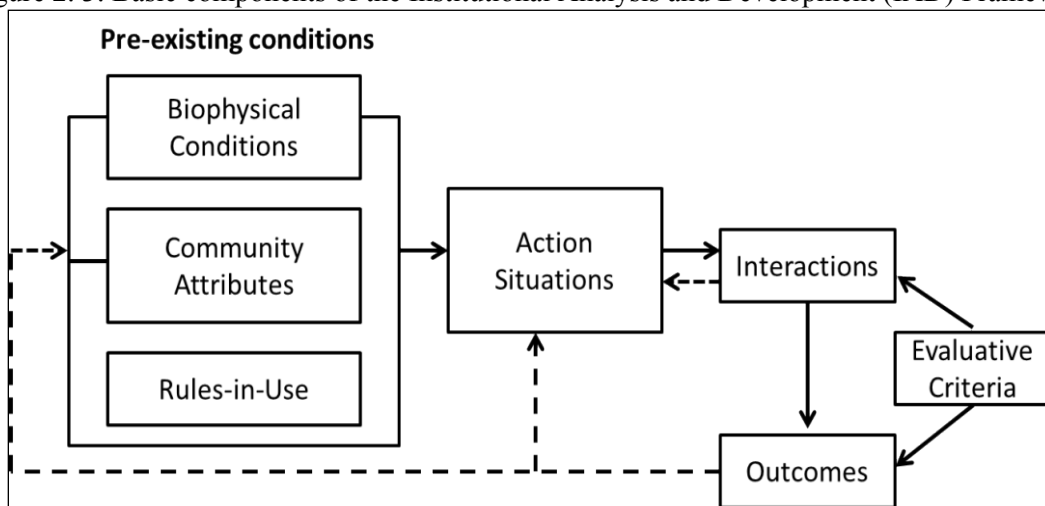
2.5.2 The Institutional Analysis and Development (IAD) Framework

The Institutional Analysis and Development (IAD) Framework is one of the frameworks that bears the contention of the Institutional Theory. The framework contends on the role of rules and structures in authorizing or limiting certain individual, group or organization actions leading to influence their behavior towards making rational choices (Ostrom, 2011; Ostrom et al., 1994). The framework provides bases for institutional analyses that focus on understanding the set of rules and norms that individuals use to make decisions. However, in course of time the users of the rules and norms make habitual acts to use the rules and norms to the extent that it influences them to make rational choices (Ostrom, 2011; Ostrom and Cox, 2010).

Basing on the use of common poor resources that need to be rationally undertaken, the IAD Framework is constructed to relate institutional processes, common property and use of institutions to bring desired outcomes. The framework is centered on analyzing an action situation, examining patterns of interactions within the situation, identifying the outcomes and evaluating these outcomes. In so doing, the framework identifies the biophysical factors, community elements and the rules in use and factors that influence the structure of the action situation (Ostrom, 2011, pp.10; Ostrom and Cox, 2010, pp.5). Aggregating these elements forms the basic components of the framework for institutional analysis as presented in Figure 2.3.

Nonetheless, the IAD Framework lacks internal variables that explain the role of economic factors, lacks attention to diversity and lacks variables for assessment of complex natural systems and processes (Cole et al., 2014; McGinnis and Ostrom, 2014; Ostrom and Cox, 2010). These are some of the elements that form the core variables of this study and were needed to be examined from an empirical situation. The failure of the IAD Framework in addressing these elements led the study to adopt the Social-Ecological System (SES) Framework. This became relevant to complement for an inclusive analysis that accommodates economic, social and the natural systems that the institutional framework addresses them as external variables.

Figure 2. 3: Basic components of the Institutional Analysis and Development (IAD) Framework



Source: Adapted from Ostrom and Cox, (2010, pp. 5)

2.5.3 The Social-Ecological System (SES) Framework

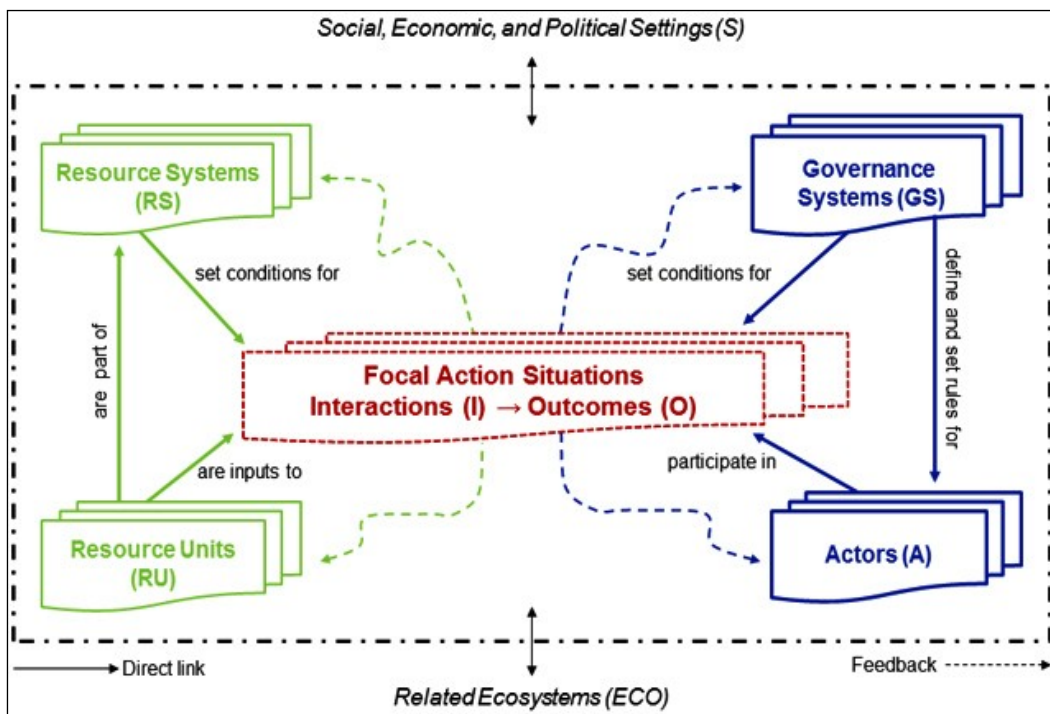
The nature of the study extends further to include frameworks that focus on analysis of social, economic and ecological aspects within a particular setting. The Social-Ecological System (SES) Framework was found relevant for adoption. The framework is formulated to facilitate analysis of economic, social and ecological aspects for effective resources management and sustainability within complex social-ecological systems (Cole et al., 2014; McGinnis and Ostrom, 2014; Basurto et al., 2013; Epstein et al., 2013; Ostrom and Cox, 2010; Ostrom, 2009).

Since its inception, the SES Framework has developed through changes and improvements. The version of the framework that this study adopted goes further to including elements of social, economic and ecological analyses that are reflected in an action situation that involves actors who interact to bring outcomes. These elements are Resource Systems (RS), Resource Units

(RU), Governance Systems (GS), Social Economic and Political Settings (S) and Related Ecosystems (ECO) (Cole et al., 2014; McGinnis and Ostrom, 2014; Epstein et al., 2013). Combining these elements results into a framework for analysis in a social ecological system and hence a Social-Ecological System (SES) Framework. The components and the entire framework are presented in Figure 2.4.

However, the SES Framework is criticized to be descriptive, diagnostically oriented with a static list of elements. It cannot evaluate the outcomes in a system that has changing economic, social and ecological elements (McCord, et al., 2016; Cole et al., 2014). These factors led the founders of the IAD and SES frameworks to slightly modify and combine the two into a combined Institutional Analysis and Development and Social-Ecological System (IAD-SES) Framework, a framework that counterbalances the identified tradeoffs within the founding frameworks.

Figure 2. 4: The Social-Ecological System (SES) Framework



Source: Adapted from McGinnis and Ostrom, (2014, pp. 4)

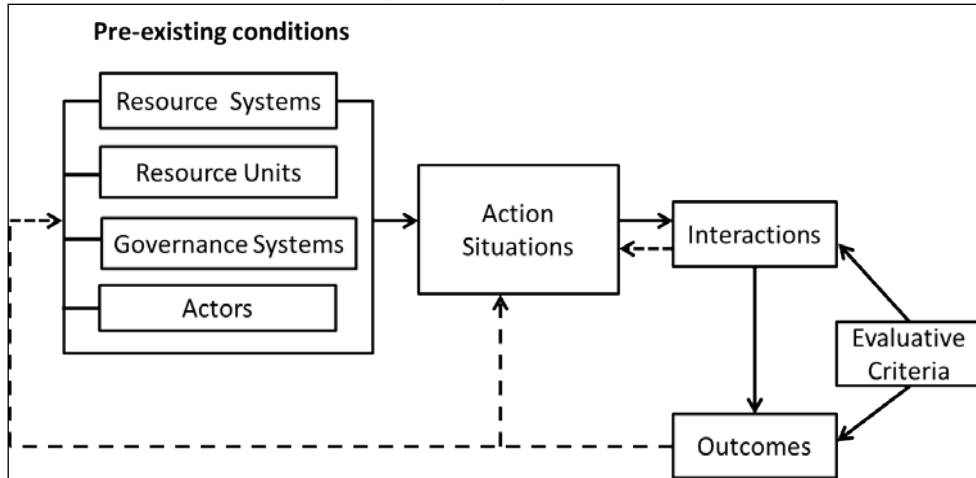
2.5.4 The combined IAD-SES Framework

The above explained theories and frameworks suggest for adoption of the combined Institutional Analysis and Development and Social-Ecological System (IAD-SES) Framework by this study. The combined IAD-SES Framework is formed from the combination and slight modifications of the IAD and SES Frameworks. In line with the founding frameworks, the combined IAD-SES Framework is intended for analyses of action situations and actors' interactions with expected outcomes that are influenced by social, economic, political and ecological factors in a social ecological system (McGinnis and Ostrom, 2014; Cole et al., 2014). The framework integrates the analyses within institutional, economic, social and ecological aspects in ensuring suitable use of the common pool resources in a particular setting. The combined contents form a new framework for analyses in social ecological systems as presented in Figure 2.5.

The combined IAD-SES Framework is composed of seven first-tier variables which are Social, Economic and Political Settings (S), Related Ecosystems (ECO), Resource Systems (RS), Resource Units (RU), Governance Systems (GS), Actors (A) and Action Situation which includes Interactions (I) and Outcomes (O) (McGinnis and Ostrom, 2014; Cole et al., 2014). These variables can be extended to various numbers of tiers to meet the type of analysis that a particular research needs. In a general understanding, the Social, Economic and Political Settings and the Related Ecosystems entail elements in these variables that can affect or be affected by any component within a social ecological system. Resource Systems and Resource Units denote the natural and physical resource elements that a social ecological system co-exists with. The Governance System represents the rules or institutional aspects that are used in guiding performances within in a system. Actors entail various individuals or communities and their decision capabilities in interactions within a social ecological system. An Action Situation indicates a setting where all inputs and resources are transformed by interacting actors to bring outcomes. Interactions entail the processes where individuals or communities intermingle, transform and use resources to find their existence in a social ecological system. Outcomes are the observable consequences due to interactions in an action situation.

The above explained first tier variables guide the identification of relevant factors and analyses of institutional, economic, social and ecological aspects in enhancing rational choices in use of common pool resources in social-ecological systems.

Figure 2. 5: The combined Institutional Analysis and Development and Social-Ecological System (IAD-SES) Framework



Source: Adapted from Cole et al., (2014, pp.16)

2.5.5 Relevance of the combined IAD-SES Framework to the study

The combined IAD-SES Framework is built on the Institutional Theory, the Institutional Analysis and Development (IAD) Framework and the Social Ecological Systems (SES) Framework. Since the combined IAD-SES Framework is founded from these theories and frameworks, its relevance to this study similarly reflects the relevance of the founding theories and frameworks to the study. The adoption of the combined IAD-SES Framework for this study is attached on the theme of the study and the tools it used in making the investigations. The main theme of the study was to examine sustainability in a smallholder commercial farming situation that involves various public and private actors. Actors work together under the guidance of rules and norms that are set to enhance rational choice making. The choices are geared on use of common natural resources, other resources and opportunities that are extracted for smallholder commercial farming in a specific area. In view of the similarities in variables of inquiry used by the study to the variables and contentions of the combined IAD-SES Framework, the searches of the study could be relevantly facilitated by the guidance of this framework.

Specific relevance of the framework to this study is that the study adopted the tools that are defined as tier variables by the framework (Cole et al., 2014; McGinnis and Ostrom, 2014). The study adopted these variables to form its key constructs that were used in finding answers to its questions. Also, the study adopted the diagnostic approach that is embedded in the framework in finding answers to its questions (Cole et al., 2014; Cox, 2014; McGinnis and Ostrom, 2014).

Moreover, the framework assisted in defining and delineating a specific study area, an agro-ecological zone which is a typical replica of a social ecological system.

2.5.6 Adoption of the combined IAD-SES Framework in empirical research

Literature provides empirical research practices that adopt the IAD and SES frameworks either being combined or one building on the other. Partelow and Boda, (2015) use the IAD and SES frameworks to assess the state of stakeholder engagement and resource systems interactions in lobster fisheries in California. The frameworks define the characteristics of lobster fisheries as social ecological systems and provide a wider set of components that aid to widen the scope of sustainability analysis. They also show the way the frameworks are operationalized, a situation that indicates possibilities of replication in real life situations. Cox, (2014) uses the IAD and SES frameworks to assess the maintenance of cooperation in governance of irrigation systems in farming communities of the Taos Valley in Mexico. The frameworks reveal the action situation, biophysical, institutional and social factors which are further linked to the governance systems, actors groups, resource systems and resource units and the ways they influence each other. The use of the frameworks provide an advantage of formerly underutilized interconnected analyses of action situations.

Moreover, Fundi, (2017) assesses water allocation processes and conflicts in irrigation schemes in Tanzania. The study adopts the IAD and SES frameworks to understand the institutional and non-institutional elements that surround a policy issue, an action situation as entailed in the contexts of the frameworks. Through the frameworks, institutional mediation of water allocation and emanating conflicts are revealed as outcomes from the action situation. Likewise, McCord et al., (2016) use the combined IAD-SES Framework in a study on a reformed water governance system that was executed to water user groups in various catchment areas in Kenya. The study uses the framework to capture the complex institutional arrangements and interactions that existed before and after the reforms. The framework is also used in addressing the outcomes produced from actors, institutional arrangements and broader subsystems in the situation. Furthermore, Garrick et al., (2018) build on the combined IAD-SES Framework to characterize drought adaptation under resource systems and resource units elements in the Rio Bravo/Grande trans-boundary river shared by Mexico and the United States of America (USA). The framework also defines the mode of trans-boundary water sharing agreements prior exploration of the perceived effectiveness of different integration mechanisms.

2.6 Conceptual Framework for the study

The conceptual framework is drawn from the gap in theoretical and empirical literature that link smallholder farmers' choices of commercial farming models and sustainability considerations. The scope of the study assesses consideration of sustainability criteria in various commercial farming models that smallholder farmers choose in the Highlands Agro-Ecological Zone in Njombe District in Tanzania. The ultimate focus is to provide an understanding on the extent of smallholder commercial farmers' transformation in orientation from making commercial farming choices basing on apparent business benefits to making choices that integrate sustainability criteria in the study area. Theoretical and empirical diagnoses and analyses to research questions are guided by the combined IAD-SES Framework. This study limits smallholder commercial farming scope to the inputs and production levels only where pulling of resources in endeavors to commercialize farming in the area is done.

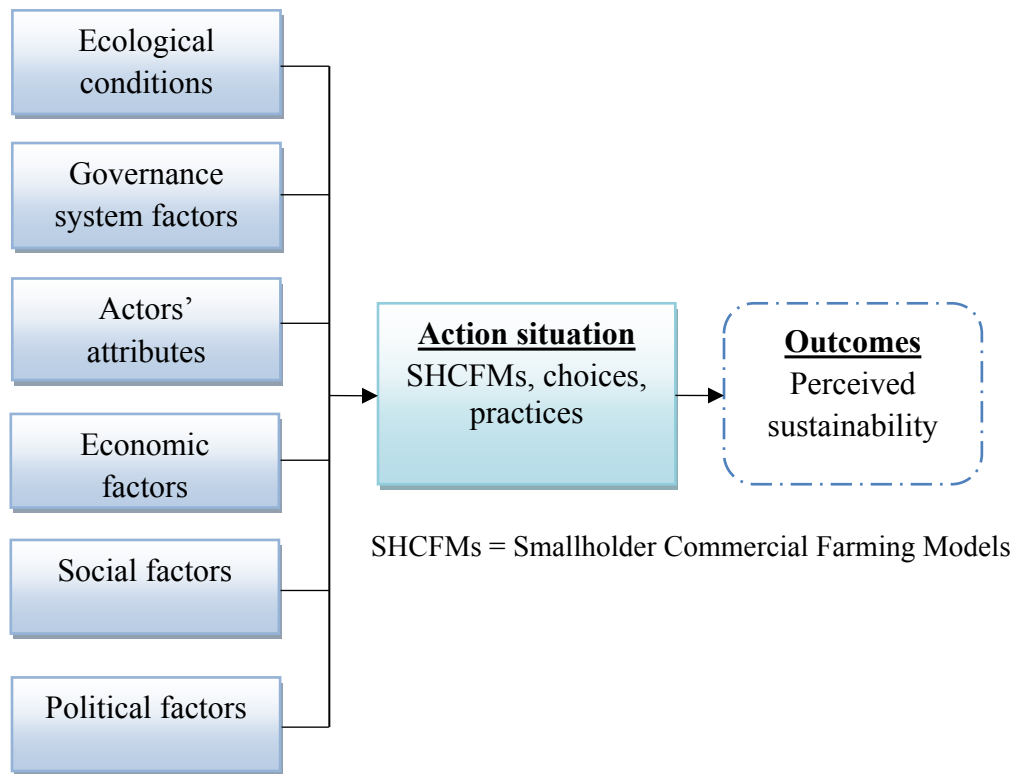
The diagnostic identification of institutional, resource systems use and related aspects in smallholder commercial farming in the zone are guided by the tailored six first tier variables of the combined IAD-SES Framework. The variables are the Social, Economic and Political Settings (S), Related Ecosystems (ECO), Resource Systems (RS), Resource Units (RU), Governance Systems (GS) and Actors (A). The diagnostic identification of commercial farming models that smallholder farmers choose in the area are guided by the Interactions (I) tier variable and its extensions under the framework. On the other hand, the identification of institutional, economic, environmental and social interactions and outcomes in smallholder commercial farming in the area are respectively guided by the Interactions (I) and Outcomes (O) tier variables of the framework. Moreover, the empirical testing of theoretically identified factors and identification of other empirical factors that constitute drivers for smallholder farmers' choices of commercial farming models in the area are guided by the six first tier variables of the framework. These variables are tailored to Ecological, Social, Governance Systems, Actors, Political Settings and Economic factors and their extensions from the framework.

Additionally, the consideration of sustainability criteria by smallholder farmers in choices of commercial farming models is assessed by the six first tier variables with the ecological, social and economic dimensions as sustainability assessment variables. Furthermore, smallholder farmers' perceive performance of chosen commercial farming models with respect to sustainability criteria (ecological, social and economic) in the area is guided by the Outcomes

(O) tier variable with its extensions. The aggregation of identifications, tests and analyses of under the identified variables provide answers to the main research question.

From the logic of the framework it is eventually conceptualized that, smallholder farmers' choices of commercial farming models basing on integration of sustainability criteria results into sustainable commercial farming models and practices in the Highlands Agro-Ecological Zone in Njombe District. Ultimately, this contributes to enhancing economic, social and ecological/ environmental sustainability in the entire social ecological system. This conceptualization is presented in Figure 2.6.

Figure 2. 6: Conceptual framework for smallholder farmers' choices of commercial farming models and sustainability



Source: Researcher's construct from literature review

2.7 Operationalization of research constructs

The interests of this study was aligned to the multi-tier variables of the combined IAD-SES Framework (McCord et al., 2016; Partelow and Boda, 2015; Cole et al., 2014; Cox, 2014; McGinnis and Ostrom, 2014, Ostrom and Cox, 2010). The variables of the framework were used in diagnosing the action situation in order to assess various sustainability aspects and its outcomes in a designated social ecological system. In realizing this inquiry, various concepts and practices were considered and guidelines were established as explained in the proceeding parts of this chapter.

2.7.1 The Common Pool Resources (CPR): Its conception and reality in the study

The foundations of the IAD and SES frameworks intended to provide diagnostic tools for assessing the use of common pool resources (CPR) and sustainability (Cox, 2014; Ostrom, 2010; Ostrom and Cox, 2010). Formerly, CPR analyses that based on IAD and SES were mainly on fisheries, irrigation systems, water management, forests, wildlife and pasture resources. Research advances the CPR analyses to agriculture, land use and tenure, social organization and global commons as other bands of common pool resources (Ostrom, 2014; Degafa, 2010; Fisher et al., 2010; Hess, 2006). This study referred to the current scope of research on CPR when adopting the combined IAD-SES Framework. The referred CPRs include agricultural land, natural resources for agriculture, the environment and social organization within smallholder commercial farming in the Highlands Agro-Ecological Zone in Njombe District.

The history of land regimes in Tanzania indicate the existence of common pool interests on land, natural vegetation, forests, natural water and the environment. For instance, despite the various modes of uses and tenure systems, land is a public resource in Tanzania and its uses connote consideration of other users. The National Land Policy 1997, the Land Act 1999 and the Village Land Act 1999 stipulate laws and guidelines that require land users to safeguard and protect land against improper, unintended and wasteful use; protect it for beneficial use and maintain its quality (URT, 1997; URT, 1999a; URT, 1999b). These actions indicate the existence of subtractability and rivalry characteristics among land users, a feature of a common pool resource. The study investigated on smallholder farmers' choices and practices on common pool resources (the environment, land access, use and ownership and social equity) as they engage in various commercial farming models practiced in the Highlands Agro-ecological Zone in Njombe District in Tanzania.

2.7.2 Definition of a social ecological system

As its name entails, the combined IAD-SES Framework suits for diagnostic inquiries of phenomena that exist in a social ecological system. The tool is suitable for analyses of action situations that exist in environments that are surrounded with complex interactions of institutional, social, economic, political, ecological and actors elements. The multi-tier variables of the IAD-SES Framework provide suitable tools for diagnoses in a social ecological system (McGinnis and Ostrom, 2014; Cole et al., 2014).

This study characterized its case study area, the Highlands Agro-Ecological Zone in Njombe District as a social ecological system. The distinctive geographical location of the area, its altitude, temperature, ranges of rainfall and fertile lands underline its climatic features among others in the region (URT, 2018; URT, 2013a). The diverse ecological features of national parks, mountains and forests, extensive undulating plateaus that drain river basins make the zone an integrated ecosystem that a majority of livelihoods within the region depend on (URT, 2018; URT, 2013a; Milder, 2013). These climatic and ecological features within the area have attracted many small- and large-scale commercial farmers to engage in production and commercialization of crops. All these provide characteristics of a social-ecological system that made the study to assess the influence of institutional, social, economic, political, ecological and actors conditions on smallholder commercial farming and sustainability in the area.

2.7.3 The Action Situation of the study

The Action Situation is the central theme in analyses that use the combined IAD-SES Framework. An Action Situation is a setting that involves actors who undertake activities and processes that aim at achieving different goals that are set by actors. It is the central functioning of a phenomenon that is guided by several rules which stipulate what to do, what not to do or what not to take at given conditions. These sets of rules require actors' reasoning when making decisions on what to or what not to do (McGinnis and Ostrom, 2014; Epstein et al., 2013; Cole et al., 2014; McGinnis, 2011; Ostrom, 2011).

In operationalization of research variables, this study defined its Action Situation with its distinct interactions and outcomes to mean groupings of smallholder commercial farmers who partner with other actors in agriculture to undertake commercial farming activities in the Highlands Agro-Ecological Zone in Njombe District. Through partnering with other actors in agriculture, smallholder farmers interact and choose various farming models and processes to facilitate

commercialization of farming. In this situation, smallholder farmers use the interactions to extract natural, non-natural and physical resources to realize their commercial farming. Yet, smallholder commercial farming activities are guided by specific partnership agreements and general rules to foster order and attainment of actors goals. Actors are obliged to use their reasoning to make choices within the bounds of the provided agreements and rules. Ultimately, sustainability outcomes measured in terms of ecological/environmental, social and economic criteria are observed.

2.7.4 Diagnosing the Social Ecological System (SES), commercial farming models and interactions

The six first-tier variables from the combined IAD-SES Framework guided the explanations of a social ecological system for the study. Depending on the level of a construct where concrete answers were obtained (normally in the 2nd or 3rd tiers), specific variables were used in gathering empirical inquiries for the explanations of the social ecological system. The study defined the Highlands Agro-Ecological Zone (a social ecological system) as its resource system. Land and other natural resources that are used in agriculture are defined as a resource unit in this study. The land use governance system, social, economic, ecological/environmental, actor and political factors with respect to the commercial farming were used in diagnosing and defining the characteristic features of the social ecological system with respect to the combined IAD-SES Framework.

Furthermore, the action situation in which smallholder commercial farming that is realized through various models and their respective interactions were identified through the use of various operational variables of the framework. The selected tier variables for the two sorts of identifications and diagnoses are included in a summary in Table 2.3.

2.7.5 Diagnosing drivers for SHFs choices of CFMs, consideration of sustainability criteria and perceived performance of CFMs with respect to sustainability criteria

This study also intended to identify the drivers for smallholder farmers' choices of commercial farming models that they practiced in the study area. Variables from the combined IAD-SES Framework that were identified to represent the drivers include governance system factors, actor conditions, political factors, ecological/environmental factors, social factors and economic factors. These guided the diagnosis to verify if these drivers influence the smallholder farmers' choices of commercial farming models in the study area. Several categories which are related to

agricultural land use were derived from the 2nd and 3rd tier variables of the framework. However, some tier variables that were extracted from the combined IAD-SES Framework were slightly modified to suit the wider scope of drivers for farmers' choices of specific commercial farming models in the study area.

Moreover, the study intended to assess the extent to which smallholder farmers consider sustainability criteria in specifically chosen commercial farming models in the study area. To operationalize this inquiry, variables from the combined IAD-SES Framework were selected to guide the diagnosis and inquiries on the question. In order to develop an explicit understanding of sustainability, the study limited itself to the triple bottom line sustainability. The 1st tier variables that were selected from the framework to diagnose sustainability include the ecological/environmental, social and economic variables. These were extended to their operational variables and measurement criteria.

Furthermore, the same triple bottom line sustainability variables were used in conducting a diagnosis on smallholder farmers perceived performance of chosen commercial farming models with respect to sustainability criteria. The study had a limited ability in measuring sustainability by using actual indicators and units of measurements. Assessments of sustainability of commercial farming models adopted by smallholder farmers was determined basing on farmers' perceived performance of commercial farming practices within the inputs and production levels of the agricultural value chain. The triple bottom line sustainability pillars, functional variables and measured criteria from the combined IAD-SES Framework for the intended diagnoses are included in a summary as presented in Table 2.3.

The search for drivers for choices of models, consideration of sustainability criteria and perceived performance of models with respect to sustainability criteria carry the core variables and the modality in which they have been operationalized to arrive at obtaining data for answering the research questions. These explanations are linked to some methodological aspects through which the entire research is operationalized. The core variable elements and the key methodological components are summarized in Table 2.3.

Table 2. 3: Summary of research questions, variables, operational and methodological plans

Variables operationalization plan			Operational methods		
Research subject/ question	Research Constructs	Operational variables	Measured variables	Data type	Methods of inquiry
(Cole et al., 2014; McGinnis & Ostrom, 2014; Ostrom, 2010; Ostrom and Cox, 2010)	Action situation: (SES)				
	Resource System (RS)	Sector, Size	2	Qualitative	In-depth interviews
		Dynamic adaptability	1		
		Carrying capacity	1		
	Resource Unit (RU)	Interactions with other resource units	1		
		Economic value	1		
		Uniqueness	1		
	Governance System (GS)	Land access governance	1		
		Land use governance	1		
		Land ownership govern.	1		
		Land use rules	1		
		Land use monitoring and sanctions	2		
	Actors Conditions (AC)	Population attributes	1		
		Socio-economic attribs.	3		
		Actors' influence on land access	2		
		Land access & use history	3		
	Social, Economic/ Market and Political Conditions (SEP)	Land supply-demand	1		
		Land markets competit.	1		
		Land access costs	1		
		Land market incentives	1		
		Land based development	1		
		In-flow for land access	1		
		Land access, use and ownership politics	1		
Ecological/ Environmental Conditions (ECO)	Land degradation & control patterns	3			
	Climate change patterns on land use	2			

Continues in the next page

Research subject/question	Research Constructs	Operational variables	Measured variables	Data type	Methods of inquiry
RQ1: Identification and diagnosis of CFMs and interactions (Cole et al., 2014; McGinnis & Ostrom, 2014; Ostrom, 2010; Ostrom and Cox, 2010)	Action situations:				
	Interactions(I)	Deliberation processes	1	Qualitative	In-depth interviews
		Information sharing	1		
		Harvesting mechanisms	1		
		Conflicts	2		
		Investment activities	1		
		Lobbying activities	1		
		Self-organizing activities	1		
		Networking activities	1		
		Monitoring activities	3		
Evaluative activities	3				
RQ2: Drivers for SHFs choices of CFMs	Governance system (GS)	Land access governance	1	Qualitative & Quantitative	In-depth interviews FGDs & Q'nnaire
		Land use governance	1		
		Land ownership govern	1		
		Land use rules	1		
		Land use monitoring and sanctions	2		
	Actor conditions (A)	Population attributes	2		
		Socio-economic attribs.	3		
		Actors' influence on land access	2		
		Land access & use history	3		
	Political factors (P)	Group polit. orientation	1		
Local polit. climate		1			
National polit. climate		1			
RQ2: Drivers for SHFs choices of CFMs RQ3: SHFs consideration of sustainability criteria in CFMs RQ4: SHCFs perceived performance of CFMs wrt. sustainability criteria	Ecological/ Environmental (ECO)	Land degradation	3	Qualitative & Quantitative	In-depth interviews FGDs & Q'nnaire
		Climatic/Ecological information and resilience	4		
	Social (SO)	Equity/fairness on land needs, use and ownership	3		
		Healthcare, safety, security and welfare	3		
		Farm employment creation	2		
	Economic (EC)	Land demand-supply	2		
		Capital and financing structures	4		

Source: Researcher's adaptation and construction after literature review

2.8 Summary on the chapter

This chapter has given clarifications and contexts on the key terms that form the constructs of this study. The chapter has further explained the key smallholder commercial farming concepts that are linked to the study. In these terms, the limitations in the scope of sustainability contexts to the Triple Bottom Line (TBL) understanding of sustainability has been clarified. The chapter has drawn the background of various smallholder commercial farming models and their standpoints. Through conceptual literature the chapter has presented a synthesis and formulation of a conceptual model for deriving smallholder commercial farming models in the study area. It is from this framework that various group-based smallholder commercial farming models were derived, selected and adopted for empirical inquiries of the study.

This chapter has explained the theoretical framework that has been used by the study. In it, the Institutional Theory which is the founding theory to the Institutional Analysis and Development (IAD) Framework and the Social Ecological Systems (SES) Framework have been explained. The chapter has further expanded the development of the Institutional Analysis and Development (IAD) Framework and the Social Ecological Systems (SES) Framework to the combined IAD-SES Framework that is adopted in guiding this study. The combined IAD-SES Framework with its relevance for this study and cases of its empirical applications have been explained. The chapter has clarified the developed conceptual framework through which the study is conceptualized and presented a respective model for this abstraction.

Furthermore, the chapter has presented the structure through which this study is operationalized. It included explanations of the operational meanings and scopes of complex concepts such as the common pool resources concept, social ecological system, action situation and interactions. The chapter also explained various sets of tier variables that were extracted from the framework and their plans for application in diagnosing answers to this study. The chapter concluded by presenting a summary of what has been contained in the entire chapter. The next chapter presents a methodology that has been used in undertaking this study. In it, various methods, techniques and processes that were adopted in realizing the conceptual and empirical components of the study are explained.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter generally explains on the methodological aspects and procedures that were followed towards realization of this research. In these aspects, the research philosophy, the contents of the research design and approaches, the scope of the research, data sources and types, the determination of case studies, sampling methods and data collection methods are presented. The chapter explains on the procedures that were followed in accessing the case studies for empirical data collection. Along this line, the chapter explains the various procedures that were undertaken to facilitate ethical access to data collection and the ways in which the data to be collected were validated prior collection. Furthermore, the chapter explains the procedures in which the collected data were organized, managed and analyzed. The chapter then explains the methodological limitations that this study encounter summing up with a summary of the contents of the chapter.

3.2 Research philosophy

Creswell, (2014) defines research philosophies as general philosophical orientations about the world and nature of research that a researcher brings to a study (Creswell, 2014. p. 35). This understanding is attached to beliefs that a researcher develops (basing on previous orientations, experiences and mentorship) to get inclined to adopt either a qualitative or a quantitative or mixed methods approach in conducting a research. The world is filled with beliefs on approaches that can be used in learning and understanding various phenomena. Scholars classify these beliefs or philosophies into sets of actions that guide the courses of understanding phenomena. The beliefs are named differently by scholars depending on their orientations. Other call these philosophies as paradigms (Babbie, 2014, Lincoln et al, 2011, Mertens, 2010), others name them as ontologies (Crotty, 1998) others call them broadly conceived methodologies (Neuman, 2014) and so on. Creswell, (2014) names these philosophies as worldviews and classifies them into four sets which are Post-positivist, Transformative, Constructivist or Social Constructivist or Interpretivism and Pragmatic Worldviews.

The Post-positivist worldview holds a cause-effect relationship in which a study conducted under this worldview needs to identify and assess the causes that influence outcomes (Phillips and Burbules, 2000). This worldview holds more for quantitative research than qualitative ones. The transformative worldview embraces beliefs in marginalized individuals in societies and hence

focuses on critical theory, participation and action research (Mertens, 2010). On the other hand, the constructivism worldview holds on individuals use of their subjective meanings and experiences in constructing understanding of the social world (Denzin and Lincoln, 2018). This worldview believes in an inductive rather than deductive approach in understanding. Furthermore, the pragmatic worldview focuses on actions and situations and providing solutions on problems and arriving at outcomes (Patton, 2015; Tashakkori and Teddlie, 2010). It does not focus more on methods but uses any approaches to find solutions to problems. The beliefs attached to these worldviews are the determinant factors for a researcher to choose the methods for undertaking a specific research.

Detailing the characteristics of the pragmatic philosophy, Creswell, (2014) contends on the philosophy to apply a mixed methods approach where researchers use both qualitative and quantitative methods in research. The philosophy also provides room for researchers to choose methods, techniques and procedures of research that suit the purpose at hand. Moreover, pragmatic researchers look on the what and how in research with intentions to see consequences or outcomes in research. Pragmatism believes research to occur in a social, political, historical and other contexts. In general, the pragmatic philosophy opens a wide room for multiple methods, different assumptions and the use of different techniques to collect and analyze data.

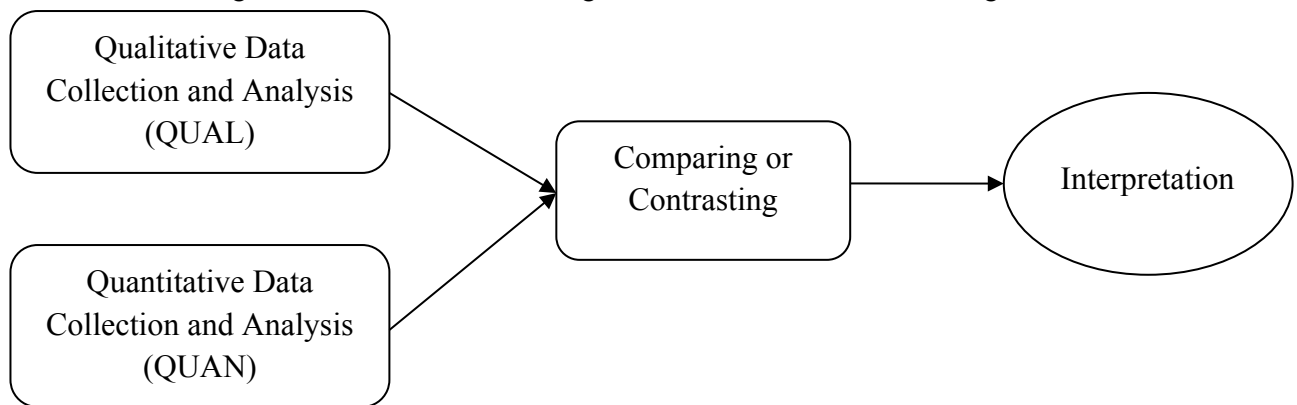
There is a higher correspondence between the knowledge search and methodological aspects that this study used and the beliefs of the pragmatic philosophy. The nature of this study is based in an action situation that aims at reflecting consequences or outcomes. The study used a mixed methods approach to capture a large understanding of the action situation that surround smallholder commercial farming and sustainability. Moreover, the questions of the study are on the what and the how of practices in the action situation. In general, the complexity of institutional, social, economic, environmental and social aspects in an action situation called for freedom in choices of theories, methods and tools in searching data and interpreting the results into one meaningful understanding. These elements correspond with the beliefs of the pragmatic philosophy.

3.3 Research design

This study adopted the mixed method design in conducting its research. A mixed method design involves the use of both qualitative and quantitative data that are rigorously collected through qualitative and quantitative procedures and integrated into an analysis design that merges, connects or imbeds the data (Creswell, 2014; Venkatesh et al., 2013; Onwuegbuzie and Combs, 2011). The procedures can incorporate the sequential or concurrent timing of data collection and can be backed by a philosophical overview or a theory (Creswell, 2014,p. 266). There are three types of mixed methods designs. These are Convergent Parallel Mixed Methods Design, Explanatory Sequential Mixed Methods Design and Exploratory Sequential Mixed Method Design. Due to the need for complementary clarifications, expansions or illustrations of the same phenomena from different views, this study used a Convergent Parallel Mixed Methods Design (See Figure 3.1).

In this study, the research collected qualitative and quantitative data and separately analyzed the data. In an explanatory way, the study compared and contrasted the results to build strong interpretations of meanings from in-depth studies of several phenomena in purposively selected multiple cases (Creswell, 2014; Venkatesh et al., 2013; Onwuegbuzie and Combs, 2011; Johnson et al., 2007).

Figure 3. 1: A Model of Convergent Parallel Mixed Methods Design



Source: Adapted from Creswell, (2014)

In this regard, qualitative approaches were used for inquiries of qualitative data (Saunders et al., 2009; Robson, 2002) on empirically practiced smallholder commercial farming models and drivers for smallholder farmers' choices of these models in the study area. It was also used in inquiries of qualitative data on smallholder farmers' consideration of sustainability criteria in

commercial farming model choices. It was further used in inquiries of qualitative data on smallholder farmers perceived performance of their commercial farming models with respect to sustainability criteria. On the other hand, the quantitative research design was used in inquiries of numerical data on drivers for smallholder farmers' choices of commercial farming models in the study area. It was also used in gathering numerical data on smallholder farmers consideration of sustainability criteria in chosen commercial farming models and on how smallholder farmers perceive the performance of chosen commercial farming models with respect to sustainability criteria in the study area. The designs were complementarily used in the analyzing the collected data. At the end, both qualitative and quantitative findings were integrated into a whole to form one complete meaning.

3.4 The scope of the research

In order to enhance a streamlined research, this study defined a specific scope under which the research was to be conducted. The scope of the research focused on commercial farming models which involve smallholder farmer groups that are engaged in commercial farming in partnership with other actors in the study area. Group-based commercial farming models were used with an assumption that the collective attribute has higher influence on its members' consideration of sustainable farming practices compared to other attributes. Due to the spread scope of the agricultural value chain, the study limited its searches to the inputs and production levels of the value chain. The research was conducted in the Highlands Agro-Ecological Zone in Njombe District, an area with characteristic features of a social ecological system as targeted by the study. This area is in the South Western Highlands of Tanzania within the Southern Agricultural Growth Corridor of Tanzania (SAGCOT).

3.5 Data types and sources

This study used both secondary and primary data. Secondary data were sought for literature reviews and in extraction of relevant concepts related to the study. These were sought and gathered from relevant journal articles, books, research reports, policy reports and company profiles and reports. These were accessed from libraries, case studies and online data and information sources. On the other hand, primary data was obtained from selected case studies and was used in answering the research questions and in providing empirical information of other subjects of the study that are not covered in research questions. Sources of primary data

were selected samples of target respondents from the study area. Primary data was collected by using various techniques which include in-depth interviews, focus group discussions and questionnaires with selected respondents in the study area.

3.6 Qualitative data collection techniques and procedures

Researchers' choices of tools for data collection are guided by the types of data that is sought. In regard to this study, qualitative data were one of the types of data that were sought for the study. Qualitative data were collected by using in-depth interviews and Focus Group Discussions that were administered in the study area.

3.6.1 In-depth interview instruments and their administration

The study administered in-depth interviews to collect qualitative data. The tool portrays more benefits for face to face interviews as it gives flexibility and allows the researcher to collect supplementary information from respondents and the environment (Creswell, 2014; Kothari, 2004). Various in-depth interview tools were formulated for qualitative data inquiries focusing on relevant literature that provided inputs in the themes (Cole et al., 2014; McGinnis and Ostrom, 2014; Ostrom, 2010; Ostrom and Cox, 2010). In-depth interview instruments in forms of open-end questions were prepared, ethically cleared, pre-tested and administered to target respondents. The researcher administered all the in-depth interviews personally to capture the real states and feelings of respondents on the discussed themes.

One category of in-depth interviews was administered to purposively targeted Njombe District Officers who are responsible for management of agricultural related resources in the District. The interviewed officers are the District Agriculture and Irrigation Management Officer, the District Natural Resources and Environmental Management Officer, the District Land Management Officer, the District Cooperatives Management Officer and the District Public Health and Sanitation Management Officer. Interviewing these managers aimed to acquire data that describe the Highlands Agro-Ecological Zone in Njombe District as a specified social ecological system focused by the study. The data was sought for explanations of smallholder commercial farming and sustainability in the zone with respect to the combined IAD-SES Framework adopted for use in the study. Also, the interviews aimed at identifying the sustainability impacts resulting from the interactions of smallholder commercial farming models with social, economic, ecological, political and governance aspects in the zone. The above listed

District Management Officers were selected for in-depth interviews because everyone is an expert in a respective field which contributes to sustainability of commercial farming in the study area. It was relevant to select them because they are equipped with sufficient information that the research questions inquired.

Furthermore, in-depth interviews were administered to managers of purposefully selected agribusiness companies or firms or initiatives which partner with smallholder commercial farmers in the area. The interviewed officers are the Njombe District Cooperatives Management Officer, the Projects Management and Evaluation Officer for Njombe Development Office (NDO) with CARITAS, the Marketing Officer at Njombe Agriculture and Development Organization (NADO), the General Manager at Njombe Out-growers Services Company (NOSC) and the Project Manager of Tanzanice Agrofoods Limited (Tanzanice). Interviews with these officers aimed at capturing opinions on performance of their smallholder involving commercial farming models and sustainability considerations in the area. These management officers from agribusiness companies or firms or initiatives were selected for in-depth interviews because they are informed about their companies and were suitable to provide relevant information that the research questions inquired.

3.6.2 Focus Group Discussions (FGDs) and their administration

Qualitative data was also gathered by using Focus Groups Discussions (FGDs). Focus Group Discussions (FGDs) prove to be the most efficient ways in representing the collective reality of a group. “Focus group discussions are identified as methods that allow researchers to access the process through which participants simultaneously manage their individual identities and make a collective representation to the researcher” (Barbour in Flick, 2014, p. 315). In order to capture the collective reality of a group from individual members, this study opted to use focus group discussions in gathering qualitative data. Focus Group Discussions (FGDs) were conducted with representatives from purposively selected groups of smallholder farmers who undertake commercial farming through various models by partnering with agribusiness companies or firms or initiatives in the area. Lists of prepared, ethically cleared and pretested open-ended themes were used in guiding the discussions.

The focus group discussions were conducted with smallholder farmer groups that were identified from specific villages located in the area. Earlier contacted group leaders assisted the researcher to randomly gather ten (10) members of a farmer group to participate in a discussion. In course

discussions, the researcher introduced the intention of the visit, the intention of the discussion and then sought for consents of participants by them filling and signing the consent forms for participation. With affirmed consents of participants, all focus group discussions were documented in audio records for the researcher to be able to thoroughly capture the provided information. All focus group discussions were personally conducted by the researcher.

The study conducted sixteen (16) focus group discussions with smallholder commercial farmer groups that are located in visited villages. From this number, two (2) groups were used for the pilot testing of the research instruments and one case was dropped because it had unsatisfactory data. The study adopted thirteen (13) groups that were used as actual cases. This number is higher above the eight (8) cases that were targeted for the study due to existence of various types of models within the prior conceptualized models of the study (Refer Part 2.4.2 in Chapter Two of this Thesis). The number of respondents varied in discussions. Nonetheless, the ideal required number of participants which is six (6) to eight (8) (Creswell, 2014, p. 294) and six (6) to nine (9) (Tracy, 2013, p.170) was satisfactorily attained in many groups. All the details on data sources and other elements that were involved in qualitative data collection by using focus group discussions are summarized in Table 3.1.

The themes of discussion were on gathering general data on smallholder commercial farming groups that were selected as case studies. The other theme was on gathering data that explain on the drivers for smallholder farmers' choice of specific commercial farming models in the study area. The other theme inquired on smallholder commercial farmers' consideration of economic, social and environmental sustainability criteria in specifically chosen commercial farming models in the area. The final theme inquired on smallholder farmers' perceived performance of specific commercial farming models with respect to economic, social and environmental sustainability criteria in the area.

3.7 Quantitative data collection techniques and procedures

Since this study used a quantitative approach to data inquiry and analysis, quantitative data were collected by using quantitative techniques and procedures. A questionnaire technique was used in collecting quantitative data from target respondents. A simple random sampling method was used in obtaining respondents for filling a questionnaire.

3.7.1 Sampling procedures

Simple random sampling technique was used in selecting respondents for gathering quantitative data. The technique enables the researcher to use a sample to make inferences on the entire population (Saunders, et al., 2009). Since this study used multiple cases of purposefully selected smallholder commercial farmer groups, the sample of respondents for quantitative data were also to be obtained from the same purposefully selected smallholder commercial farmer groups. The sampling frame for this study considered all group members in the thirteen (13) farmer groups selected to represent the different commercial farming models identified in the study area. Due to a lack of clear databases that document all members in smallholder farmer groups and the potential existence of smaller numbers of members in groups, a targeted sample of ten (10) respondents was proposed to be obtained from each group. This means the total sample size for the entire study was to be one hundred and thirty (130) respondents. Nevertheless, the total number of respondents who filled the questionnaire were one hundred and twelve (112) indicating that the study met the target sample at 86.15%. This sample size did not include smallholder commercial farmers who were involved in focus group discussions despite the same groups being used for both focus group discussions and questionnaire administration. This sample size was obtained by using appropriate considerations for determining quantitative sample size (Kothari, 2004).

3.7.2 Quantitative data collection techniques

Questionnaires provide an efficient technique for collecting quantitative answers from a large sample by using a large number of respondents to respond to the same questions (Saunders et al., 2009). This study adopted a questionnaire technique to collect quantitative data. A prepared, ethically cleared, pre-tested and translated into Kiswahili Language questionnaire with was administered to a sample of one hundred and twelve (112) smallholder commercial farmers. These are members of thirteen (13) groups that were purposefully selected to represent different smallholder commercial farmer groups in the area. Farmers to be administered with a questionnaire were randomly selected from representative farmer groups and did include the ones who were involved in focus group discussions. An outsourced and trained research assistant made face to face administration of questionnaires with selected respondents in every group. The research assistant approached the respondents, clarified the intention of the visit as explained in the consent form, gave a questionnaire and a consent form and guided the respondent in reading

and filling the form and the questionnaires to completion. After completion of the administration, filled questionnaires were collected and submitted to the researcher for verification and filing.

Table 3. 1: Summary of data sources and data gathered through focus group discussions and questionnaires in selected smallholder commercial farmer groups

No	Village	State of a group	Company/ Firm/ Initiative	Sector	Crop types	Number of participants/ respondents	
						FGDs	Q'nnaires
1	Mtwango	AMCOS	Agriculture and Cooperatives	Public	Round Potatoes	10	10
2	Ibumila	AMCOS	Agriculture and Cooperatives	Public	Maize	10	10
3	Ninga	AMCOS	Agriculture and Cooperatives	Public	Maize	10	10
4	Madeke	MOHAP-COS	Agriculture and Cooperatives	Public	Pineapples	10	10
5	Matembwe	AMCOS	Agriculture and Cooperatives	Public	Maize	10	12
6	Lupembe	AMCOS	Agriculture and Cooperatives	Public	Tea	10	00
7	Isoliwaya	AMCOS	Agriculture and Cooperatives	Public	Tea	13	10
8	Kichiwa	AMCOS	Njombe Development Office (NDO) and CARITAS	Private	Soybeans	10	10
9	Igongolo	AMCOS	Njombe Development Office (NDO) and CARITAS	Private	Soybeans	10	07
10	Upami	AMCOS	Njombe Agriculture and Development Organization (NADO)	Private	Maize	00	03
11	Matiganjola	AMCOS	Njombe Agricultural Development Organization (NADO)	Private	Round Potatoes	08	10
12	Itunduma	AMCOS	Njombe Agricultural Development Organization (NADO)	Private	Round Potatoes	08	10
13	Lwangu	Farm Block	Njombe Out-growers Services Company (NOSC)	Private	Tea	10	10
14	Iboya	Farm Block	Njombe Out-growers Services Company (NOSC)	Private	Tea	10	07
15	Wikichi	Group	Tanzanice Agrofood Company	Private	Avocados	11	09
16	Itulike	Group	Tanzanice Agrofood Company	Private	Avocados	08	07
16	Total					148	135

Source: Research field data, (October 2018)

Key:

AMCOS	Agricultural Markets Cooperative Societies
CARITAS	Catholic Relief, Development and Social Services Organizations
MOHAP-COS	Madeke Organic and Horticulture Agricultural Producers Cooperative Society

Questionnaire administration sought to capture quantitative data from respondents. It first inquired data on the basic individual, demographic, institutional, social and economic characteristics of target smallholder commercial farmers. Secondly, it inquired data on drivers for smallholder farmers' choices of specific commercial farming models in the study area. The third thematic focus was on smallholder commercial farmers' consideration of sustainability criteria in specifically chosen commercial farming models in the study area. The fourth theme inquired on smallholder commercial farmers' perceived performance of specific commercial farming models with respect to sustainability criteria in the study area.

All the details on data sources and other elements that were involved in quantitative data collection by using a questionnaire are as well summarized in Table 3.1.

The above explained methodological aspects used in this study are summarized and indicated in Table 3.2.

3.8 Ethical considerations

The entire process to undertake research needs adherence to the required ethical conduct. The main ethical issues that are considered include researchers' depiction of individual values of honesty, integrity and frankness and treatment of other people as far as their consent, anonymity, privacy and confidentiality are concerned (Tracy, 2013, p. 243; Walliman, 2011, p. 43). Depending with the type and place where research is undertaken, researchers abidance by ethical conducts are governed by respective authorities in particular places. With respect to this research, the process was central to ensuring that the researcher obtains a research ethical clearance, approval letters and research permits from various authorities to facilitate undertaking a research that is ethically sound. Various activities were undertaken to ensure that the research obtains documents that verify researcher's consideration of ethical conducts in the entire process.

Table 3. 2: A summary of key methodological aspects used in the study

Research design and data types	Respondents selection procedure	Data collection techniques	Target respondents	Selected respondents	Inquired data
Qualitative	Purposive	In-depth interviews	5 District Officers	Agric. Officer Coop. Mgt Officer Land Mgt. Officer Environ. Officer Health & Sanitation Officer	Farming resources use system in the zone. Adopted CFMs in the zone. Interactions in CFMs. Perceived performance of CFMs wrt. Sust. Criteria.
			5 Officers from selected CFMs	1 officer from each selected CFM	Specific adopted CFMs Perceived performance of CFMs wrt. Sust. criteria
		Focus Group Discussions (FGDs)	Smallholder farmers from groups in CFMs	13 Smallholder farmer groups in CFMs 2 for @ CFM @ with ≈10 SHFs representatives	Adopted CFMs. Drivers for SHFs choices of CFMs. Consideration of Sust. criteria in CFM choices. Perceived performance of CFMs wrt Sust. criteria.
Quantitative	Simple Random Sampling	Questionnaire	Smallholder farmers from groups in CFMs (not included in FGDs)	112 SHFs from selected farmer groups in CFMs 10 from @SHF group	Adopted CFMs. Drivers for SHFs choices of CFMs. Consideration of sust. criteria in chosen CFMs. Perceived performance of CFMs wrt sust. criteria.

Source: Researcher's construct, (2018)

Key:

- CFMs Commercial Farming Models
- FGDs Focus Group Discussions
- SHFs Small Holder Farmers
- Sust. Sustainability

3.8.1 Research ethical clearance

This research was conducted for study purposes and was guided by the research rules and regulations of Carl von Ossietzky Universität Oldenburg. In processes of undertaking this research, the researcher applied for a research ethical clearance from the Commission for Research Impact Assessment and Ethics of Carl von Ossietzky Universität Oldenburg. The Commission is responsible for providing advices to academicians and establishing ethics aspects on research activities at the University and other cooperating universities. In so doing, it assesses the ethical and legal aspects on non-medical research on humans (CVO, 2017). The application for the ethical clearance required the researcher to submit various documents to the commission. The researcher submitted a research proposal, summary of the research project that is approved by the supervisor, research instruments for data collection, a brief project description to respondents, a form for respondents' declaration of consent and a form for respondents revocation of consent. These documents were reviewed to see if the research and the entire project meet all the ethics requirements as per the commission's guidelines.

Issuance of the ethical clearance is very imperative to any research undertaking. It is through the clearance that a governing authority verifies if the ethics considerations are observed prior to undertaking the research. Such considerations include the relevance of the area in which the research is to be done, relevance of the topics, themes and questions that the research intends to ask, relevance of methods that the research uses and relevance and soundness of respondents that the research targets. Furthermore, consideration of consent, confidentiality, data privacy and anonymity of respondents by the researcher are to be verified (Creswell, 2014, Tracy, 2013; Walliman, 2011). The Ethics Commission of Carl von Ossietzky Universität Oldenburg issued the ethical clearance after verifying that the research has considered all the requirements.

3.8.2 Research permits and acceptance letters

In Tanzania, research activities are undertaken after getting research permits from the Tanzania Commission for Science and Technology (COSTEC). This is the National Authority that responsible for issuing research permits to domestic and international researchers who intend to do research in Tanzania. Nonetheless, there are research institutions that are mandated to issue research permits to its scholars. As academic staff of the University of Dar es Salaam, the researcher applied for the research permit from the University of Dar es Salaam as it has mandate to issue research permits to its scholars. Research permits that introduced the researcher to the

Njombe Regional Administrative Secretary (RAS) and the Njombe District Executive Director (DED) were provided. The permits facilitated for ease acceptance of the researcher to the hosting authorities in Njombe Region.

Successively, the Njombe Regional Administrative Secretary (RAS) issued an acceptance letter to the researcher addressing it to the Njombe District Executive Director (DED). In succession, the Njombe District Executive Director (DED) issued an acceptance letter that introduced and addressed the researcher to respective Heads of Departments that were proposed to work with the researcher in the District. The Heads of Departments received the letters and were ready to work with the researcher since all the introductory protocols were followed as required.

While undertaking the research activities in the District, the researcher's access to commercial farming companies or firms or initiatives and respective smallholder farmer groups used the same approach of introductory letters. The Heads of Departments issued other introductory letters to various commercial farming companies or firms or initiatives that the researcher intended to visit. Furthermore, access to smallholder farmer groups which work with these commercial farming companies or firms or initiatives was supported by providing introductory letters or permits that were provide by responsible officers from these commercial farming companies or firms or initiatives.

Despite it being bureaucratic, this process gave confidence to the researcher and the intended respondents to the research. The given permits and letters gave clarity and did not leave rooms for the respondents to doubt the legality of the researcher and the associated research activities in the study area. Appendices 2.1, 2.2, 2.3, 2.4, 2.5 and 2.6 included in this thesis show some of these necessary research permits, ethical clearance and acceptance letters that were issued for this research.

3.9 Validity and reliability

One of the major roles of a research is to come up with results that are trusted and that will be confidently utilized by the intended users. To attain this role, consideration of qualities of the methods that are designed to facilitate undertaking of the research becomes imperative. Ignoring the fact results into collection of biased data, a situation that may result into queries in the quality of a specific research. This standpoint brings in the validity and reliability contentions in research.

Literature provides an understanding of validity as an assertion that a study or a research tool really measures the concept it is intended to measure (Rolfe, 2006 in Blair, 2016, p. 56; Babbie, 2014,p.154). Since measuring of various aspects to answer the research questions uses a combination of methods and tools, a key issue on these methods and tools is on their ability to measure what they are intended to measure to get data for the answers. This research ensured the validity of methods and tools of measurement by undertaking various processes to ensure that the methods and tools that are used foster validity in research. The question of reliability which is a twin concept to validity is also of high concern in research. Reliability entails the ability of a tool or method to give the same results every time when it is used in different measurements of the same phenomena (Rolfe, 2006 in Blair, 2016, p.56; Babbie, 2014, p.152). When an instrument is designed for measurement, it has to consider stability, consistency and dependability in giving the same results when it is used to measure different occurrences that measure the same concepts. Validity and reliability of methods and techniques used in research foster inquiry of quality data that bring trustable results and hence the quality of a research is determined.

This study considered the attainment of quality data and results by ensuring validity and reliability of methods and tools that were used in gathering. There are various processes that were undertaken by the study before it started using the methods and tools for inquiries and analyses as explained.

As a means to attain its validity, this research was ethically cleared by the Commission for Research Impact Assessment and Ethics of Carl von Ossietzky Universität Oldenburg. The commission checked and verified the contents of the research instrument and other contents of the research that they intend to measure what the research intends to study. The study also undertook a preliminary field work to acquaint itself with the actual study phenomenon. This assisted in devising methods that include actual contents as they really concur in the study area. This process contributed to ensuring that the gathered data are of high quality because it is inquired through appropriately structured procedures and processes (Patton, 2015).

Moreover, the designed research instrument was shared to various experts in the fields of business and sustainability management for critiquing and verifying its relevance in the study. The instrument was shared to one expert at Carl von Ossietzky Universität Oldenburg, one expert at the University of Dar es Salaam, one research expert at the Tanzania National Land Use Commission and to one expert in agriculture in Njombe District. These experts reviewed the

contents of the instrument with respect to their expertise to see how the instrument grasped satisfactorily what was to be studied (Babbie, 2014; Kothari, 2004).

Furthermore, consideration of validity and reliability in a research can be attained by pre-testing or pilot testing or field testing the designed research instrument before its actual use (Colton and Covert, 2007; p.129). In line with validity and reliability functions of the instrument, pre-testing of a research instrument is done to see if the instrument meets its intended purpose of capturing desired information (Colton and Covert, 2007). In order to ensure validity in research and attainment of quality research data, the instrument for this research was pretested to two cases of Ibumila and Mtwango smallholder commercial farmer groups in the study area who were among the potential respondents of the study. From it, there were very insignificant variations in the contents of the instrument before and after pre-testing.

Also, this research triangulated its data to ensure validity and reliability. Data triangulation is a method where a research uses one dataset that is collected by using one type of instrument which is supported by another data set that is collected by using a different instrument. This is done in order to offset the biases of data inquiry from one technique and arrive at an integrated interpretation of results (Williamson, 2018; Babbie, 2014; Creswell, 2014; Flick, 2014; Mertens and Bieber, 2012). In response, this study used two methods to collect data on the key research questions and two methods to analyze the gathered data. In-depth interviews and focus group discussion techniques were used in collecting qualitative data whereas a questionnaire was used in collecting quantitative data. The two types of data collection techniques were used to reduce the biases of using one method. Similarly, the two types of analyses from triangulated data brought integrated interpretations of results into one complete meaning.

3.10 Limitations in study methodology

A major methodological limitation that is depicted by this study is on its inability to find a satisfactory number of cases to represent one of the smallholder commercial farming model, the Non-contracted Organic Farming Model in the study area. This study proposed to select two smallholder commercial farming groups to represent every possible smallholder commercial farming model that is practiced in the study area. Due to the scarcity of smallholder organic farming activities in the study area, the study faced challenges in finding the second farmer group in that type to represent the model. Instead, it managed to find only one case, the Madeke MOHAP-COS to represent the Non-contracted Organic Farming Model. For this matter, the

study findings that emanate from this model are made from a single case, different from other findings that are made from cases that satisfactorily represent their respective models. However, due to the necessity of representation of models in the study, it was necessary to adopt that single case for representation. Fortunately, the case provided a very rich information base and it was very relevant and suitable to the study because of its peculiarity in organic farming in the region.

3.11 Data organization, processing and analysis

After all the intended data for this study were collected, the task of processing the data in order to bring the expected results was undertaken. The task included a series of activities such as data organization, data processing and data analysis and interpretation of findings. These activities are explained hereunder.

3.11.1 Data organization and processing

Data management included activities such as sorting the complete data from storage instruments, translating the data from the collection language to the study language, transcribing and ordering them into formats before entering them into specific software for processing and analysis. With respect to qualitative data, the sorted data was translated to English Language to suit the study needs as focus group discussions and in-depth interviews were both administered in Kiswahili Language. The data was then transcribed into Office Word text format ready to be exported to a software for the subsequent steps. On the other hand, quantitative data was sorted from completed questionnaires and similarly translated from Kiswahili Language to English Language. Once completed, the data was input in Office Excel format before being exported to a software for processing and analysis. The organized data were then exported to respective software for processing and analysis. MAXQDA Analytics Pro 2018 Software aided the qualitative analysis and IBM SPSS Statistics 26 Software aided the quantitative analysis.

While qualitative data was already exported to a software, data coding as a method to derive the contents or themes of the study was done (Saldana, 2016; Flick, 2014). In spite of many coding types, this study used the Descriptive, Concept and In-Vivo coding types and a streamlined codes-to-theory model for qualitative inquiry (Saldana, 2013.p.13) guided the search for the themes of inquiry. On the other hand, quantitative data entered in software was categorized into variables from which themes of inquiry were also sought through descriptive statistics ready for analysis (Field, 2018; Aljandali, 2016).

3.11.2 Data analysis

Being guided by themes that were sought by the study, both qualitative and quantitative data were processed to find meaningful representation of the data to the themes. The results were found and presented in various formats depending on specific themes of the study. Results of thematically analyzed qualitative data were presented by using various tools including quoted statements from in-depth interviews and focus group discussions. The advances in software technology have made MAXQDA Software to get equipped with applications that transform qualitative data into quantitative formats. This capacity was used in deriving qualitative based results in forms of frequencies, cross-tabulations, averages and percentages and were presented by using tools such as tables, bar charts, pie charts and figures (Saldana, 2016).

On the other hand, descriptively analyzed quantitative data was used in deriving descriptive results from variables that represented various themes of the study. The results were derived in forms of frequencies, cross-tabulations, averages and percentages and were presented in forms of tables, bar charts and pie charts (Aljandali, 2016). Descriptive statistics tools were used in order to summarize the large raw data into manageable and interpretable formats. The descriptive statistics approach was used in quantitative analysis in order to match the magnitudes of data analysis in the two categories of data. Furthermore, the research questions sought answers through an explanatory approach, something that could satisfactorily be answered through descriptive statistics.

3.12 Summary on the chapter

This chapter has generally explained the methodological aspects that guided realization of this research. The adopted philosophical worldview, the research design and approaches, the scope of the research, the types of data gathered and their sources have been presented. It has also explained the methods it used in getting the representative groups for qualitative data inquiry and the sampling methods and sample sizes of quantitative data. Techniques of data collection have also been explained. The chapter has also explained the various ethical procedures that were followed to secure access to case studies for empirical data collection. Research abidance to quality data collection and trustable results has been indicated by the explanations of how it took concern for validity and reliability aspects. The methodological limitations that the study encounters were also explained. The chapter concludes by presenting various procedures it

followed in processing data to get results. Such procedures include organizing, processing and analyzing the collected data to get results for answering the research questions.

The next chapter presents the general overview of Tanzania, the country where the study was carried out. It also presents the specific characteristics and smallholder commercial farming institutional and social ecological system aspects in the Highlands Agro-Ecological Zone in Njombe District, the actual research area for this study.

CHAPTER FOUR: THE STUDY AREA AND SMALLHOLDER FARMING INSTITUTIONAL AND SOCIAL ECOLOGICAL SYSTEM ASPECTS

4.1 Introduction

This chapter presents explanations of the study area in which the target case studies were identified. The chapter begins by providing an overview of Tanzania, the country in which the study area is located. It then presents the Njombe District and its Highlands Agro-Ecological Zone which is the case study area and where the empirical research cases were selected for the study. Thereafter, the chapter explains on the Highlands Agro Ecological Zone with respect to the Institutional Analysis and Development and Social Ecological Systems (IAD-SES) Framework. In this respect, the smallholder commercial farming action situation is explained in characteristic features of a resource system, a resource unit, governance system, actor conditions, social, economic and political conditions and ecological conditions. Also, interactions in terms of land use harvesting mechanisms, land use conflicts, investment activities, self-organizing activities and monitoring and evaluative activities in smallholder commercial farming are explained. The chapter concludes with discussions on smallholder commercial farming action situation, interactions and sustainability in the zone.

4.2 Tanzania: Location, demographic and economic overview

The United Republic of Tanzania, shortly named Tanzania is one of the African countries that is located in the East African Region. Tanzania lies between latitudes 1° S and 12° S and between 29° E and 41° E covering a total area of 947,300km² that includes land area (885,800km²) and inland water (61,500km²) (URT, 2017, p. 4). Tanzania is constituted by Tanzania Mainland (883,300 km²) and Tanzania Zanzibar (2,500 km²). Tanzania Mainland constitutes the land area, inland water bodies and the major Islands of Ukerewe (647km²) and Mafia (518km²). The major water bodies in Tanzania Mainland are Lakes Victoria, Tanganyika, Nyasa, Rukwa and Eyasi. The country also occupies other minor lakes and parts of the Indian Ocean. On the other hand, Tanzania Zanzibar is mainly formed by two major isles of Unguja (1,554km²) and Pemba (906km²) together with other over 50 islets in the Indian Ocean (URT, 2017, p. 4).

Tanzania Mainland is bordered with the countries of Kenya and Uganda to the North and Rwanda, Burundi and Democratic Republic of Congo to the West. It is also bordered by Zambia and Malawi to the South-West and Mozambique to the South. The Indian Ocean borders

Tanzania Mainland to the East and the entire part of Tanzania Zanzibar (URT, 2017, p. 4.). Figure 4.1 shows the geographical location and boundary of the United Republic of Tanzania. According to the National Population and Housing Census (PHC) that was conducted in 2012, Tanzania indicates to have a population that is growing at an average rate. Statistics on this census indicate that Tanzania has a population of 44.9 million which indicates a 2.7% average annual population increase from 2002 to 2012. Out of the 44.9 million population, 43.6 million (97.1%) live in Tanzania mainland and 1.3 million (2.9%) live in Tanzania Zanzibar (URT, 2014, p.15). Furthermore, statistics show 48.7% of the population are males and 51.3% are females. 70.4% of the population live in rural areas and 29.6% are urban dwellers indicating a 67.5% increase in urban population from 2002 to 2012 (URT, 2014, p.19-20). This population indicates an existence of a large working population (15-64 years) compared to the population of the dependents (children 0-14 years and the elderly 64+ years). The country has a population that is dependent, indicating a dependency ratio of 92%, a ratio that is similar and normal in many developing countries (URT, 2014, p. 33).

Tanzania is endowed with varieties of physical and natural resources. It has vast fertile and arable land; natural forests and vegetation covers, valleys, rivers and river basins; lakes, the ocean, mountains, minerals and natural gas reserves; national parks and game reserves. The large populations of Tanzania use these resources for economic activities and earning of livelihood (URT, 2016). Various sectors utilize these natural resources together with other resources to provide economic and social welfare of the population. The sectors include agriculture, forestry, mining and quarrying, building and construction, manufacturing, trade and commerce, public administration, health and education (URT, 2016; URT, 2014). The working population in these sectors mainly take occupations as farmers, legislators, administrators and managers, professionals, technicians and clerks, business managers, service workers, shops and stall workers and street vendors, crafters, livestock keepers, fishermen, plants and machines operators and assemblers, elementary workers and other non-specified activities (URT, 2014).

Figure 4. 1: Map of Tanzania showing international boundaries and location of Njombe Region



Among the performing industries in Tanzania, the agriculture sector dominates the absorption of the working population. Data indicate a 3.4% real growth rate in agriculture with a 69.9% share to the overall national employment and contributing to a 29.7% share of the National Gross Domestic Product (GDP) and 20.4% share of the total export earnings (URT, 2017, p. 55). Due to the importance of the agriculture sector, Tanzania sets strategic interventions to improve crop production, agricultural infrastructure development, improving Research and Development (R&D) in agriculture, promoting agricultural land use planning and enhancing availability of markets.

4.3 The study area

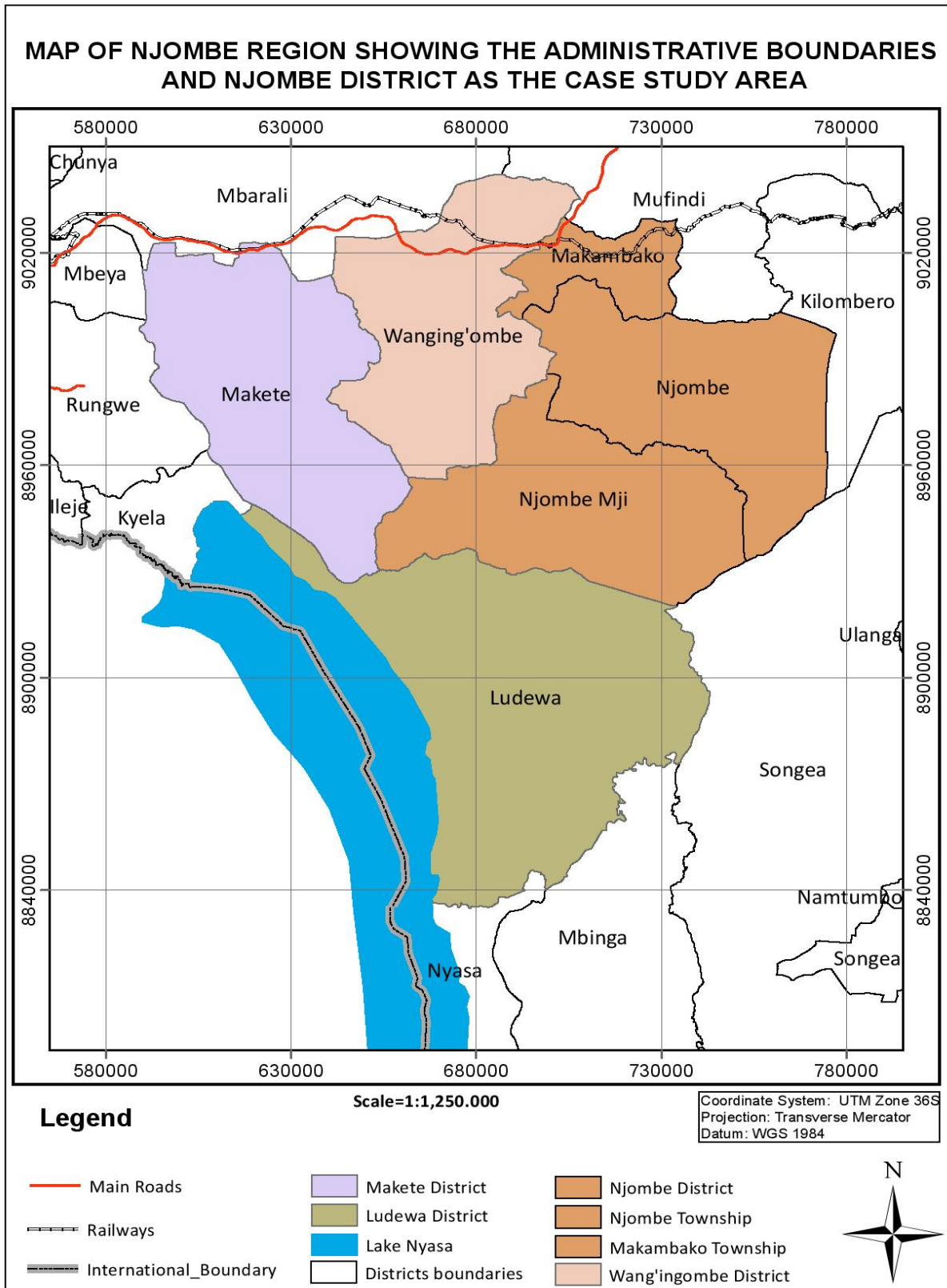
The Highlands Agro-ecological Zone in Njombe District is the area where this study was conducted. This part includes explanations of the location, demographic characteristics, climatic conditions and economic activities of the area and its associated jurisdictions.

4.3.1 Njombe District

Njombe District is one of the districts in Njombe Region located in the Southern Highlands of Tanzania. The district lies between latitudes 8°8'S and 9°8'S and between longitudes 33°5'E and 35°8'E. The total surface area of the district that includes land area (6780 km²) and water area (447 km²) is 7,227 km² (URT, 2018, p.7; URT, 2013a.p.3). Njombe District is bordered by Iringa Region in the North, Wanging'ombe and Makete Districts in the West, Ludewa District in the South and Morogoro Region in the East. The Head Quarters of Njombe District is located in Njombe Town. Figure 4.2 shows the geographical location of Njombe District within Njombe Region.

According to the 2012 National Housing and Population Census (HPC), Njombe District has the population of 309,797 which indicates a 0.8% population growth rate in the region (URT, 2018, p.12; URT, 2013a, p. 6). This population in this district is distributed in an average density of 46 persons per km² in which Makambako District Council leads with the highest density of 227 persons per km². Njombe Town Council follows with the density of 41 persons per km² and Njombe District Council being the least populated with the density of 27 persons per km² (URT, 2018, p.12). The lower population density in Njombe District Council is associated to the large part of the land area in the district being vast and being used for tea and tree plantations.

Figure 4. 2: Map of Njombe Region showing administrative boundaries of Njombe District



The Southern Highlands of Tanzania experiences three ranges of climatic zones which are the highlands zone, the midlands zone and the lowlands zone. The undulating altitude with hilly plateaus and landscapes together with vast and dense vegetation covers in many parts of the area result into existence of variations in climatic zones in the region. The geographical location of Njombe District which is in this region makes it to experience two climatic zones of highlands and midlands zones. The highlands climatic zone lies between 1600 to 3000 meters above the mean sea level. It has humid temperatures that are normally below 15°C with rainfall ranging between 1000 and 1600 mm per annum that usually rains in one season from November to May (URT, 2018, p.10; URT, 2013a, p. 4). On the other hand, the midlands climatic zone lies between 700 and 1700 meters above the mean sea level with humid temperatures that are mild and lower in the cold seasons in June and July falling below 10°C. The zone has rainfall that ranges between 1100 and 1300 mm per annum (URT, 2018, p.10; URT, 2013a, p. 5). These climatic zones are among the zones that provide suitable landscapes and climates that support longer seasons of agricultural activities than in other climatic zones in the country. This situation makes the area a potential for attraction of many agricultural investments from local and foreign agribusiness.

Njombe District is among the top feeding economies of the Nation. Agriculture is the dominating economic activity to the people in the district employing more than 80% of the working population (URT, 2018, p. 20). There is high production of both food and cash crops in the district. The district is one of the leading suppliers of soft timber and round potatoes in the country. This makes Njombe Region to lead in supply of soft timber and round potatoes to the country (URT, 2017, p. 34; URT, 2013a, p.11). For instance, production and processing of soft timber is the major agricultural activities and has been the leading source of revenues over years in the district (URT, 2018, p. 21). Other cash crops that are mainly produced in the district include tea, coffee, sunflowers and pyrethrum. Tea production is one of the major investments in the district. There are various tea processing factories such as Ikanga, Kabambe-Unilever, Kibena, Lupembe and Luponde Tea Factories that are fed by tea leaves that are cultivated in the district. The other main food crops produced in the district include beans, wheat, sweet potatoes, cassava, cow peas, green peas and fruits and vegetables. Njombe district economic activities are also based in livestock keeping activities, forestry, tourism and wildlife activities. Figure 4.3 shows some of the major economic activities that are undertaken in Njombe District.

Figure 4. 3: Some major economic activities that are undertaken in Njombe District



Smallholder timber business in Njombe District

Large scale tea estate in Njombe District



Smallholder avocado farming in Njombe District

Smallholder pineapple farming in Njombe District

Source: Field research data, (October 2018)

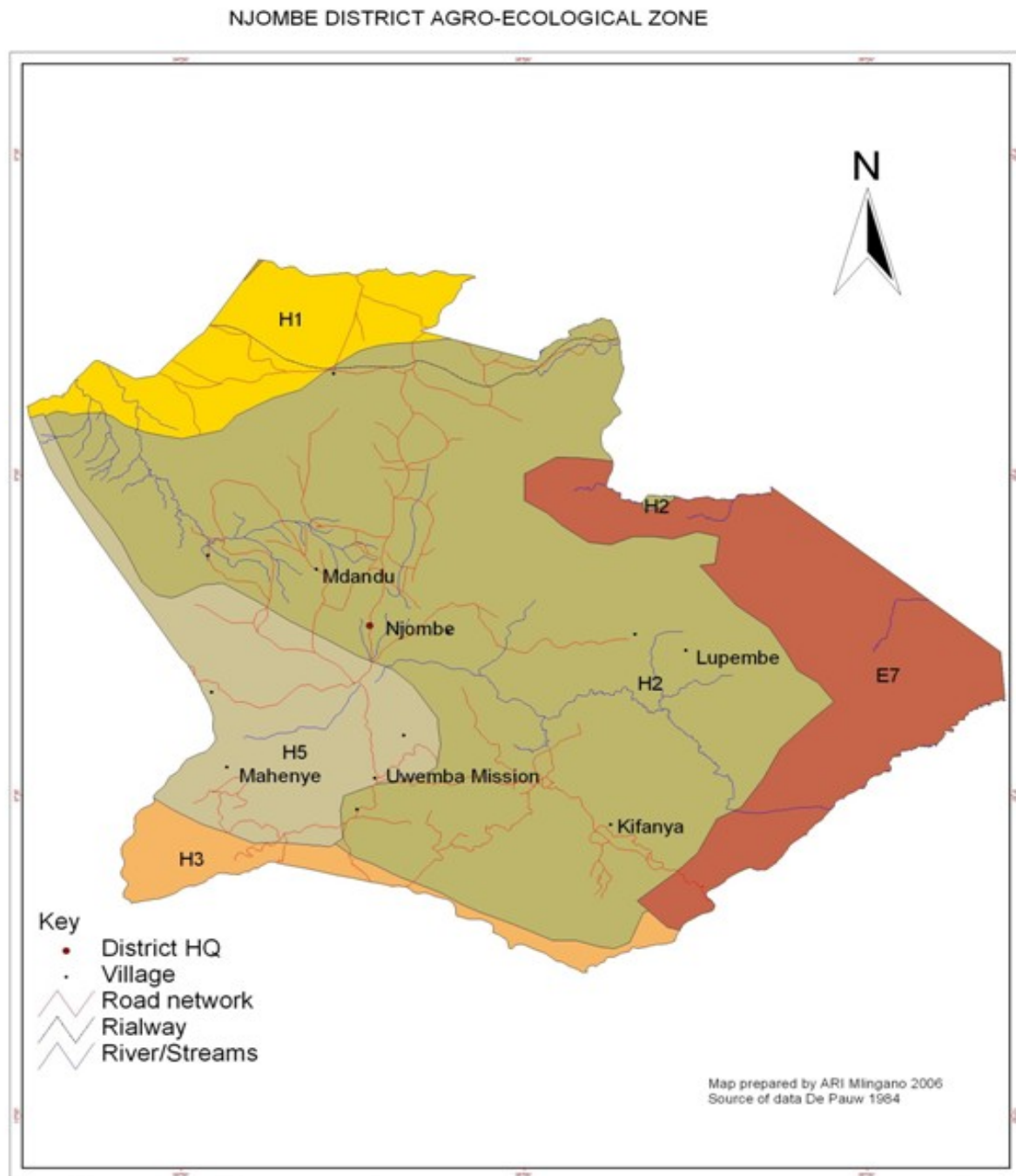
The existence of various climatic zones together with the ecological features in the region has led to the formation of various agro-ecological zones in the district and the entire region. There are three agro-ecological zones that are identified in the district. These are the highlands agro-ecological zone, the midlands agro-ecological zone and the lowlands agro-ecological zone. Figure 4.4 shows the distribution of agro-ecological zones in Njombe District. These zones have attracted for performance of different agricultural activities depending on the climatic, ecological and geological characteristics of the zones. Due to the prominent potentialities and attractive characteristics that support agriculture in these zones, the highlands agro-ecological zone in the district was selected for this study.

4.3.2 The Highlands Agro-Ecological Zone in Njombe District

The Highlands Agro-Ecological Zone in Njombe District covers Lupembe, Imalinyi and Mdandu Divisions in the District. The area has diverse ecological features such as the extensions of the Udzungwa National Park, extension of the Southern Highlands and valleys, extensions of the Udzungwa Mountains and forests and other protected montane forests. The extensions of the highlands and valleys form undulating plateaus and river valleys that drain water into the great Ruaha and Rufiji river basins and Lake Nyansa basin (URT, 2018, p.10). These features create an integrated ecosystem that provides various livelihood activities (URT, 2013a; Milder et al., 2013).

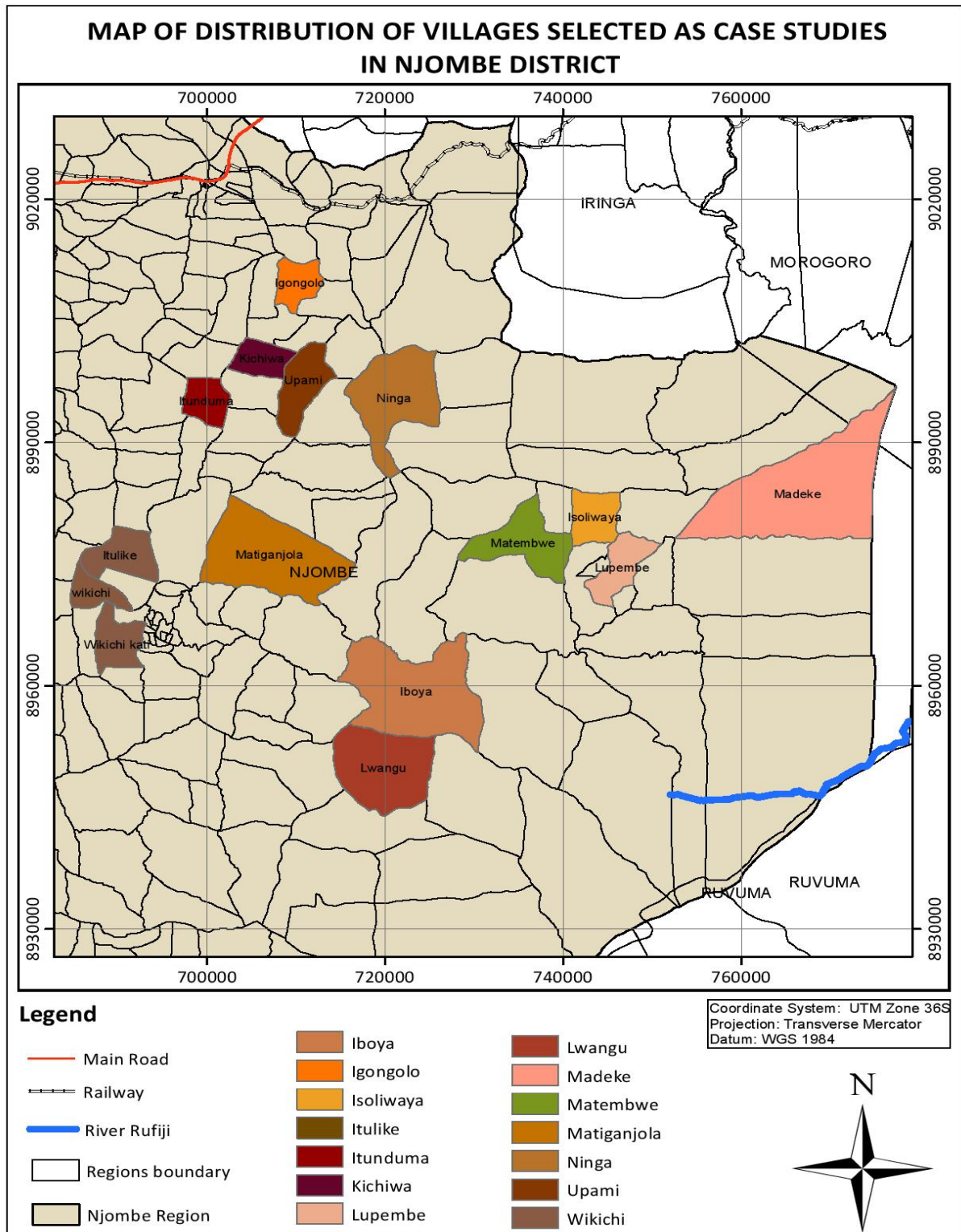
Suitable climatic conditions within the zone attract many engagements in production and commercialization of crops. Major crops such as timber, tea, maize, tomatoes, onions, round potatoes, sunflower, sesame and fruits and vegetables are cultivated (Milder et al., 2013; Mkavidanda and Kaswamila, 2001). The zone has abundant land resources that attract agribusiness engagements (URT, 2013a; Milder et al., 2013). The agro-ecological features and social economic activities in the zone characterize a social-ecological system with institutional, social, economic and ecological interactions and impacts. This zone provided suitable cases of smallholder commercial farming practices and models from which institutional, social, economic and ecological aspects and sustainability were examined through the study. Various villages that are located within this zone as indicated in Figure 4.5 provided the cases of farmer groups and models that were selected for the study.

Figure 4. 4: Map of Njombe District showing the distribution of Agro-Ecological Zones



Aez_code	Altitude (masl)	Rainfall(mm/year)	Physiography
E7	750-1300	800 - 1000	Flat to rolling plains, locally hilly strongly dissected uplands and low hills
H1	1500-2000	600 - 700	Flat to undulating and rolling plains and plateaux developed on granites, gneiss
H2	1500-2100	1400 - 1600	Undulating to rolling plains and plateaux at high altitude developed on granites
H3	1500-2300	1000 - 1200	Strongly dissected hills/mountains strongly susceptible to erosion and landslide
H5	1200-2400	1000 - 2000	Undulating to rolling volcanic plains and plateaux to strongly dissected mts
R	Not applicable	Not applicable	Rocky terrain

Figure 4. 5: Map of Njombe District indicating the villages with selected smallholder farmer groups



4.4 Action situation in the Highlands Agro-Ecological Zone as a social ecological system

This part explains the Highlands Agro-Ecological Zone in Njombe District as a social ecological system. These explanations reflect smallholder commercial farming Action Situation (A) within the system. The explanations are guided by the contentions of the Institutional Analysis and Development and Social Ecological System (IAD-SES) Framework. The action situation is explained in terms of the zone as a resource system, specification of a resource unit within the system, resources governance system, actor conditions, social economic/market and political conditions and ecological conditions within the system.

4.4.1 The zone as a resource system (RS)

The Highlands Agro-Ecological Zone in Njombe District has characteristics of a resource system (Cole et al., 2014; McGinnis and Ostrom, 2014; Ostrom, 2010; Ostrom and Cox, 2010). The area covers Lupembe, Imalinyi and Mdandu divisions in the District. The system is endowed with natural and physical resources such as vast and fertile land, reliable natural water sources, quality air, natural forests and evergreen vegetation covers and a conducive climate that attracts investments in varieties of economic activities. Also, social, economic and other livelihood activities exist within specific governance mechanisms in the system. Combining these factors and institutional aspects that are attached to various sectors portray a complex social ecological system.

The use of resource endowments results into resource use dynamics in the system. For example, tree plantations and other crop farming require extensive portions of fertile land. Similarly, farming activities such as horticulture need perennial supply of water from various natural sources. Also, needs for farming land results into clearing of large forests and vegetation cover and destroys the natural fauna in the system. These extensive land needs increase land demands and connote complexity in fostering sustainability of the social ecological system. However, adaptations to these dynamics is guided by various laws and by-laws. Land uses in the system are generally governed by the Land Act No. 4 of 1999 and Village Land Act No. 5 of 1999 and local governments by-laws. Forests uses are governed by the Forests Act No. 1 of 2002 and local government by-laws. The environment is safeguarded by the Environment Management Act No. 20 of 2004 and local government by-laws. In general, resource uses within the system are guided by sector specific laws, policies and by-laws. These contribute in addressing the dynamics that emerge in the course of crosscutting uses of resources by various users in the system.

Despite the demands in resources from many users in the system, the system accommodates the current needs of its users. For instance, there are no declared prominent land scarcities, water scarcity or scarce forest products in the area. Due to many sectors that this system covers, this study specifically focused on the agricultural land use system in the zone.

4.4.2 Agricultural land use system as a resource unit (RU) in the zone

As resource system, the Highlands Agro-Ecological Zone in Njombe District is formed by various sub-systems of resource units. The identified physical and natural endowments, their associated activities and governance aspects form sub-systems of resource units as explained in Section 5.4.1 of this chapter. The agricultural land use system was the target resource unit for this study. Agricultural land use system and the way it is linked to extraction of other resources and respective outcomes it brings in the entire social ecological system are explained.

The agricultural land use system entails a combination of agricultural land use, the associated use of other resources, interactions of resource users and mechanisms for management of resources extraction in the zone. The agricultural land use system in the zone portrays convenient land access and desirability in land uses. The agricultural land use system is also supported by the reliable climatic conditions and soil fertility that support farming activities of many short and perennial crops in the zone. Farming activities are also supported by availability of water from rains and natural water sources and streams that are plenty in the zone. Agricultural land is used for cultivation of main food crops such as maize, round potatoes, beans, tea, coffee, fruits and vegetables. Tree plantation is also one of the prominent farming activities in the zone. The potentiality of land in the zone escalates its value as time passes.

Agricultural land use has indicated some destructive practices such as extraction of natural vegetations in search of extending farming plots for plantations, destruction of water sources in search of water or planting of water drying trees in water sources. Also, there is large selling of land by indigenous owners to private buyers. Also, higher demands in land for tree plantations and emerging avocado fruits farming in the zone are causing the value of land to escalate as time goes. Arguing on this, one of the land officers in the district says:-

“Land selling is done by village authorities and by individual owners. One acre of land is currently sold at an average of 100,000 Tanzania Shillings in remote areas while three years back, such a land size was sold at an average of 50,000 Tanzania Shillings. Villagers see the current price to be a good price for them and they continue selling big portions of their lands without bothering for their future land needs. There are worries of future land crisis to inhabitants in the zone as large parts of the land will be sold to and owned by intruders”.

(Officer, Njombe District, 2018).

Land selling in the zone and the entire country is regulated by the Village Land Act, No.5 of 1999 that does not allow for the village authority to sell more than 50 acres of its land to one investor or individual farmer. However, the practice has not always been followed accordingly. Worst, the law is silent on the maximum size of land that individual landowners can sell to individual farmers and investors. Village land committees and the district land authorities advise villages and individuals landowners to survey their lands and control their land selling behaviors.

4.4.3 Agricultural land use governance system (GS)

The agricultural land use system in the zone is mainly governed by the Njombe District Authority through the Land Department. Land access, use and ownership structures are centralized and are guided by the District Land Department. In rural areas, agricultural and settlement land is generally governed by the Customary Land Ownership as stipulated in the Village Land Act, No. 5 of 1999, local government by-laws and village councils ownership committees. Due to the crosscutting nature of agriculture, some farming practices are guided by different authorities in the zone. For instance, agricultural land use practices that are connected to the environment fall within the guidance of the Environment Management Act, No. 20 of 2004 and local government authority environmental management by-laws. These are used in guiding and controlling farming activities in or along water sources and prominent use of agricultural fertilizers, insecticides and pesticides and any other additives in the zone.

In cases where agricultural land uses are linked to public health, the Public Health Act, No. 1 of 2009 and local government public health by-laws are adopted to guide the use. For example, due to prominence in tree plantations in the zone, there are mechanisms for prevention and control of fire eruptions in the zone. Farmers are not allowed to set fires before getting permits from respective village authorities while cleaning their premises or farms. Authorities verify the

requested needs for fire setting and provide permissions after ensuring that the fire to be set will not bring any adverse impacts to the environment and to property.

Agricultural land uses also extend to the destruction of forests and natural vegetation and ecosystems. Not all land in the zone is accessible for farming. There are other protected natural forests and vegetation covers that are prohibited to be used for agriculture or residence purposes. The reserved forests in the district are Shamishombo, Numbi, Iditima, Mahalale, and Maeka. Using land for farming and extraction of forest products in all reserved forests is completely forbidden by law. Village authorities cannot distribute or sell land to individuals from these forests. Agricultural land that is subjected to extraction of forests and vegetation is guided by the Forests Act, No,14 of 2002 and local government forests by-laws.

The Njombe District Authority is also partners with government agencies, private investors and Non-Governmental Organizations (NGOs) to govern agricultural land uses in the zone. For example, Mpango wa Kurasimisha Rasilimali na Biashara za Wanyonge Tanzania (MKURABITA) works with the Njombe District Authority in formalizing the informally owned land to enable the lands to get titles. The Njombe District Authority also partners with the Rain Forest (RFA) to foster controlled use of farm inputs such as fertilizers, pesticides and insecticides. This aim at enhancing health and safety welfares of land users and protection of the environment in the zone. Also, parastatal organizations, Faith Based Organizations (FBOs), Non-Governmental Organizations (NGOs) and private initiatives participate in fostering afforestation and tree plantation, protection of natural vegetation and control the destruction of vegetation covers in the zone. Such agencies include Tanzania Forest Fund (TaFF), Tanzania Forest Services (TFS) and the Forest Development Trust (FDT). Others include Private Forests Program (PFP), Umoja wa Wakulima wa Miti Matembwe (UWAMIMA), Umoja wa Wakulima wa Miti Nyombo (UWAMINYO), Umoja wa Wakulima wa Miti Ikuna (UWAMI), Kanisa la Kiinjili la Kilutheri Tanzania (KKKT) Lupembe and Sayuni Sisters.

The large part of rural farming land in the zone is traditionally owned by farmers inheriting lands from fore parents. Other inhabitants own the land through renting and purchasing. With the current demands for extensions of tree plantations and avocado fruits farming in the zone, a large number of farmers from outside the region are owning lands through purchasing. Land use monitoring is done by local government authorities and is guided by the district and village land use plans. There are village land use committees which are responsible for monitoring land uses

(Officer, Njombe District,208). Also, village authorities have by-laws that they use in sanctioning improper land users in the zone. The historically and traditionally built respect of people's land and boundaries in the zone is used together with institutional measures that are established in monitoring land uses in the zone. There are no major land use conflicts between neighboring or heterogeneous land users in the zone and the entire region in comparison to other regions and districts in the country (Officer, Njombe District, 2018).

4.4.4 Agricultural land users' conditions (AC) in the zone

The major activity of the human populations in the zone is crop farming. More than 78% of residents in Njombe District are smallholder farmers who engage in small scale farming with farm sizes ranging between 2 to 5 acres (Officer, Njombe District, 2018). Large scale farmers are few and are specifically engaged in tea and timber plantations. Bigger tree plantations are owned by Tanganyika Wattle Company (TanWat) and some private large-scale farmers. Larger tea farms are owned by Kibena Tea Company, Lupembe Tea Factory and Luponde Tea Company and some individual large-scale farmers. Smallholder farmers in the zone are homogeneous in terms of culture and lifestyle, social and economic status and dependence on farming as a means of income generation and earning livelihood. However, the prominence of commercialization of farming in the zone is leading to influx of people from other regions to the zone for commercial farming and therefore changing the homogeneity of farmers in the zone.

Despite scarcity and high costs in land especially in areas that surround towns and townships in the district, smallholder farmers' access to farming land is generally not constrained. Smallholder farmers who access land through purchasing can get it instantaneously. Smallholder farmers also purchase land from neighboring villages in case of shortage in one village. In some cases, smallholder farmers who work in registered groups can influence access to farming land are given priority and access land for farming from respective village authorities. This is done to foster more engagement and development of smallholder farming in the area.

There is a high shift in smallholder farming behaviours in the zone especially youths do not engage in farming on business as usual practices. Youths are becoming more entrepreneurial in search for more rewarding opportunities and not agriculture alone. For example, the prominent tree plantations and timber business in the zone is making many youths to shift from engaging in crop farming to casual employment in tree plantations by individuals and companies. This state

threatens the sustainability of smallholder engagement in food crops farming and future availability of food in the zone.

4.4.5 Agricultural land use and social, economic and political conditions (SEP) in the zone

The conditions on demand and supply of land for farming in the zone in general are in equilibrium. There are no major land need imbalances and crises to land users in the zone. There are no competitive land selling and buying conditions in the zone especially in rural areas. Smallholder commercial farmers who need land can access land without competing with large buyers as there are varied options and buying choices. The distribution of land still allows to be accessed from any individual even from different villages. Smallholder farmers are sellers and buyers of land depending on the needs. However, the emerging need for tree plantations and avocado fruits plantations are causing an influx of people to the zone and the entire region for land purchases. Nevertheless, this state has not yet been an inconvenience for smallholder farmers to access land for farming as they face no major transaction costs in land access processes (Officer, Njombe District, 2018).

In some cases, smallholder farmers are incentivized by their local government authorities to access land for farming activities. Asserting some smallholder farmer groups to be incentivized to accessing land from village authorities, one officer in the district says:-

“Farmer groups in the villages of Ikang’asi and Mfriga were granted a total of 200Acres of land to support their farming activities. Farmer groups in Nyave were given a total of 800Acres of land by the village authority for supporting their farming activities. Umoja wa Wakulima wa Miti Matembwe (UWAMIMA) groups were also given land by their village authority for tree plantation. So, incentives for smallholder farmer groups to access land are evident and the mode of granting land is for group ownership under customary ownership. However, in order for these groups to get land incentives, they are supposed to be formally registered, own a constitution, engage in recognized farming activities and be managed under cooperatives and Njombe District Agriculture and Cooperatives Development Officers” (Officer, Njombe District, 2018).

Agricultural land use-based development include the fact that many villagers are farmers and they use land for farming activities as a means to earn their livelihoods. However, agriculture in the district and the region as a whole is not for earning livelihoods but a means of income generation through using farming for commercialization. Tree plantation activities are a

prominent investments for the people in Njombe. Many rural populations especially youths get employed in farming, wood harvesting and processing, and management of investors farms.

There are slight and indirect regional and national political influences on agricultural land use in the zone. One officer claimed that the existed crisis in farmers' access to maize markets by limiting the selling of maize to domestic markets only was associated to political interests. There are also moments where politicians for their own interests give farmers instructions that contravene with the guidelines on abiding by 60-meter distance farming from water sources and 20-meter distance farming along riverbanks. Other areas include vain promises for supply of farm inputs and improvement of products prices by politicians especially during elections.

4.4.6 Agricultural land use and ecological/environmental conditions (ECO) in the zone

Environmental conditions that involve smallholder farmers in the zone are more focused on preservation and restoration of the vegetation cover, proper land use and sustainable farming practices such as controlled use of fertilizers, pesticides and herbicides. Deforestation and clearing of natural forests and vegetation cover is a common practice in the zone due to agricultural expansions especially for new tree plantations, avocado fruits, pineapples and other crops farming. There is evidence of a slow encroachment of natural forests in Madeke Village due to expansions and development of new pineapples farms. Water sources are also being encroached for development of bore water holes and streams for irrigation of vegetables and perennial crops. Frequent forest fires are also evident and are common during dry seasons. These practices are the major causes of deforestation of natural vegetation cover in the zone (Officer, Njombe District, 2018).

Some indications of land degrading practices are found to exist due to prolonged use of Ammonium Sulphate fertilizers in Igongolo, Kichiwa, Ninga and Matembwe villages where production of maize is very high. The use of Ammonium Sulphate proved to increase maize production and yield but the adverse impacts include increased soil acidity to the extent that no farming can be done in these areas without using artificial fertilizers. There is also evidence of farming practices that cause soil erosion in Lupembe Ward (Officer, Njombe District, 2018).

With respect to climate change impacts, the undulating land terrain and steep valleys in the zone do not support floods in case of heavy rains. Droughts are also not reported to occur in the zone as the climate and weather conditions in the entire region support long seasons of temperate humidity. However, gradual changes in temperatures in the area are possible causes of various

impacts that are happening in the area. There are cases of such impacts as one agriculture officer in the district affirms:-

“There are experiences of increases of temperatures in the region. These might be the outcomes of climate change. Some crops such as bananas and beans which were not growing in the zone due to low temperatures are now growing as temperatures are raising up and supporting the growth. There are also experiences of more insects and plant diseases such as emergence of “ weed carrots” in the zone due to high temperatures. These could be the climate change impacts in the zone ”.

(Officer, Njombe District, 2018).

4.5 Interactions in the Highlands Agro-Ecological Zone in Njombe District

Interactions are occurrences within a social ecological system that integrate different actors in their social or economic endeavours to support their livelihoods. In this study, interactions of smallholder commercial farmers with other actors are explained in terms of modalities of common agricultural resources use or harvesting, conflicts that exist in course of using resources and investment activities related to commercial farming in the zone. Other elements are the self-organizing activities for smallholder commercial farming, smallholder networking activities, monitoring and evaluative activities in smallholder resources uses in the system. Explanations on interactions in the zone are clarified under these elements as follows.

4.5.1 Agricultural land harvesting mechanisms in the zone

This entails the common mechanism that is established for shared accessing and extraction of common agricultural related resources within the zone. According to the provisions of the Village Land Act, No.5 of 1999, there is the individually owned land and the village owned land in rural areas. There are individual residents who own lands and there is lands that is reserved and owned by the village for public uses and for serving individual villagers who fall in land needs over time. Deliberations for apportionment of the individually owned land are upon the individual owner. The owner decides on what to do and how to use the land. Despite this ability, the owner is obliged to safeguard the quality of land by avoiding destructive land uses such as uncontrolled use of synthetic fertilizers and subjecting it to erosion. The user has to think of the communal advantages of land when its land uses are linked to other resources such as water sources, forests and the environment.

On the other hand, apportioning of village land is done by the village assembly and it is to be in accordance with a village land use plan. There can be specific land needs from individual

villagers or farmer groups or investors. These need to be decided by the public decisions of the village assembly. These are institutionalized through registration of groups, work with a constitution, engage in specifically known farming activities and work within cooperatives and be recognized by the social development and cooperatives development and management offices in the district.

4.5.2 Agricultural land and related resources use conflicts in the zone

Resource use conflicts are some of the elements that bring complexity in managing resources and fostering sustainability of social ecological systems. There are no remarkable conflicts in agricultural land and related resources uses among various users in the Highlands Agro-Ecological Zone in Njombe District. Notwithstanding, there are minor conflicts in individual farms boundaries, a majority of which are solved through the institutionalized approaches. Land use conflicts in villages are institutionally settled through respective village land councils (VLC). In case such conflicts fail to be solved at the village level by the councils, they are successively sent to be handled by ward tribunals (WT), district land and housing tribunals (DLHT), the High Court Land Division (HC-LD) and the Court of Appeal (CA) (Officer, Njombe District, 2018; URT, 1999a, p.75).

4.5.3 Smallholder farming investment activities in the zone

The district authorities together with parastatal and private entities in the area have specific activities that enhance smallholder farmers financial investments. One case of smallholder financial investments in the area included a financial partnership between the Njombe District Council, Tanzania Agricultural Development Bank (TADB) and smallholder farmer groups represented by their Agricultural Markets Cooperative Societies (AMCOS) in villages. In this partnership, smallholder farmer groups in the villages of Ilingitu, Nyombo, Upami, Matiganjola, Ninga and Ikuna received a loan worth 171,605,370.00 Tanzanian Shillings from TADB to support their farming activities (Officer, Njombe District, 2018).

Moreover, the organization of smallholder farmers into AMCOS in the district indicates further growth to enable these societies to initiate financial investments by forming or joining Savings and Credit Cooperative Societies (SACCOS). There are several AMCOS that have established or joined SACCOS in the area. Data from the Njombe Rural District Council indicate 64% of the AMCOS to have joined SACCOS which to date serve a total of 6366 smallholder farmers with total savings worth 1.3 Billion Tanzanian Shillings. It is through these SACCOS that smallholder

farmers receive their revenues after selling their crops and in them certain percentages of the revenues are deposited as savings (Field data, 2018).

Furthermore, smallholder farmers in the area are supported by the district authorities to invest in cultivation of long-term crops for long term sustenance of their commercial farming. In this type of investment, smallholder farmer groups are apportioned with village lands in order to foster development of smallholder farming in long term and strategic crops that are cultivated in the area. Contending on this investment, an agricultural officer in the district says:-

“The district has reserved a total of 498.8 Hectares of land that will be distributed to smallholder farmers in all twelve wards within the Njombe Rural District Council for the purpose of promoting cultivation of tea and coffee as strategic crops in the district”

(Officer, Njombe District, 2018).

Despite the existence of private investments by smallholder farmers themselves, there are initiatives that are set by the public or private bodies or with partnerships to involve smallholder farmers in various farming investment activities in the zone as it has been indicated by the explained cases.

4.5.4 Smallholder self-organizing activities in the zone

The current emphasis on growth of smallholder farming is leading to the formation of initiatives that organize and unite smallholder farmers to enable them to gain capabilities to meet the production and marketing challenges. Smallholder farmers are being organized in farmer groups, farming blocks, agricultural markets cooperatives societies (AMCOS), regional cooperative unions and other various forms. The motive to establish farmers’ organizational bodies needs to originate from farmers themselves. However, the modality of promoting the establishment of these unions and their respective managements are done by farmers in partnership with district authorities. Smallholder farming organizational forms in the zone in are identified to begin at the farmer group level. Several farmers groups in a village or in a ward organize themselves and grow into an agricultural markets cooperative society (AMCOS). These organizational forms are managed under the Cooperatives Societies Act No. 6 of 2013. The district cooperatives management office organizes and manages all activities related to promotion, organization, registration and managing of farmer groups and societies in the district.

Considering smallholder organization activities in form of AMCOS, data indicate a total of 22 registered AMCOS in Njombe Rural Distinct Council serving around 2,542 smallholder farmers

from 20 villages in the district (Field data, 2018). This is a greater step towards enhancing growth of smallholder farming activities in the area.

4.5.5 Agricultural land use monitoring and evaluative activities in the zone

The agricultural land uses in the area are monitored and evaluated under the provisions of the Village Land Act, No. 5 of 1999 to which many of the land uses are guided. Land uses in the village are required to be in accordance with the village land use plan that delineates the uses as communal village land, individually occupied land and village land reserved for communal and individual occupation (URT, 1999a, p. 20). The land use monitoring and evaluation is based on the plan. Abidance of the village land use plan at the village level is done by the specific village councils (VC). These do the monitoring activities in a cascading approach down wards to the lower divisions of branch and street levels. They make frequent visits to specific land uses to observe any incompatible land uses in the area. Any land use incompatibilities that are found by the committees are reported for taking measures. Whenever there are conflicting opinions, they are subjected to the land use disputes settling bodies that are found from the village level to the national level (Refer part 4.5.2).

In cases of agricultural land uses that crosscut to other sectors, monitoring of such uses is done within specific village authority by-laws, ward councils and district councils. In control of agriculture-related environmental destruction practices such as planting trees in water sources, individuals who are found destroying the environment are subjected to payment of compensations for the damage. Moreover, fire out-breaks as environmental destroying practices in farms and tree plantations are so much controlled in the area. Farmers are not allowed to set fires for clearing their farms without a permit from the village authority. Fire setting is permitted to be done early in the morning or evenings where there are lower wind levels to control the possibility of fire out-breaks. In case a damage is caused by fire, the destroyer compensates the owner either by paying the stipulated fines or by replanting.

4.6 Conclusion and discussions on institutional and social ecological system aspects in the Highlands Agro-Ecological Zone in Njombe District

The above parts have explained on the Highlands Agro-Ecological Zone in Njombe District as a social ecological system. It has clarified it as a resource system, its agricultural land use as a resource unit with action situation and existing interactions that involve smallholder commercial farmers and other agricultural stakeholders in the system. The suitable weather and climate

conditions, the natural and physical resources endowments and extraction processes and social and economic activities of human populations are social ecological system features of the zone. The action situation has indicated the existence of smallholder commercial farmers organized in groups or societies interacting with other stakeholders such as the government, local authorities, private initiatives and agribusinesses for commercialization of agriculture. There are existences of organizational activities that focus on creating capabilities to smallholder farmers to capitalize on various resources and opportunities that are within the localities of the zone for economic, social and ecological wellbeing in the zone.

Challenges are part and parcel of any endeavour and in this respect, extensive extraction and destructive use of natural resources, lack of institutional mechanisms and weak enforcement mechanisms exist in smallholder farming action situation and interactions in the zone. However, these activities, interactions and challenges are not left to prevail in their own ways without any enforcement and governance mechanisms. In this regard, general laws, specific laws, by-laws and guidelines for instance in agricultural land use, forests use, water resources use and the environment are set by national authorities and local government authorities. These governance mechanisms aim at fostering proper extraction and utilization of available resources for sustainable smallholder commercial farming and sustainability in the entire zone.

Sustainability within the Highlands Agro-Ecological Zone in Njombe District as far as institutional, social, economic and ecological aspects in smallholder commercial farming is a point of concern. The zone has portrayed the existence of an action situation with interactions through which generic sustainability outcomes are observed. From the revealed action situation and interactions, sustainability concerns on basis of institutional, social, economic and ecological aspects are explained.

The cross-cutting nature of agriculture requires farmers and other stakeholders to take concern of the provided laws, by-laws and guidelines that guide the extraction and use of agricultural related resources in the area. All sectors that are interlinked to agriculture and whose resources are extracted for agriculture are enhanced with a governance mechanism that guide the extraction and use of such resources. Such a mechanism is established with laws such as the Land Act. No. 4 of 1999 and its local government by-laws, the Village Land Act No. 5 of 1999 and local governments by-laws and the Environment Management Act, No. 20 of 2004 and its local government environment management by-laws. Others include the Water Resources

Management Act No.11 of 2009 and local government water management by-laws and the Forests Act, No,14 of 2002 and local government forests by-laws. The mechanism is put in place to facilitate for crosscutting and sustainable use of respective resources in the area. This governance mechanism is an indication of institutional sustainability fostered by the authorities in the zone.

Ecological sustainability is also taken into concern by the authorities through partnerships with smallholder farmers and other stakeholders in commercial farming in the area. Indications of extensive extractions of land and natural forests and vegetation for new farms and plantations are environmental vulnerabilities in the area. Nonetheless, initiatives to protect the natural resources by local government authorities, private sectors and farmers are evident. Engagements in activities related to the controlled extraction of natural forests, the protection of natural water resources, promotion of afforestation and controlled use of artificial fertilizers, pesticides and insecticides are geared at a reduction of environmental risks in the area. Moreover, farmers show responses to environmental welfare by adopting farming methods such as organic farming that do not use artificial additives and insecticides. These general states of engagement in protection of ecology and biodiversity indicate ecological sustainability in the area.

Processes towards access, use and ownership of land for agriculture are portrayed to be less constrained in the area. A majority of farmers own land through inheritance and in case of more land needs by smallholder farmers, they can equitably access it through renting or purchasing. The land demand and supply status in the area yet indicates the absence of competitive conditions. This state of land access, use and ownership in smallholder farmers indicates the existence of equitable practices as there is still the availability of land in the area and farmers can still access land outside the boundaries of their villages. However, this equity is supposed to be sustainably fostered in order to avoid future land shortages and land use conflicts. Establishment of village land use plans and surveying of individual land portions are the optimal means to enhance equitable access, use and ownership of farming land in the area.

Due to the availability of land and a lack of competitive behaviours towards land demand and supply in the area, a majority of smallholder farmers manages the costs of accessing and owning land from rural parts in the area. This reduces the economic burden to farmers who access land through renting or purchasing. In cases of exceptional land needs, some local government authorities set mechanisms of incentivizing and facilitating such land needs. Examples of farmer

groups or specific need groups such as women and the youth are indicated to be facilitated to access and own land for undertaking their commercial farming activities. Farmers' economic ability to access and own land and local authorities facilitation of specific groups to access land indicate general considerations of economic sustainability as far as land needs for farming in the area is concerned.

Connected to economic sustainability in agriculture is the existence of financing mechanisms that aim at supporting smallholder commercial farming in the area. Initiatives to support smallholder financial capability are built on farmer organizational mechanisms as preconditions for accessing financial institutions and services. All farm financing mechanisms found in the area emphasize a grouping of farmers to enhance their traceability and trust for financial empowerment. Initiatives that link smallholder farmers to banks for farm loans to enhance their farm financial sustainability require farmers to be organized in groups. Also, the sensitization of smallholder farmers to establish their own financing and credit access mechanisms through Savings and Credit Cooperative Societies (SACCOS) and group revolving fund models indicate initiatives to enhance their farm's economic sustainability.

Discussions on social ecological systems sustainability concerns lead to drawing a generic conclusion. This general conclusion is based on the presence of modalities that are founded by authorities to govern the sustainable extraction of agricultural resources by smallholder farmers in the zone. The conclusion is also based on the identified initiatives that integrate smallholder farmers in environmental protection. It is also based on the identified mechanisms that enhance equitable access, use and ownership of land in the area. The conclusion is further based on the economic ability by smallholder farmers to access land and their integration in farm financing mechanisms. These bases are analyses of opinions from relevant experts and officers responsible for management of agricultural related resources in the zone. From these bases, this study finds the presence of established mechanisms that facilitate smallholder commercial farming to take concerns for institutional, ecological, social and economic sustainability in the area. These are general sustainability concerns from expert opinions. Specific sustainability concerns that emanate from smallholder commercial farmers and other agricultural stakeholders in the area are explained in proceeding chapters of this thesis.

Sustainability concerns are a key issue by the local governments and the government in partnerships with smallholder farmers and other stakeholders in smallholder commercial farming

in the area. As responsible authorities to foster sustainability in the area, local authorities and the government use their efforts and initiatives in partnership with other stakeholder to enhance sustainable undertaking of smallholder commercial farming practices in the area despite encountered challenges.

4.7 Summary on the chapter

This chapter has presented characteristics of the study area in which the target case studies were identified. Explanations on location, demographic and economic activities about Tanzania, the country where the study was undertaken and on the Njombe District where a specific case study is located are given. Specific explanations on the Highlands Agro-Ecological Zone in Njombe District as the case study and where the empirical research cases were selected for the study are also made. The chapter has further explained on the Highlands Agro-Ecological Zone with respect to the Institutional Analysis and Development and Social Ecological Systems (IAD-SES) Framework. Under this guide, characteristic explanations of the zone as a social ecological system are made.

Moreover, the action situation which focuses on characterizing the zone with respect to the framework and identifications of interactions within the action situation are presented. In these explanations, smallholder commercial farming within the action situation elements and interactions of smallholder commercial farmers and other stakeholder in agriculture are provided. The chapter concludes with discussions of institutional, social, economic and ecological sustainability in the action situation and interactions in the zone. In generic viewpoints, institutional, social, economic and ecological sustainability concerns are indicated to be comprehended and acted upon by respective local government authorities. It comprehends by setting mechanisms that foster smallholder commercial farming and other commercial farming stakeholders to take concerns on sustainability in the case study.

The next chapter presents on the smallholder commercial farming models that are practiced in the study area. These models are the basis for the cases that were used to further answering of the research questions of this study.

CHAPTER FIVE: SMALLHOLDER COMMERCIAL FARMING MODELS PRACTICED IN THE HIGHLANDS AGRO-ECOLOGICAL ZONE IN NJOMBE DISTRICT

5.1 Introduction

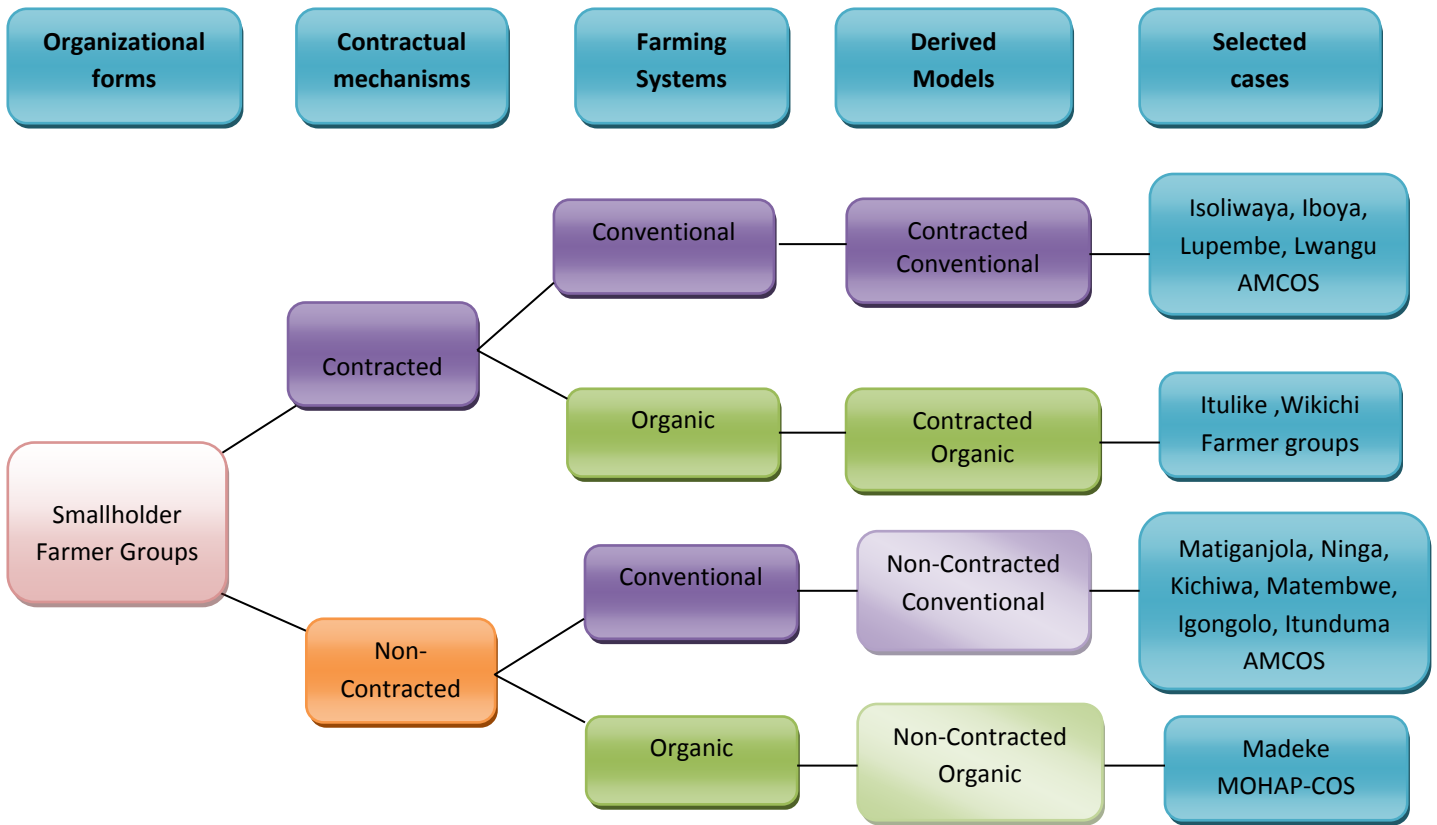
This chapter presents answers on the question that intended to identify and explain the types of smallholder commercial farming models that are practiced in the study area. In doing this, the chapter explains on various commercial farming models that are practiced in the study area and were selected as cases for the study. Explanations on the modalities in which commercial farming firms or companies or initiatives contract or partner with smallholder farmer groups in practicing commercial farming are presented. Moreover, specific contents of firms or companies or initiatives and commercial farmer groups are also presented. Thereafter, the chapter presents analytical discussions on the found models and practices and concludes with a summary of what is presented in the entire chapter.

5.2 Bases for identification of smallholder commercial farming models in the study area

Based on a conceptual review of literature, this study developed a conceptual model for the identification of smallholder commercial farming models that are practiced in the study area (Ragasa et al., 2018; Maertens and Verde, 2017; Wezel et al., 2014; Bennet and Franzel, 2013; Byerlee and Haggblade, 2013; Prowse, 2012; Seufert, 2012). The model proposed combining various elements that form specific commercial farming models that were thought to exist in the study area. These elements are smallholder organizational mechanisms, smallholder farming contractual agreements and smallholder farming systems. Combinations of these elements within smallholder farmer groups and commercial farming firms or companies or initiatives brought what this study refers to as smallholder commercial farming models.

These combinations resulted into the formation of smallholder models which are Contracted Conventional Farming Model, Contracted Organic Farming Model, Non-contracted Conventional Farming Model and Non-contracted Organic Farming Model. The derivation of these models is explained in details in Part 2.4.2 of Chapter Two of this Thesis. Figure 5.1 portrays the conceptual representation of smallholder commercial farming models and the empirical cases of selected farmer groups that represent the models.

Figure 5. 1: A conceptual representation of smallholder commercial farming models



Source: Researcher's construct after literature review

5.3 Smallholder commercial farming models that are practiced in the study area

This study empirically identified smallholder farmers who are organized in groups for commercial farming. These smallholder farmers work with commercial farming companies or firms or initiatives in various forms of arrangements to enhance smooth undertaking of commercial farming. These arrangements exist in forms of contractual agreements and non-contractual agreements. The intention of these agreements is to foster mutual development of commercial farming between the parties in various parts of the agricultural value chain. This study also found the smallholder farmers who adopt commercial farming by using conventional and organic systems. The agribusiness firms or companies or initiatives play the roles of facilitators, enablers, managing entities, business partners or markets to smallholder farmer groups.

In this respect, four types of smallholder commercial farming models were found to be practiced in the study area. The study found the existence of a contracted conventional farming model which is practiced through publicly managed and privately facilitated models. The second model

is the smallholder group contracted organic model which is practiced through a privately facilitated model. The third found model is the smallholder group non-contracted conventional model which is practiced through public and private facilitation mechanisms. The fourth model is the smallholder group non-contracted organic model that is practiced as a publicly managed model. These four types of models are undertaken through seven categories that vary between publicly managed and privately facilitated models. The four models formed the case studies for this study. These models are further explained in the following parts of the chapter.

5.4 Contracted Conventional Farming Model

The smallholder group contracted conventional farming model is formed by smallholder farmers who partner with public or private commercial farming firms or companies or initiatives in undertaking commercial farming. Smallholder farmers undertake conventional tea farming through various contractual agreements with actors in public or private sectors. In public sector agreements, smallholder commercial farming is organized in farmer societies that are facilitated and managed by the Njombe District Agriculture, Irrigation and Cooperatives Department. Under this category, tea farming and the entire industry are overseen by the Tea Board of Tanzania (TBT) and Tanzania Tea Agency (TTA). Smallholder tea farmers under this category have taken shareholding contractual agreements with parties. In this sense, farmers are sellers of tea leaves to Lupembe Tea Factory, a publicly owned tea processing factory as their market in reception of extension services, technical expertise, farm inputs and implements from the public sector. Isoliwaya and Lupembe agricultural markets cooperative societies (AMCOS) were selected to represent other farmer groups and societies in the category.

In privately facilitated agreements, smallholder commercial farming is organized in tea farm blocks. Farming activities are facilitated and managed by Njombe Out-growers Services Company (NOSC), a private company that facilitates tea farming in the area. Likewise, tea farming under this category is overseen by the Tea Board of Tanzania (TBT) and Tanzania Tea Agency (TTA). Private contractual agreements are taken by smallholder block tea farmers to supply tea leaves to Kabambe Unilever Tea Factory as its market. Farmers receive facilitation, technical and extension services, farm inputs, seeds and implements. The contracts are managed on a gradually recovered long term loan mechanism. Lwangu and Iboya Tea Farm Blocks are the selected smallholder farmer groups under NOSC to represent the model as is further explained.

5.4.1 Njombe District Agriculture, Irrigation and Cooperatives Department

The Njombe District Agriculture, Irrigation and Cooperatives Department is a local government body of the Government of the United Republic of Tanzania that is entrusted to manage all activities related to agriculture, irrigation and cooperatives activities within the District. These are providing quality agriculture and cooperatives services, capacity building, private sector facilitation for sustainable agriculture production, productivity and cooperatives development (URT, 2015, p. 2). The department is divided in two divisions, the agriculture and irrigation division and the cooperatives development division. The agriculture and irrigation division is responsible for managing agriculture and irrigation development programs through developing local level agriculture plans, provision of technical expertise, extension services, management and supply of farm inputs and implements to farmers in the district. On the other hand, the cooperatives division is responsible for facilitation of formation, management and development of cooperatives, farmer groups and unions in the district according to the provisions of the Cooperative Societies Act 5, 2013 of the United Republic of Tanzania (URT, 2013b, p. 22).

The department works with various stakeholders and partners in fostering agriculture and cooperatives development in the district. The department works with both categories of smallholder commercial farming activities that are either independent or contracted with private agribusiness firms or companies or initiatives. In this model, this study selected the department as the umbrella body responsible for managing contracted smallholder farming activities in the district. Smallholder farmer groups that are managed by the department and are selected to represent this category of a model are Isoliwaya and Lupembe AMCOS which are further explained below.

5.4.2 Isoliwaya Agricultural Markets Cooperative Society (AMCOS)

Isoliwaya Agricultural Markets Cooperative Society (AMCOS) was established in 1993. It operates under the Cooperative Societies Act 5, 2013 of the United Republic of Tanzania and is overseen by the Tea Board of Tanzania (TBT) and the Tanzania Tea Authority (TTA) (URT, 2013b; URT, 2018; Research field data, 2018). The society is a member of Muungano wa Vyama vya Ushirika Lupembe (MVYULU), a union of cooperative societies in Lupembe Ward. The society operates within the jurisdictions of Isoliwaya Village. It has a total of 247 members including males, females and youths with male membership dominating over others.

Conventional tea farming is the main activity under the society though members also engage in cultivation of beans, fruits, vegetables and tree plantations. Farmers in the society individually own land through inheritance from their fore parents. The owned farming land average between one acre to twenty-five areas per person (Research field data, 2018). Large farmlands were obtained during the Tanzania villagization program in 1970s and were surveyed under customary ownership. The National Property and Business Formalization Program for Tanzania named as Mpango wa Kurasimisha Rasilimali na Biashara za Wanyonge Tanzania (MKURABITA) ran a program to revisit and renew the title deeds of all previously surveyed tea farmlands. The Ikanga Factory also facilitated surveying of tea farmlands under the society.

Isoliwaya AMCOS has a 25% shareholding co-ownership contract with Lupembe Tea Factory (Research field data, 2018). The factory is the buyer of tea leaves from the society. Adverse long-term contractual disparities between the parties led into non-functionality of the contracts. Legal procedures were on table for legitimate solutions. The society also contracts with Ikanga Tea Factory for inputs, technical expertise and a market for tea leaves. The society partners with the Rainforest Alliance (RFA) for sustainable agricultural activities. These sustainable agricultural activities include farmers training on proper tea harvesting, tea hedging, afforestation, proper handling and protections against harmful uses of chemical fertilizers, additives, sprays and insecticides used in tea farming.

5.4.3 Lupembe Agricultural Markets Cooperative Society (AMCOS)

Lupembe Agricultural Markets Cooperative Society (AMCOS) was re-founded in 1993. It operates under the Cooperative Societies Act 5, 2013 of the United Republic of Tanzania and is overseen by the Tea Board of Tanzania (TBT) and Tanzania Tea Authority (TTA) (URT, 2013b; URT, 2018; Research field data, 2018). Lupembe AMCOS is a member of the union of cooperative societies in Lupembe Ward known as Muungano wa Vyama vya Ushirika Lupembe (MVYULU). Society members come from the Lupembe Ward. To date, the society has a total of 431 members in of which males dominate other genders. The low benefits gained from tea farming in the area lead youths to be reluctant in joining tea farming.

Conventional tea farming is the main business of the society. Farmers also engage in the cultivation of maize, beans and fruits and vegetables and tree plantations. Land is traditionally owned through inheritance and averages between half an acre to six acres (Research field data, 2018). Due to the importance of the tea crop, all tea farmlands in the society were surveyed

under the National Property and Business Formalization Program in Kiswahili named as Mpango wa Kurasimisha Rasilimali na Biashara za Wanyonge Tanzania (MKURABITA) program.

Lupembe AMCOS under MVYULU are 25% shareholders of Lupembe Tea Factory (Research field data, 2018). The agreements are on supply of farm inputs to farmers for selling tea leaves to the factory. However, contractual discrepancies between the parties made the contracts to be stopped and are subjected to legal procedures. Moreover, the society has contracts with Ikanga Tea Factory, a private tea processor in the area. It is for supply of farm inputs to farmers and the factory being their tea market. Lupembe AMCOS also partners with the Rainforest Alliance (RFA) for sustainable agricultural practices. The alliance trains farmers on proper tea harvesting, tea farms hedging, afforestation and on proper handling of chemical fertilizers, insecticides, additives and sprays that are used in tea farming.

5.4.4 Njombe Out-growers Services Company (NOSC)

Njombe Out-growers Services Company (NOSC) is a smallholder farmer facilitation company that was established in 2014 for the provision of professional services to smallholder tea farmers in Njombe District. It facilitates smallholder commercial tea farming through individual tea farming and block tea farming systems. The company works with the central and local governments of Tanzania as enablers and creators of harmonious agribusiness environment. It works with Njombe Town Council in sensitization roles, land access and titling facilitation and hosting of farming businesses. It works with SAGCOT in agribusiness pioneering, the Tea Board of Tanzania (TBT) as tea business industry regulator and Tanzania Smallholder Tea Development Agency (TASHTIDA) for provision of extension services. The company also works with Tea Research Institute of Tanzania (TRIT) for technical expertise and training and Tanzania Rural Roads Agency (TARURA) for roads infrastructure services in the area.

The first operation phase of the company targeted an impact of \$33 million foreign direct investment in rural smallholder-based tea economy, serving more than 3800 farmers and creating more than 8000 direct farm jobs (NOSC Officer, 2018). To date, the company works with 25 tea blocks in 10 villages with a total of 1258 smallholder farmers who are TTB registered and Rainforest Alliance certified. It has supplied over 23 million tea seedlings and indicates an average of 48% annual increase in green leaf production over years of operation. Eighteen (18) Farmer Field Schools (FFS) and state of art services such as mechanical harvesters, automatic weather stations, lightning conductors, e-scales and pay slips are enhanced by the company

(NOSC Officer, 2018). The company's mode of business is operated through a consortium of contracted partners. These are smallholder farmers as green tea leaves producers, Unilever Tanzania through its Kabambe Tea Factory as the market and NOSC itself as the facilitator and provider of technical expertise and services to smallholder tea farmers in the area. Iboya and Lwangu Tea Far Blocks that operate under the company were selected cases for the study.

5.4.5 Iboya Tea Farm Block

Iboya Tea Farm Block is officially named as KIWACHAI, a Kiswahili abbreviation for Kikundi cha Wakulima wa Chai Iboya. The block was established in year 2015 following the facilitation and motivation by Njombe Out-growers Services Company (NOSC). The block operates within the boundaries of Iboya Village and all its member come from the same village. The block has a formal leadership, a constitution, its by-laws and sets of responsibilities and sanctions to members. The block has a total of 38 members and the mode of block farming does not allow addition of new members in the block. The group is gender balanced with almost equal representations of men and women. However, youths representation is low due to their low motive to participate in tea farming in the area.

Contracted conventional tea farming is the main activity of the group whereby the entire group manages one block tea farm. The group owns approximately 33 Hectares of land with 26 Hectares of it being cultivated with tea (Research field data, 2018). This farmland was obtained from the group's request from Iboya Village Authority under NOSC facilitation. The farmland is being surveyed under the Commissioner of Lands at the National level to avail the group with the legal right of occupancy. The block operates commercial tea farming under contractual agreements with NOSC for facilitation, extension services, access of farm implements, access of farm inputs, fertilizers, insecticides, pesticides and additives that are required in tea farming. Furthermore, the tea farm block has contracts with Unilever Tea Tanzania Limited at Kabambe Tea Factory in Lwangu Village as its tea market.

Figure 5. 2: Tea farming under contracted conventional farming model



Smallholder tea farming in Lwangu Tea Block Smallholder tea farming in Isoliwaya Village
Source: Field research data, (October 2018)

5.4.6 Lwangu Tea Farm Block

Lwangu Tea Farm Block is named as Mshikamano Lwangu Farm Block. It was established in 2015 after farmers getting knowledge and motivation on block tea farming from Njombe Out-growers Services Company (NOSC). The group in the block operates by involving individual farmers from Lwangu Village who joined together to undertake block farm. The block has its formal management, its leadership, sets of laws for managing the group and it has the discipline committee for sanctioning the indiscipline behaviours. The block tea farming group has a total of 56 members of which females are many than men. Men and youths are few as they perceive tea farming is no longer profitable and is enslaving. The number of members ought not to increase as the block is completed. Any sorts of decreases in number of members are to be replaced by next of kins of the decreased members.

The main farming activity of the group in the block is conventional tea farming although farmer members are not restricted to own and engage in other crop farming activities outside the block. The tea block has a total of 51 Hectares of land of which 32.2 Hectares are cultivated and planted with tea (Research field data, 2018). This land is owned by the group and was acquired from Lwangu Village Authority through NOSC facilitation. The land is being surveyed for acquisition of formal ownership. The group is contracted to NOSC for technical expertise, extension

services, education, farm inputs and technology. It is also contracted to Unilever Tea Tanzania as its tea market through the Kabambe Tea Factory. The parties have contracted on a long-term loan mechanism that is recovered through farmers' selling of tea leaves to the factory.

5.5 Contracted Organic Farming Model

The smallholder group contracted organic farming model found in the study area is formed by smallholder organic farmers who have contracted with a private commercial farming company in undertaking commercial farming activities. Smallholder farmers who are organized in groups undertake commercial organic farming activities by partnering with a private company that facilitates on production and provision of a market. In this model, smallholder farmer groups engage in organic avocado fruits farming and are facilitated by Tanzanice Agrofoods Limited (Tanzanice) that operates in the entire region. Under this model, contractual agreements are made for farmers to produce organic avocado fruits under supervision and technical facilitation of Tanzanice. The company contracts to be the market for the produce organic avocados in agreed quantities and prices.

Organic avocado fruits farming needs farmers to abide by the agreed upon production standards to enable the fruits to be purchased by Tanzanice. The agreements require farmers to use natural manure and or composite and no artificial fertilizers and pesticides are to be used in avocado farming. Avocado farms are also not to be mixed with any other crops. To attain this agreement, the company trained lead farmers who do the follow-ups and inspections from farms preparations to harvesting in all farms of organic farmer members. Farmers also regularly fill control forms for checking the abidance by the organic production requirements. The harvested avocado fruits are also tested to see if there are any chemical residues as per agreed standards. The company has assured a reliable market to all fruits produced by farmer members. The contracts between farmer groups and the company are renewable on an annual basis. Organic farmer groups that have contracted with Tanzanice were selected as cases to represent the model in the study. Further explanations on Tanzanice, the hosting company for the model and Itulike and Wikichi smallholder farmer groups as selected cases for the model are provided in the next parts of the chapter.

5.5.1 Tanzanice Agrofoods Limited (Tanzanice)

Tanzanice Agrofoods Limited is a private business company that is formed through a joint venture of Tanzanian and Finish based companies. Tanzanice is a daughter company to Perunamestarit OY Finland which was a partner to the Seed Potato Development Project (SPDP) that was undertaken in the Southern Highlands of Tanzania between 2012 and 2015. The partner saw opportunities in fruits and vegetables food value chains from the area and decided to develop a local based business company in these value chains. Tanzanice was established in 2017 and is registered as a business company to operate nationwide. The company aims to create sustainable business value chains to smallholder commercial farmers in Tanzania.

In Njombe District, Tanzanice works with smallholder organic avocado farmers who are organized in groups. About 230 farmers in groups are trained and certified as organic avocado farmers (Tanzanice Project Manager, 2018). The company contracts to be the buyer of organic avocados from farmer groups. The contracts are on prices and supply quantities and are renewable depending on the demand of products in global markets. The company also trains, advises and guides farmers on products improvement on a win-win basis. The training are on organic farming and on abidance to organic farming standards. The company uses trained lead farmers who monitor farming practices of the registered organic farmers. Through this, the company knows individual farms and their organic farming status. When verified organic, the company certifies the products through the European Union recognized Organic Certification which is a standard and international certification. The company exports the products to European Union countries which is its current market scope.

By the year 2018, the company had exported a total of 200 tons of organic avocados to European markets and around 500 farmer were expected to be certified under the GAP Global Certificate (Tanzanice Project Manager, 2018). In fostering social equity, Tanzanice fights against child labour and farmer exploitation. It also promotes safe food production, safe products for consumers and safe production for the environment. The company also supports partnered farmers' access to financial services by providing memoranda of understanding (MOU) to financial institutions that need verification of farmers who seek financial services.

5.5.2 Itulike Smallholder Organic Farmers Group

Itulike smallholder organic farmers group, named as TUONDOKE Group was formed in 2007 and it is registered under the Business Registration and Licensing Authority (BRELA) as a smallholder farming business. The group is formed by individual members who come from different parts in Njombe Region. Changes in the constitution allow farmers who conduct organic avocado farming in the entire Njombe Region to join the group. The group has a constitution and by-laws that are used in managing and guiding all matters in the group. The current number of group members is 172 with more women than men and a majority being above 45 years of age (Field research data, 2018). Land scarcity in the village and longtime taken for avocado fruits to yield discourage many youths to engage in avocado farming.

The main production activity in Itulike farmer group is the cultivation of organic avocado fruits. Farmers are also engaged in cultivating maize, round potatoes and vegetables. Organic farming is mainly done by using traditional organic fertilizers such as manure and composites. Chemical fertilizers are not used at all in organic farming. Organic avocado farms are individually owned by farmers and land is owned through inheriting and purchasing and many of these lands are not surveyed. Large organic avocado farms go up to seven acres and smaller farms to one acre. The group constitution allows farmer membership seekers to own land from half an acre and above. The village faces land shortage due to its proximity to Njombe Town, a situation that makes it not easy to access a portion of land for purchasing from this village in the near future.

Itulike smallholder organic farmers group contracts with Tanzanice Company for organic farming facilitation services through training and education. The company is the primary buyer of organically produced fruits from the group. The parties sign a seasonal contract that is renewed on an annual basis and every farmer owns a copy of the signed contract. The group also works with the local government authorities for technical expertise from agricultural extension officers. It has partnerships with the Southern Agricultural Corridor of Tanzania (SAGCOT) for technical expertise and inputs. Moreover, the group partners with Tanzania Horticultural Association (TAHA) for training on product quality improvement and provision of organic products transportation logistics services.

5.5.3 Wikichi Smallholder Organic Farmers Group

Wikichi smallholder organic farmers group was established in 2012. The group began after farmers facilitation for fruits farming from Mr. Erasto Ngole, a volunteer and famous fruits farmer in Njombe Region. The official name of the group is Umoja wa Wakulima wa Matunda Wikichi (UWAMAWI). The group is formed by individual members from Wikichi Village to facilitate and ease meeting, planning and services provision to members. The group has a three years term management, has a constitution, by-laws and stipulations of sanctions to members who contravene the rules and guidelines of the group. Currently, the group has 78 members in a more men than women distribution. Positive outcomes such as increases in income levels, meeting livelihood needs and construction of houses that avocado farmers are experiencing are attracting new members to join the group.

This group is mainly engaged in cultivation of organic avocado fruits. Other crops such as maize, round potatoes, wheat and vegetables are also cultivated by members. Manure from domestic animal dung and organic composites are used as fertilizers. The land for farming in a majority cases is owned through inheritance and purchasing and it ranges between one and six acres. The incorporation of the village land into the Njombe Town has led to land scarcity in the village leading some farmers to search for land in other villages.

Wikichi farmer group had partnerships with Tanzanian Agriculture Productivity Program (TAPP) and TechnoServe that trained farmers on various farming skills. These initiatives left the group with master skills and expertise in organic farming. Currently, Wikichi farmer group has contracts with Tanzanice for facilitation of organic farming and purchasing of organic avocados. The company trained lead farmers who do follow-ups, observations and inspections of organic farming practices in farms. The company also tests the harvested avocados to verify if they are really organic. This is done technically to trace any inorganic residues in fruits. Once this is done, the company certifies the fruits as organic. Moreover, contracted farms are documented in terms of ownership, size and location and are numbered for traceability and quality control.

Figure 5. 3: Avocado farming under contracted organic farming model



Traditional organic manure processing facility

An organically grown avocado tree with fruits

Source: Field research data, (October 2018)

5.6 Non-contracted Conventional Farming Model

The smallholder non-contracted conventional farming model is formed by smallholder farmer groups that have partnered with public or private commercial farming firms or companies or initiatives in undertaking commercial farming. Smallholder farmers undertake conventional commercial farming without legally binding contractual agreements with their partners. In this model, farmer groups are managed by public sector institutions and others are facilitated by private initiatives in undertaking commercial farming. Publicly managed smallholder commercial farming is organized in farmer societies under the facilitation and management of Njombe District Agriculture, Irrigation and Cooperatives Department. The department facilitates maize cultivation and selling to the National Food Reserve Agency (NFRA) of the Government of Tanzania. Smallholder farmers are not contractually bound to sell maize to NFRA and can choose other markets they deem suitable. Ninga and Matembwe agricultural markets cooperative societies (AMCOS) are representative farmer groups in this category. Farming practices under these cases are explained in Parts 5.6.1, 5.6.2 and 5.6.3 of this chapter.

On the other hand, privately facilitated smallholder commercial farming is organized in societies under the facilitation of two initiatives of Njombe Development Office (NDO) with CARITAS and Njombe Agricultural Development Organization (NADO). The former facilitates smallholder soybeans farming and the latter facilitates round potatoes farming. Since these initiatives are private and are not for business, their facilitation activities are not bound by for profit contracts. Smallholder farmer groups are free to sell their produce to any of the facilitated or personally identified markets. Kichiwa and Igongolo agricultural and marketing cooperative societies facilitated by NDO with CARITAS and Matiganjola and Itunduma agricultural and marketing cooperative societies facilitated by NADO are selected farmer groups to represent this category for the study. More details on these initiatives and their case groups are explained in Parts 5.6.4, 5.6.5 and 5.6.6 and Parts 5.6.7, 5.6.8 and 5.6.9 of this chapter.

5.6.1 Njombe District Agriculture, Irrigation and Cooperatives Department

As explained, publicly managed smallholder farmer groups under non contracted conventional model operate under the facilitation and management of Njombe District Agriculture, Irrigation and Cooperatives Department. Explanations of this smallholder farmers facilitation body are provided in Part 5.4.1 of this chapter. The two respective groups of smallholder farmers selected to represent the model are explained below.

5.6.2 Ninga Agricultural Markets Cooperative Society (AMCOS)

Ninga Agricultural Markets Cooperative Society (AMCOS) was found in 1997. The society was founded in Ninga Village though with time its jurisdiction has extended to Situ and Lima villages. The society is formed by individual members and groups. That means, new members can join individually or as newly formed groups. The society has its management, its constitution and by-laws. Every member declares to adhere to set rules, guidelines and responsibilities of the society including buying shares. The society has a total of 155 members being composed of many men than women. Youths are represented with a small number as they claim not to see the benefits of group-based farming.

Maize, the main crop under the society is cultivated conventionally with little use of traditional animal manure fertilizers. Farmers also cultivate beans, coffee and vegetables. Land is individually owned and accessed through inheritance. Increases in land demands in the area, has made some farmers to access land through purchasing from other inhabitants. A majority of

these lands are neither publicly nor traditionally surveyed. Portions of land that farmers own vary in an average between three to six acres.

The National Food Reserve Agency (NFRA) is the major buyer of maize from the society. Seasonal business agreements between the society and NFRA are effected through the Warehouse Receipt System (WRS) and farmers receive their payments through bank accounts. Silverland Company located in Iringa Region is the other buyer of maize from Ninga AMCOS. Farmers sell their maize to this company on their conviction after being satisfied with price offers. The society has contracted with Tanzania Agricultural Development Bank (TADB) for a gradually recovered loan facility. The society has partnership with the Alliance for Green Revolution in Africa (AGRA) for market services and farmer capacity development programs. The alliance has integrated the society into the ten project member countries to get access on the daily markets and statuses.

5.6.3 Matembwe Agricultural Markets Cooperative Society (AMCOS)

Matembwe Agricultural Markets and Cooperative Society (AMCOS) was established in 1986. It operates under the provisions of the Cooperatives Societies Act, 2013 of the United Republic of Tanzania (URT, 2013b). The society is formed by individual members and associations. That means, persons who wish to join as individuals or associations such as church associations can be members of the society. The operational boundaries of the society are within Matembwe and Iyembela villages which are the founding parties of the society. The current number of members in the society is 600 in which women members are more than men with a small number of youths.

Matembwe society member are mainly engaged in conventional maize cultivation. Other crops such as beans and tree plantations for timber are also cultivated. Enormous land portions are traditionally and individually owned. Village land use plans for farming, pasture and reserve was long time developed but lacked control and led some individuals to possess big land portions. Large cultivated lands have been different as it was before where a smallholder farmer had gone to the capacity of cultivating 10 acres but now has decreased to eight or seven acres. Small farmers cultivate land that range between one and a half to two acres. These decreases are associated with a lack of services in farm inputs, lack of farm financial supports and lack of commercial farming partners.

Matembwe AMCOS business partners are not enduring. The society had once contracted with Britan who signed contracts for commercial maize farming. The company was committed to engage in the whole maize value chain including supply of inputs and expert services and markets. The contractual agreement went unsuccessful due to poor seasonal maize yields. The society also negotiated a contractual agreements with National Food Reserve Agency (NFRA) through the warehouse receipt system to purchase maize. This was operational and seasonal and farmers cannot rely it as a market that can absorb all the produced maize in a season.

Figure 5. 4: Maize farming activities under non-contracted conventional farming model



Harvested maize farm in Matembwe Village



Maize warehouse in Ninga Village

Source: Field research data, (October 2018)

5.6.4 Njombe Development Office (NDO) with CARITAS

Njombe Development Office (NDO) with CARITAS is a non-governmental and not for profit organization that is formed and managed by the Roman Catholic Church. The organization facilitates provision of social services and development initiatives in Njombe Region. It deals with the implementation of social and development projects in agriculture, water supply and energy and operates under the motto “Working for the Needy”. The organization started to operate in Njombe Region in 1998.

NDO with CARITAS has served various agricultural projects including the “Soya ni Pesa” Project that is financed by the United States Department of Agriculture (USDA). The “Soya ni Pesa” Project, literally translated as “Soybeans is Money” was established in 2012. Under this project, the organization works with smallholder and large-scale farmers to promote soybeans cultivation as a means of income generation. Smallholder farmers are organized in groups of 15 to 30 members and are coordinated by Community Volunteers (CVs) who are trained to facilitate group mobilization and soybeans cultivation in the region.

The “Soya ni Pesa” Project intends to meet two major objectives. The first is to facilitate farmer group lending and saving mechanisms for meeting agricultural costs and social services. This is realized through the Savings and Internal Lending Community (SILC) financing mechanism. Farmers can borrow the internally saved funds to meet agricultural needs and social services. The second objective is to promote soybeans cultivation to increase farmer incomes. The organization handles farmer groups with smaller farms between one and ten acres. It also serves medium and large-scale farmers of up to fifty acres of which 50% of the costs for insecticides and herbicides are subsidized (NDO Project Officer, 2018). NDO with CARITAS observes a majority of women farmers to lack independent decisions in using land for farming unless permitted by their spouses. This is observed because the project has a special target of promoting women empowerment by encouraging women to join in smallholder farmer groups. The organization allowed up to 70% of farmer group members to be women in order to meet the target (NDO Project Officer, 2018). The organization has served more than 11,000 farmer groups of which 200 are in Njombe District and are served through the Soya ni Pesa Project (NDO Project Officer, 2018).

In implementing its activities, NDO with CARITAS intercedes the formation of contracts between farmers and other agribusinesses. The organization facilitated contracting between soybeans farmers and agro dealers such as Mtewele General Traders for seeds and fertilizers and Agri-Seed Company for soybeans seeds. The organization facilitated farmers’ financial linkages to Tanzania Postal Bank (TPB) and CRDB Bank who have farmers loan components. The organization also linked soybeans farmers to markets which include Matembwe Enterprises in Njombe, Silverland Company in Iringa and Solidecom and Hill companies in Dar es Salaam. Most of soybeans markets are poultry food processing enterprises. A majority of the mediated contracts are verbal and are normally made during purchasing phases.

Moreover, in its facilitation roles, NDO with CARITAS linked farmer groups with the Tropical Pesticides Research Institute (TPRI) for training on awareness, prevention and protection against excessive uses of fertilizers, herbicides and pesticides. The organization also facilitates the provision of Rain Gauges and links its farmers to TanWatt Weather Station for access of weather forecast services. Kichiwa and Igongolo agricultural markets cooperative societies are the selected smallholder commercial farming groups that are facilitated by NDO with CARITAS. Details on these groups are provided hereunder.

5.6.5 Kichiwa Agricultural Markets Cooperative Society (AMCOS)

Kichiwa Agricultural Markets Cooperative Society (AMCOS) like other formal agricultural markets cooperative societies is formed and operates under the provisions of the Cooperatives Societies Act 20 of the United Republic of Tanzania. This society started in 2015 when Market Infrastructure Value Addition and Rural Finance (MIVARF) program mobilized smallholder farmers in villages to work in groups to improve their farming activities. The society is formed by three groups that are composed of individual members. The society has its leadership headed by a chairperson, a secretary and a treasurer and an overall management board that is formed by members from within the society. The society operates within the boundaries of Kichiwa Village. Currently, the society has a total of 55 members, women being more than men and a lower presence of youths. Youths are claimed to be passive to work, like easy and simple jobs and do not like to invest in agriculture because it delays paying back.

Farmers under Kichiwa AMCOS mainly cultivate soybeans, maize, round potatoes and tomatoes. Soybeans is the main crop referred in this study. Conventional and mixed farming methods by applying organic manure and chemical fertilizers are used. Owned lands vary in sizes ranging from one acre to ten acres, a majority being acquired through inheritance and are not surveyed. Deliberate initiatives made by the Njombe District Commissioner to promote survey of lands led to a 25,000 Tanzanian Shillings contribution campaign for land surveys. It led to land surveys, some farmers' reception of title deeds and the process was continuous (Research field data, 2018).

Kichiwa AMCOS has no business contracts in its commercial farming practices. The Njombe Development Office (NDO) with CARITAS is the primary commercial farming partner to the society. This initiative provides education, facilitates farm inputs and market access to the society. The initiative established a Savings and Internal Lending Communities (SILC) program

to Kichiwa AMCOS members to facilitate their farm financing. Moreover, the society partners with YARA company for getting support on environmental protection and proper land use through established farm fields. The society also had partnership with MIVARF who linked them to NFRA. The partnership ended when MIVARF programme ended its activities in the area.

5.6.6 Igongolo Agricultural Markets Cooperative Society (AMCOS)

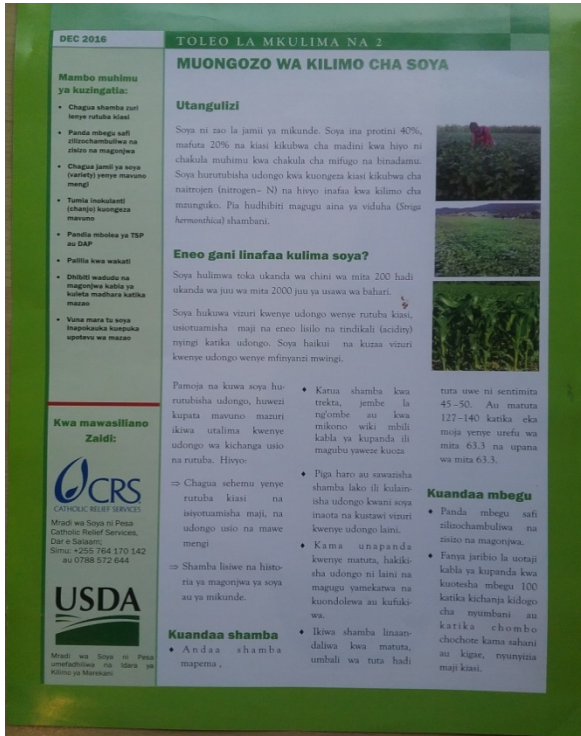
Igongolo Agricultural Markets Cooperative Society (AMCOS) is officially named as Mshikamano AMCOS Igongolo. This society was found in 2013 with farmer groups that grew privately under Njombe Development Office (NDO) with CARITAS initiative. It grew into an AMCOS and in 2018 was formerly registered to operate under the guidelines of the Cooperatives Act 20 of the United Republic of Tanzania. The society emerged from eight smallholder farmer groups which were intended for developing a Savings and Internal Lending Communities (SILC) financing mechanism that was initiated by NDO with CARITAS. The AMCOS operates in farmer groups that are formed by individual members. Currently, the society has a total of 48 members who are registered under the AMCOS. There are more than ten farmer groups with more than two hundred members that are in processes to join the AMCOS. The distribution of members indicate more women than men and there are no youth members as youths claim working in groups delays development.

The main crops that are cultivated by farmers in Igongolo AMCOS are maize, beans, soybeans, sunflower, sesame and millet. These are cultivated by using mixed farming methods where chemical fertilizers and natural manure are alternatively used. Soybeans is the main crop referred in this study. However, the current changes in weather and unreliable markets are making farmers to shift their concentration from cultivating soybeans to maize cultivation. Farming lands are individually owned by farmers and are accessed through inheriting, renting and purchasing from inhabitants. The lands owned by farmers under the society range between three acres and six acres.

Igongolo AMCOS works with various stakeholders. However, there are no any agribusiness contracts between the AMCOS and these stakeholders. The society partners with Njombe Development Office (NDO) with CARITAS initiative in cultivation of soybeans. The initiative used the “Soya ni Pesa Programme”, to facilitate for extension services, access to farm inputs, sustainable farming methods by using legumes such as soybeans and crop rotation and access to markets. Moreover, the society has partnership with Mteweke Agribusiness who facilitates for

provision of farm inputs that farmers access through group purchasing. The society formerly partnered with One Acre Fund that provided education on sustainable farming practices.

Figure 5. 5: Farming activities under non-contracted conventional farming model



A leaflet with soybeans farming guidelines under CARITAS' Soya ni Pesa Project



A cleared soybeans and maize rotational demonstration farm in Igongolo Village

Source: Field research data, (October 2018)

5.6.7 Njombe Agricultural Development Organization (NADO) initiative

Njombe Agricultural Development Organization (NADO) is a smallholder farmer facilitation initiative that fosters smallholder farmers development through proper farming and crop commercialization in Njombe Region. The organization started in 2008 as a ward level smallholder farming group called UMOVITA which abbreviates Umoja wa Vikundi vya Maendeleo Tarafa ya Mdandu. It grew to operate to the district and regional levels and in 2018 it was registered to start to operate nationwide. NADO is a not for profit and non-contracted organization whose main focus is to train smallholder farmers on sustainable farming methods, commercial farming and post-harvest handling methods. The initiative trains on production of round potatoes, maize, sweet potatoes, sunflowers and horticultural crops. These are mainly cultivated conventionally by using chemical fertilizers.

NADO also trains farmers on entrepreneurship and personal financing methods through poultry, livestock keeping and group lending as means to generate extra incomes. The intention of these sorts of training is to transform smallholder farmers from doing farming on business as usual to doing commercial oriented farming. Nonetheless, emphasis on production for consumption and nutrition is part of the goals. Excluding other area where it operates, the initiative had managed over 25 farmer groups in Njombe District by 2017 (NADO Officer, 2018). It also formed more than 25 farmer field schools which were meant for training farmers and a majority of these were adjourned after the training.

The initiative partners with and links farmers to agribusiness actors that include seed breeders of Uyole Agricultural Research Institute, One-Acre Fund and Syngenta. It also works with suppliers of fertilizers and implements of Mtewele Agro dealers and YARA. Other partners are markets such as the Akhlan Enterprises, a round potatoes processing company in Dar es Salaam. NADO works with local government authorities in dialogues for land access and proper land uses in the area. The initiative also facilitates farmers financing by promoting personal savings and Savings and Credit Cooperative Societies (SACCOS) financing by using its established NADO SACCOS. The initiative also assists farmers to prepare business plans to farmer groups that need to access funds from large financial institutions. Matiganjola and Itunduma agricultural markets cooperative societies were selected smallholder commercial farming groups to represent other groups under the initiative. The details on farming practices in these groups are further presented.

5.6.8 Matiganjola Agricultural Markets Cooperative Society (AMCOS)

Matiganjola Agricultural Markets Cooperative Societies (AMCOS) started in 2015 after farmers were motivated by farm school training from Njombe Agricultural Development Organization (NADO). Farmers were trained on proper cultivation of maize, round potatoes and tomatoes and later on saw the need to unite their efforts in farming activities. The society is organized in groups with individual members, it has its leadership headed by a chairperson, a secretary and a treasurer and all functions and activities are guided by a constitution. The operational boundaries of the society are within Matiganjola Village. The society has a total of 104 members whose gender distribution has been balancing after farmers seeing the benefits of group farming. There are very few youths in the group as many flock for casual employment at TanWatt, a timber plantation and processing company that is located closer to the village.

Farmers under Matiganjola AMCOS cultivate round potatoes as the main business crop. Maize and vegetables are also cultivated by farmers in the society. The methods of cultivation is by using manure and some industrial fertilizers and pesticides. Farming land is accessed through inheriting, renting and purchasing and the owned lands range between half an acre and four acres. Many of these lands are surveyed customarily after farmers getting training on the importance of formal land ownership.

At its starting stages, the society contracted with NADO for farm inputs, fertilizers, seeds, technology and training services. This contract ended when the society grew and was left to be independent. Currently, the society does not have any formal business contracts. Instead, it has several partners who work together to facilitate commercial farming. It has partnerships with NADO that facilitates provision of training on sustainable farming practices, environmental protection, farmer safety, land uses and rights, establishing farmer financing mechanisms through Village Community Banks (VICOBAs) and Savings and Credit Cooperative Societies (SACCOS) and some small infrastructure development. The society is partnered to SAGCOT for farm inputs and seeds, YARA for fertilizers and Uyo Agricultural Research Institute (ARI-Uyo) for seeds access. The society also partners with local governments and works with extension officers for extension services, training and markets access facilitation.

5.6.9 Itunduma Agricultural Markets Cooperative Society (AMCOS)

Itunduma Agricultural Markets Cooperative Societies (AMCOS) was found in 2012 through Njombe Agricultural Development Organization (NADO) initiative. The initiative started by training farm lead experts from farmers who became disseminators of knowledge on appropriate farming technologies of round potatoes, maize, beans, fruits and vegetables. More training of farmers made them to see the need to form farmer groups in order to get the training in groups. The groups were registered into an AMCOS after attracting a sufficient number of individual members from the village. The mode of membership in the society is formed by individual members. The society operates within the boundaries of Itunduma Village. The society has a total of 70 members of which women are many compared to men. Youths are also present members in the society.

Round potatoes is the main cultivated business crop although farmers also cultivate maize, beans, fruits and vegetables and engage in livestock keeping. Farmers were specifically trained on cultivation of round potatoes in order to produce potatoes for consumption and for business.

The society mobilized for startup capitals in groups for cultivating and selling round potatoes. Through this, the society established group farms in which groups labour and time are invested to manage the farms and the business. Farmers own individually their farmlands through inheritance, purchasing and renting. Group farmlands are accessed by renting from private villagers and from the village authority. There are no individual farmers who have surveyed their lands. The smallest owned farmland size is one acre whereas the large farmland size is five acres. However, there are farmers who had large farms even before coming of NADO. These expanded their farms to twenty even thirty acres of round potato farms after joining NADO.

Many of the business agreements in Itunduma AMCOS are seasonal and non-contractual. The common private buyers of round potatoes from the society include Nyatu, Matinginya and Boston Businesses and use the spontaneous sell-buy mechanism. Also, NADO has been a strong partner to the society. It has facilitated initiation of the society through provision of education and training on appropriate farming of round potatoes and other crops, sustainable farming practices, environmental protection, farmer protection, farm equipment supply and linking farmers to financial institutions. Moreover, the society has partnerships with One-Acre Fund who facilitate supply of round potato seeds to the society.

5.7 Non-Contracted Organic Farming Model

Constrained choices and decisions make smallholder farmers to undertake commercial organic farming activities without contractual agreements with any public or private sector companies. However, commercial farming activities under this category are supported by the public sector. In the study area, this commercial farming model is facilitated by the Njombe District Agriculture, Irrigation and Cooperatives Department. This is a public body that is responsible for fostering management and development of all farming activities in the district. Smallholder farmers who undertake organic farming under this model were found in Madeke Organic and Horticulture Agricultural Producers Cooperative Society (MOHAP-COS). The scarcity of organic farming activities in the area led to select MOHAP-COS, the only found representation of farmer groups under the model. The components of the model are further explained in the following parts of the chapter.

5.7.1 Njombe District Agriculture, Irrigation and Cooperatives Department

As it is previously detailed, publicly managed smallholder commercial farming groups under non-contracted conventional model operate under the facilitation and management of Njombe District Agriculture, Irrigation and Cooperatives Department. Explanations of this smallholder commercial farming facilitation body are provided in Part 5.4.1 of this chapter. A specific smallholder farmer group that is managed by the body and selected to represent the model is explained hereunder.

5.7.2 Madeke Organic and Horticulture Agricultural Producers Cooperative Society

Madeke Organic and Horticulture Agricultural Producers Cooperative Society (MOHAP-COS) begun in 2003 as a smallholder farmer group that supplied fruits to Dabaga Factory. It is registered under the provisions of the Cooperative Societies Act 20 of the United Republic of Tanzania. It is specifically registered for undertaking organic horticultural farming in Madeke Village. The society is formed by individual members who belong to groups. It is currently composed of ten groups that are led by a board of group members. Its constitution instructs members to undertake organic horticultural farming without using fertilizers and other inputs that are not organic unless instructed otherwise after research.

The society has 168 members with more men than women and a smaller number of youths. Youths seek jobs in towns and are discouraged to engage in agriculture due to high unavailability of markets for their products despite cultivating organically. Farmers mainly cultivate organic horticultural crops which include pineapples, avocados, mangoes, cassava, vegetables and bee keeping. The main crop selected for this study is organic pineapples. A majority of farmers own land individually and such types of lands are not surveyed. The farm sizes that farmers under the society cultivate range between one and two acres. Despite individual ownership, some women farmer groups own land communally. The village authority provided land to some women groups for communal ownership of the land. This was done to promote women engagement in group farming and enhancing women empowerment. The Madeke Village where MOHAP-COS is located is characterized by availability of vast, fertile and virgin lands. The village encourages external investors to join the village and the society for farming activities as a means to promote commercial organic farming and opening up of the village to business.

Madeke MOHAP-COS is constrained by unreliable markets. There are several attempts of establishing business contracts for supply of pineapples but a majority of these are explained to be dubious. Putika, an entrepreneur in small scale industries in Njombe partnered with the local government to install a small-scale pineapples processing factory in the village. The facility was operated for short while and did not continue as it was subjected to higher volumes of supplied fruits that it could not sustain. Remoteness, poor communication and poor transportation infrastructure are contended to be factors that constrain partnerships and business in the area. Nevertheless, the society partners with the local government authorities at the village and district levels for extension services, training on sustainable farming and environmental protection. The society also relies on the village authority in case of farmers' specific land needs.

Figure 5. 6: Pineapple farming activities under non-contracted organic farming model



Smallholder organic pineapples farming in Madeke Village



Small-scale pineapples processing facility that is built in Madeke Village

Source: Field research data, (October 2018)

In general, the given explanations have detailed the types, contents and practices of smallholder commercial farming models that are found in the study area. From the general presentation of these models, the key information on the types and commercial farming practices in models, managing firms or companies or initiatives and their respective farmer groups are explained to

portray what takes place in these models as far as commercial farming in the area is concerned. These explanations on commercial farming models are summarized in Table 5.1.

Table 5. 1: Summary of information on smallholder commercial farming models in the study area

No.	Smallholder commercial farming model	Managing firm/company/initiative	Sector	Farmer AMCOS/Group
1.	Contracted conventional farming model	Njombe District Agriculture, Irrigation and Cooperatives Department	Public	Isoliwaya AMCOS Lupembe AMCOS
		Njombe Out-growers Services Company (NOSC)	Private	Iboya Farm Block Lwangu Farm Block
2.	Contracted organic farming model	Tanzanice Agrofoods Limited (TANZANICE)	Private	Itulike Farmer Group Wikichi Farmer Group
3.	Non-contracted conventional farming model	Njombe District Agriculture, Irrigation and Cooperatives Department	Public	Ninga AMCOS Matembwe AMCOS
		Njombe Development Office (NDO) with CARITAS	Private	Kichiwa AMCOS Igongolo AMCOS
		Njombe Agricultural Development Organization (NADO)	Private	Matiganjola AMCOS Itunduma AMCOS
4.	Non- contracted organic farming model	Njombe District Agriculture and Cooperatives Department	Public	Madeke MOHAP-COS

Source: Field research data, (October 2018)

Moreover, smallholder commercial farmer groups that are selected as representative cases of commercial farming models contain details of information on forms of grouping (groups, farm blocks or societies), their formation and registration statuses and number of members. Other information are on the types of crops cultivated in groups, the adopted farming systems and types of contractual agreements and partnerships. In order to portray a clear picture on these commercial farming models, this information is summarized as presented in Table 5.2.

Table 5. 2: Summary of information on smallholder commercial farming groups selected for the study

No.	Selected group	Year started	Reg. No.	No. of members	Business crop	Farming system	Contracts	Main Partners
1.	Isoliwaya AMCOS	1993	IR.17	247	Tea	Conventional	Govt. Ikanga	Rainforest Alliance
2.	Lupembe AMCOS	1993	IR.3350	431	Tea	Conventional	Govt. Ikanga	Rainforest Alliance
3.	Iboya Farm Block	2015	NOSC	38	Tea	Conventional	NOSC Unilever	X
4.	Lwangu Farm Block	2015	NOSC	56	Tea	Conventional	NOSC Unilever	X
5.	Itulike Farmer Group	2007	BRELA	172	Avocados	Organic	Tanzanice	SAGCOT TAHA
6.	Wikichi Farmer Group	2012	BRELA	78	Avocados	Organic	Tanzanice	TAPP Techno Serve
7.	Ninga AMCOS	1997	NJ.79	155	Maize	Conventional	X	NRFA Silverland TADB AGRA
8.	Matembwe AMCOS	1986	IR.18	600	Maize	Conventional	X	NFRA Britan
9.	Kichiwa AMCOS	2015	NJ.45	55	Soybeans	Conventional	X	NDO/ CARITAS
10.	Igongolo AMCOS	2013	NJ.74	48	Soybeans	Conventional	X	NDO/ CARITAS Mtewele
11.	Matiganjola AMCOS	2015	NJ.41	104	Round potatoes	Conventional	X	NADO YARA ARI- Uyole
12.	Itunduma AMCOS	2012	IR.75	70	Round potatoes	Conventional	X	NADO Private Buyers One-Acre Fund
13.	Madeke MOHAP-COS	2003	NJ.35	168	Pineapples	Organic	X	Local Govt.

Source: Field research data, (October 2018)

5.8 Discussions and conclusion on commercial farming models

As the types of commercial farming models found portray, the Highlands Agro-ecological Zone in Njombe District is enriched with varieties of approaches that involve smallholder farmers in commercializing their farming. This provides a good opportunity for smallholder commercial farmers to choose among the various categories in case farmers are equally subjected to such choices. However, there are variations in smallholder commercial farmers responses to the current identified commercial farming models as presented in Table 5. 3.

Table 5. 3: Distributions of commercial farming models that are practiced in the study area

No.	Commercial farming model	Categories (f)	Categories (%)
1.	Contracted conventional farming model	2	28.6
2.	Contracted organic farming model	1	14.3
3.	Non-contracted conventional farming model	3	42.8
4.	Non-contracted organic farming model	1	14.3
	Total	7	100.0

Source: (Field research data, 2018)

The percentage distributions of models that is presented in Table 6.3 are computed basing on the specific numbers of categories that were found in a model. The categories are the types of contractual agreements or partnerships that are found to exist within a model. Some models indicate to have varieties of contractual agreements or partnerships compared to others which have limited numbers of contractual agreements or partnerships. The existence of more agreements or partnerships within a model indicates more engagement of commercial farming firms or companies or initiatives and more responses of smallholder farmer to engage in such kind of a model.

As presented in Table 5.3, the non-contracted conventional farming model indicates a higher representation (42.8%) followed by smallholder group contracted conventional model (28.6%). The two models of smallholder group contracted organic and smallholder group non-contracted organic indicate the least representations (14.3%) among the models. These results indicate that a majority of smallholder commercial farmers and agribusiness firms or companies or initiatives are oriented to engage in conventional farming without taking any contractual agreements in their commercial farming. Also, these results indicate that, even in cases where smallholder farmers and agribusiness firms or companies or initiatives take contractual agreements in their commercial farming, larger parts of farming practices that are adopted with these partners are

conventional. Moreover, the results indicate that, whether contracted or not, commercial farming firms or companies or initiatives and smallholder commercial farmers' investment and engagement in organic farming in the study area is very low.

From these results, implications of non-contractual practices in commercial farming models that involve smallholder farmers and agribusiness firms or companies or initiatives are high (57.1%) than contractual practices (42.9%). This can be an indication of dependence on informal agreements between commercial farming parties that are undertaking commercial farming. Despite involvement of formal agribusiness firms or companies or initiatives and other formal stakeholders in smallholder commercial farming, contracting implies not to be given priority between parties. With the current transformations in commercial farming, the need for transforming smallholder commercial farming from informal to sustainable and formal practices through contracting becomes imperative.

Moreover, the results on the distribution of categories and models have indicated a dominance of conventional farming models (71.4%) over organic models (28.6%). This is likely to imply that engagement in commercial organic farming is not yet a strong investment opportunity that agribusiness firms or companies or initiatives and smallholder farmers can tap despite the economic and ecological benefits it offers. However, investment prospects for agribusiness firms or companies or initiatives and smallholder farmers' to invest in commercial organic farming as a result of ongoing initiatives and outcomes in the area are implied.

With these results and implications, it can be concluded that the identified variations in commercial farming categories and models involve stakeholders with varied orientations. Integrating these stakeholders together with smallholder commercial farmers can be a way to create wider opportunities for farmers' enhancement of sustainability in commercial farming and sustainability of the entire area. Also, the variations in commercial farming categories and models signify the existence of varieties of determinant factors for smallholder farmers' choices of the models and varieties in responses to ecological, social and economic sustainability. These variations need to be understood by decision makers, policy strategists, agribusiness firms and smallholder farmers themselves in order to enhance sustainability of smallholder commercial farming in the area. As part of the answers sought by this study, the variations in determinant factors for models' choices and variations in responses to ecological, social and economic sustainability are further presented and discussed in length in subsequent chapters of this thesis.

5.9 Summary on the chapter

This chapter has presented answers on the types of smallholder commercial farming models that are practiced in the study area. The chapter has presented four types of commercial farming models which are formed by agribusiness firms or companies or initiatives that contract or partner with smallholder commercial farmers groups for commercial farming. The identified commercial farming models are the contracted conventional farming model which involves public and private sector managing entities with smallholder conventional tea farmer groups and societies. The other is the contracted organic farming model which involves a private sector company that contracts with smallholder organic avocado fruits farmer groups. The third is the non-contracted conventional farming model in which public and private sector managing entities partner with smallholder farmer groups and societies in three categories. One of the categories is a partnership of a public sector entity with smallholder maize farmers and the other two categories are diverse private initiatives that partner with separate smallholder soybeans and round potatoes farming groups. The fourth is the non-contracted organic farming model which involves a public sector entity that partners with smallholder organic pineapple farmer groups in the area.

In these models, the information and commercial farming practices in agribusiness firms or companies or initiatives that manage or facilitate smallholder commercial farming in smallholder farmer groups have been explained. Moreover, information and commercial farming practices in smallholder farmer groups that are managed or facilitated by commercial farming firms or companies or initiatives have been explained. Combining the information and farming practices in respective firms and farmer groups define the specific commercial farming models.

The chapter has also presented discussions on the models found. In these discussions, variations in commercial farming models are presented to portray variations in stakeholders through which farmers can integrate with them for sustainability enhancement. Also, the variations in models are explained to portray variations in responses to ecological, social and economic sustainability that are to be understood by various actors in smallholder commercial farming. The chapter concludes with a brief summary of what has been entirely presented. The next chapter presents on the drivers that influence smallholder farmers to choose specific commercial farming models that are practiced in the study area.

CHAPTER SIX: DRIVERS FOR SMALLHOLDER FARMERS' CHOICES OF SPECIFIC COMMERCIAL FARMING MODELS

6.1 Introduction

This chapter presents the results of a research question that intended to inquire on drivers or factors that influence smallholder farmers' choices of specific commercial farming models in the study area. The chapter begins by presenting the descriptive characteristics of smallholder farmers in the thirteen selected cases of farmer groups from the identified commercial farming models. The chapter also presents the descriptive characteristics of farmer groups found in the same commercial farming models. The chapter then presents independent analyses and respective findings on drivers for smallholder farmers' choices of specific commercial farming models. Respective discussions on the findings and their implications on smallholder commercial farming in the study area are presented. The chapter concludes with a summary of what it has entirely presented.

6.2 Descriptive characteristics in smallholder commercial farming groups

The social, economic and organizational characteristics of selected smallholder commercial farmers and groups provide information for understanding the strengths in contents of farmers and their respective groups for the study. This information is categorized on the basis of smallholder farmers' ages, genders, levels of education, main livelihood activities, crop types and farming systems, land sizes owned and tenure systems. The other categories are on characteristics of smallholder farmers joining groups and commercial farming models and management of groups in smallholder commercial farming models. This characteristic information and its respective explanations are provided hereunder.

6.2.1 Age characteristics

Age defines the maturity and capacity of an individual to willingly decide to participate in any permissible undertaking. In this respect, age is an important aspect to consider for an individual to meet the requirements to participate in representing a commercial farming undertaking. The study categorized age into five groups and individuals who were selected from smallholder farmer groups for the study portray different characteristics with respect to these age groups as indicated in Table 6.1.

Table 6. 1: Age distribution of smallholder farmers in selected farmer groups

		Frequency	Percent	Cumulative Percent
Valid	18-27	12	10.7	10.7
	28-37	23	20.5	31.3
	38-47	28	25.0	56.3
	48-57	29	25.9	82.1
	58+	20	17.9	100.0
	Total	112	100.0	

Source: Field research data, (October 2018)

The data presented in Table 6.1 on age indicates a large part of representation of individuals with maturity ages. The age group of 48-57 years indicates a higher representation of 26% followed by the group of 38-47 years with a 25% representation. The age group of 18-27 is the least represented group with 10.7%. Generally, these data indicate a suitable age representation since more than 50% of individuals who represent farmers and groups are of the mid age which is a maturity age. These are assumed to have developed a clear understand on commercial farming practices and decisions to participate in undertaking smallholder commercial farming in the area.

6.2.2 Gender (sex) characteristics

Gender is a characteristic that this study confines to include variables of sex distribution of smallholder farmer members in commercial farming groups. Sex distribution means the variations or balances in presence of males or females sexes members in a group. Selected smallholder farmer groups depict different gender characteristics as indicated in Table 6.2.

Table 6. 2: Gender characteristics of smallholder farmers in selected farmer groups

		Frequency	Percent	Cumulative Percent
Valid	Male	61	54.5	54.5
	Female	51	45.5	100.0
	Total	112	100.0	

Source: Field research data, (October 2018)

The gender (sex)-based representation of smallholder farmers in the study indicates a slight difference as shown in Table 6.2. Male farmers indicate a 54.5% representation whereas female farmers are represented with 45.5%. Despite this slight difference, the representation is suitable on both sexes in groups and in the study. The study did not need to make an equal representation by both sexes as selection was random. However, this representation is thought to have provided

equal opportunities for the study to capture aspects that are gender based in smallholder commercial farming in the area.

6.2.3 Levels of education

The level of education of smallholder farmers who participate in commercial farming is an important aspect to understand. Like any other citizen in Tanzania, a smallholder farmer is required to have undertaken a basic formal level of educational training that enables him or her to use the acquired skills to sustain a livelihood and manage the environment in which he or she lives. The measures of education levels of smallholder farmers who represented the groups for the study are presented in Table 6.3.

Table 6. 3: Education levels of smallholder farmers in selected farmer groups

		Frequency	Percent	Cumulative Percent
Valid	No formal education	6	5.4	5.4
	Primary education	99	88.4	93.8
	Secondary education	7	6.3	100.0
	Total	112	100.0	

Source: Field research data, (October 2018)

In the three categories of education levels shown in Table 6.3, individual farmers with primary level of education indicate a higher representation of 88.4 % in selected smallholder farmer groups compared to other categories. No formal education is lowly represented with a 5.4%. These data signify a majority of smallholder farmers who were selected for the study to be equipped with the basic formal skills that enable them to sustain their livelihoods and manage their environments. In that matter, the study selected suitable individuals who are equipped with the basic level of education that is required to enable them to manage the practices that surround smallholder commercial farming in the area.

6.2.4 Main livelihood activities

This study focused on examining commercial farming activities that are undertaken by smallholder farmers in a specific study area. Smallholder farmers in selected farmer groups were found to engage in commercialization of farming and some few are engaged in non-farm employment as their main livelihood activities. The distribution of smallholder farmers with respect to the main performed livelihood activities are presented in Table 6.4.

Table 6. 4: Main livelihood activities of smallholder farmers in selected farmer groups

		Frequency	Percent	Cumulative Percent
Valid	Commercial farming	109	97.3	97.3
	Non-farm employment	3	2.7	100.0
	Total	112	100.0	

Source: Field research data, (October 2018)

As presented in Table 6.4. above, 97.3% of smallholder farmers who were selected for the study are engaged in smallholder commercial farming. This means that a majority of smallholder farmers that were selected for the study are engaged in production of either cash or food crops for commercialization. This is their main activity to sustain their living. On the other hand, 2.7% of selected farmers are engaged in non-farm employment activities as their main means of earning their living despite commercial farming. With these data, it signifies that the study captured respective participants who are mainly engaged in smallholder commercial farming as it targeted.

6.2.5 Main commercial crops

Smallholder commercial farmers are identified to engage in the production of various crops which include maize, sorghum, tea, Irish potatoes, sweet potatoes, pyrethrum, beans, soybeans, sesame, coffee, cassava, fruits and vegetables. Also, smallholder farmers are engaged in tree plantations which are long term crops and cannot rely in meeting seasonal incomes compared to other crops. From these diverse crops, smallholder farmer groups engage in the production of one crop as their major commercial crop under a particular model. The distribution of major crops that are identified to be mainly commercialized by smallholder farmer groups under specific commercial farming models are presented in Table 6.5

Table 6. 5: Distribution of main crops cultivated by smallholder farmers in selected farmer groups

		Frequency	Percent	Cumulative Percent
Valid	Maize	35	31.3	31.3
	Tea	27	24.1	55.4
	Irish Potatoes	14	12.5	67.9
	Fruits	26	23.2	91.1
	Soybeans	10	8.9	100.0
	Total	112	100.0	

Source: Field research data, (October 2018)

The distribution of commercialized crops in Table 6.5 indicates maize is more commercialized with 31.3% followed by tea with 24.1%, fruits with 23.2%, Irish potatoes with 12.5% and soybeans with 8.9% without regarding the commercial farming models. Maize leads to be commercialized by other farmers who are members of groups that are engaged in production of other main crops. Despite being labeled as producers of a particular main crop, some smallholder farmers engage in cultivation of other different crops as their main commercial crops. It is a common practiced means to diversify their commercial portfolio.

6.2.6 Land sizes, land access and tenure systems

Smallholder commercial farmers own land in varied sizes depending on various factors such as the ability to purchase or land inheritance norms. The identified distribution of average land sizes that smallholder commercial farmers own are presented in Table 6.6.

Table 6. 6: Distribution of average land sizes owned by smallholder farmers in selected farmer groups

		Frequency	Percent	Cumulative Percent
Valid	less than 1 acre	17	15.2	15.2
	1-5 acres	56	50.0	65.2
	6-10 acres	23	20.5	85.7
	11-15 acres	7	6.3	92.0
	15+ acres	9	8.0	100.0
	Total	112	100.0	

Source: Field research data, (October 2018)

The presented distributions of average land sizes in Table 6.6 indicate 50.0 % of smallholder farmers to own an average of 1 to 5 acres land size. This is followed by an average of 6 to 10 acres which is indicated by 20.5 % and less than an acre which is represented by 15.2%. The other forms beyond 10 acres are indicated by least percentages. The higher percentages of average land size are therefore between 1 to 10 acres. The concentration of the higher percentages between 1 to 10 acres is an indication of farmers owning the average land sizes within this range. This is a characteristic feature of smallholder farmers as far as land ownership in the area and in Tanzania as a whole is concerned.

Related to land sizes is the mechanism that smallholder farmers use to access land in the area. Various land access mechanisms that smallholder commercial farmers use in the area are presented in Table 6.7.

Table 6. 7: Types of land access mechanisms that smallholder farmers use in selected farmer groups

		Frequency	Percent	Cumulative Percent
Valid	Inherited	74	66.1	66.1
	Bought	9	8.0	74.1
	Leased	8	7.1	81.3
	Borrowed	2	1.8	83.0
	Shared	19	17.0	100.0
	Total	112	100.0	

Source: Field research data, (October 2018)

The above data in Table 6.7 indicate that, 66.1% of smallholder farmers to access land through inheritance. This is the leading mode followed by shared access which is indicated by 17.0% and buying mode which is indicated by 8.0%. Land access through inheriting from fore parents is higher as it is a common feature of land access by many rural smallholder farmers in the country. Smallholder farmers in this area cannot differ so much with other farmers in other areas. However, some smallholder farmers who are limited to inherit land or need to expand their farm sizes in the area access land through buying or sharing with others depending on their commercial farming models. Moreover, smallholder farmers in the area indicate to own land through traditional and formal tenure systems as presented in Table 6.8.

Table 6. 8: Land tenure systems through which smallholder farmers own land in selected farmer groups

Variable	Frequency	Percent	Cumulative Percent
Traditional tenure	10	62.50	62.50
Formal tenure	6	37.50	100.00
TOTAL	16	100.00	

Source: Field research data, (October 2018)

The data presented in Table 6.8 indicates that 62.50% of smallholder farmers in the area own land through traditional tenure without land title deeds as lands are un-surveyed. This form of tenure limits a large number of farmers to access farms services. Conversely, 37.5% of smallholder farmers in the area own land through formal tenure with granted customary rights of

occupancy. A majority of these are in tea farms where lands are deliberately surveyed as a national strategy to promote tea farming.

6.2.7 Smallholder farmer groups in commercial farming models

In endeavours to commercialize farming, smallholder farmers in the study area organize themselves in groups and opt among the existing farming models to commercialize farming. This study made inquiries on previous organizational forms that farmers were using before joining the current models. It also inquired on the length of time in which smallholder farmers joined the current commercial farming models. The study also inquired on the status of management of smallholder commercial farming groups under the models. The findings on these characteristics are presented in Table 6.9.

Table 6. 9: Smallholder group entry characteristics and management in selected farmer groups

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Entrance to farming model	112	1.00	5.00	1.8214	1.18713
Previous model	112	1.00	3.00	1.1964	.55083
Groups management structure	112	1.00	3.00	2.6071	.54288
Valid N (listwise)	112				

Source: Field research data, (October 2018)

Concerning smallholder farmers' time of joining commercial farming models, data in Table 6.9 indicates a mean value of 1.8 which falls under the category of time between 6 and 10 years. This indicates a reasonable timeframe for representation of smallholder farmers in models as a majority have enough experience and understanding of commercial farming practices under particular models. Data also indicate that a majority of smallholder farmers joined group farming models from the individual mode of farming represented by a mean value of 1.2. This state signifies the value of group based commercial farming models that influence smallholder farmers to shift from the individual mode of farming. Moreover, the structure of managing farmer groups under various commercial farming models is indicated by a mean value of 2.6 which represents a structured mode of management. This signifies that, management of smallholder farmer groups in commercial farming models is formal and definite and farmers can rely on the structure as a formal means of fostering commercialization of farming.

6.2.8 Smallholder farmers collaborations with actors for access of agricultural services

Smallholder farmers are identified to collaborate with various actors in commercial farming by undertaking contractual agreements or partnerships. The study identified various areas in which actors partner or contract to enable farmers' access farm products and services. The modes of actors facilitation depend on the commercial farming models that smallholder farmers adopt. The identified areas are presented in Table 6.10.

Table 6. 10: Contracted or partnered areas in selected smallholder farmer groups

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Access to farmland	112	.00	1.00	.3214	.46912
Access to farm inputs	112	.00	1.00	.7232	.44942
Access to farm technology	112	.00	1.00	.3571	.48131
Access to extension services	112	.00	1.00	.5714	.49710
Farm financial support	112	.00	1.00	.1875	.39207
Sales supports	112	.00	1.00	.5179	.50193
Access to markets	112	.00	1.00	.6786	.46912
Valid N (listwise)	112				

Source: Field research data, (October 2018)

The rate of facilitating smallholder farmers to access farm inputs in Table 6.10 indicates to be high with a 0.72 mean value followed by access to markets with a 0.68 mean value. Smallholder farmers also indicate to highly partner or contract with actors on extension services with a 0.57 mean value and access to sales support services with a 0.52 mean value. Other areas such as smallholder access to farm technology, access to farmland and access to farm financing services are comparatively lowly contracted or partnered by actors. Despite the identified smallholder farmers' facilitation, the need for more initiatives in commercial farming models to expand farmers access to farm products and services to improve smallholder commercial farming is high.

6.2.9 Structures of managing and enforcing contracts or partnerships

Contracts or partnerships that are formed between smallholder farmer groups and other actors in commercial farming are portrayed within particular management and enforcement structures in the study area. The variations in structures of management and enforcement of the undertaken contracts or partnerships are indicated as presented in Table 6.11.

Table 6. 11: Modes of management and enforcement of contracts/partnerships in selected farmer groups

			Frequency	Percent	Cumulative Percent
Management structure	Valid	Very unstructured	3	2.7	2.7
		Still forming	43	38.4	41.1
		Structured	66	58.9	100.0
		Total	112	100.0	
Enforcement structure	Valid	Very unstructured	7	6.3	6.3
		Still forming	37	33.0	39.3
		Structured	68	60.7	100.0
		Total	112	100.0	

Source: Field research data, (October 2018)

Concerning the management of contracts or partnerships that are undertaken in the model, results presented in Table 6.11 indicate that 58.9% are structured and 38.4 % indicate to be in configuration stages and 2.7% of them are unstructured. On the other hand, the enforcement of contractual or partnership agreements between parties indicate that 60.7% are structured and 33.0 % indicate to still be forming and 6.7% of them are unstructured. Despite the perceived existence of unstructured management and enforcement of contracts or partnerships in smallholder commercial farming models, greater percentage of these modalities are structured. These states imply that the parties can rely on set upon agreements for attainment of mutual benefits in smallholder commercial farming in the area.

6.3 Themes and categories of drivers for smallholder farmers' choices of farming models

Through conceptual identification, this study proposed various factors which formed the bases for drivers of smallholder farmers' choices of commercial farming models in the study area. These are ecological conditions, social factors, land use governance factors, actor conditions, political factors and economic factors. Inquiries and analyses on these factors were limited to specific variables that the study selected as explained in Chapter Three, Part 3.4.5 and summarized in Table 3.1 of this thesis. However, the adopted factors and categories of variables are briefly explained in order to bridge the gap between the used methods.

The operational categories under ecological conditions are environmental degradation control and access to climatic information and services. Under social conditions, the selected categories are smallholder farmers equity to land access, equity to land use and equity to land ownership. The other is on models captivation of healthcare, safety, security and welfare of farmers and

creation of farm employment. With regard to land use governance factors, categories from which drivers for choices are derived are on governance of land access, use and ownership and on land use norms, rules and monitoring mechanisms. Being among the proposed bases of drivers, actor conditions have variables which include categories of farmers population and social economic attributes. Other categories are actors' influences on land access, use and ownership and actors' land access and use over history. Political conditions as another base for drivers of models choices has categories of individual or group political affiliation, local level political climate and national level political climate. Moreover, economic conditions from which drivers for choices of models are driven has categories of farmers facilitation to meet land demand and supply conditions. Other economic categories are on non-cash farm capital facilitation and farmers facilitation in farm financing.

Furthermore, the study gave room for smallholder farmers to identify other factors as bases for choices of specific commercial farming models in the area. The other factors that the study found include modalities of contractual agreements between agribusiness parties, modalities of products prices, products markets and their access and farm business incomes and profits. It is from these conditions and their respective categories that inquiries and analyses on drivers for smallholder farmers' choices of specific commercial farming models were made. Quantitative and qualitative findings on the drivers are presented in the subsequent parts of the chapter.

6.4 Drivers for smallholder farmers' choice of contracted conventional farming model

Due to different aspirations, smallholder farmers are driven to choose the contracted conventional farming model found in the study area. From the quantitative and qualitative analyzed data, these drivers are identified and explained as follows.

6.4.1 Data analysis and explanations of findings under the model

In the analysis, 27 representative smallholder farmers were selected for quantitative data inquiries. These were from Isoliwaya and Lupembe agricultural markets cooperative societies (AMCOS) that are partners to public contractual agreements managed by Njombe District Agriculture, Irrigation and Cooperatives Department. Others were from Iboya and Lwangu farm blocks that are managed by the Njombe Out-growers Services Company (NOSC) through privately facilitated contractual agreements. These were selected from various groups within the model gave responses to questions on drivers for choices of the model. Quantitative data that is

analyzed from the model give results which show variations in farmers' responses with respect to ecological factors, social factors, land use governance factors, actor conditions, political factors, economic factors and other factors. These questions were grouped into categories whose responses were computed to descriptive values to arrive at final responses for the factors. The finally computed descriptive values on farmers responses are as indicated in Table 6.12.

Table 6. 12: Descriptive values of factors that influence choices in contracted conventional farming model

	N	Minimum	Maximum	Mean	Std. Deviation
Ecological factors	27	2.33	5.00	3.7407	.72991
Social factors	27	2.67	5.00	4.0617	.63406
Land use governance factors	27	2.75	5.00	4.0833	.66506
Actor conditions	27	2.60	5.00	4.0222	.61352
Political factors	27	1.00	5.00	2.8889	1.29430
Economic factors	27	1.00	5.00	3.2778	1.18754
Other factors	27	1.00	2.00	1.0370	.19245
Valid N (listwise)	27				

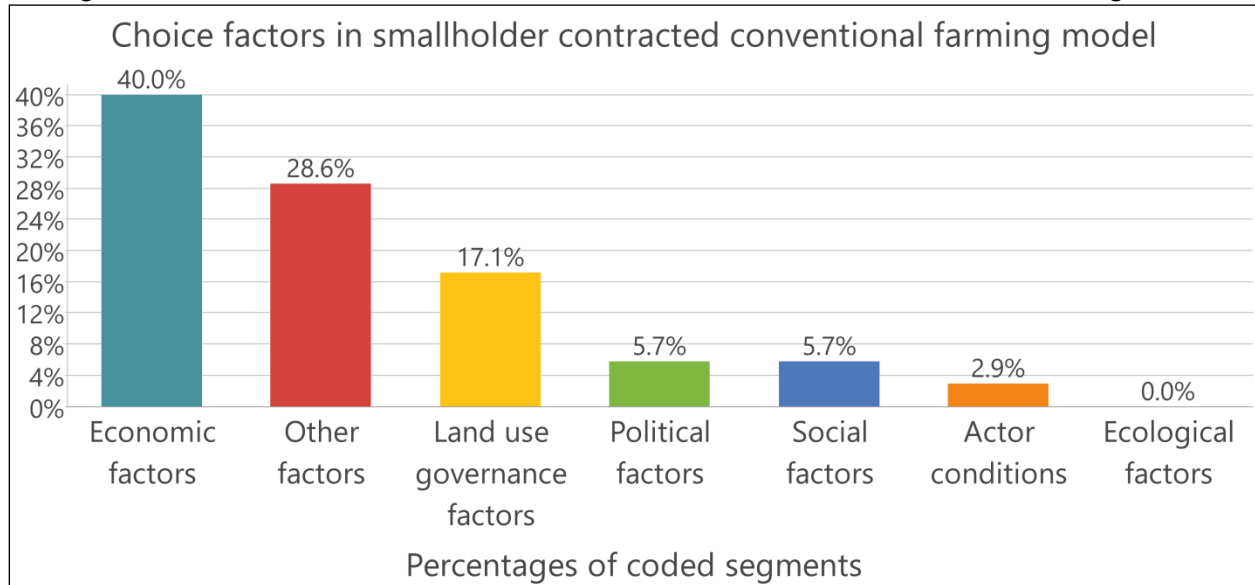
Source: Field research data, (October 2018)

The quantitatively computed mean values in every factor as presented in Table 6.12 indicate that, smallholder farmers agree that their choices of this model are influenced by land use governance factors (4.0833), social factors (4.0617) and actor conditions (4.0222) within the model. Results further indicate that, ecological factors (3.7407) and economic factors (3.2778) have neutral influences to farmers' choice of the model. Moreover, smallholder farmers' choices of the model are not influenced by political factors (2.8889) that surround the model. In addition, smallholder farmers identify no other factors (1.0370) that influence their choices of the model. These results entail that farmers' choices of the model are more inclined to the factors which farmers indicate to agree on and not on factors that are neutral or not agreeing to. Basing on this state, the factors that prevail in influencing farmers' choices of the model land use governance factors, social factors and actor conditions.

On the other hand, qualitatively analyzed data give results which indicate smallholder farmers to identify economic factors, other factors, land use governance factors, political factors, social factors and actor conditions as drivers that influence their choices of the model. Although the data are qualitatively analyzed, the coded data are transformed to quantitative formats from

which the drivers with their variations in levels of influencing smallholder farmers' choice of this model are quantitatively generated as presented in Figure 6.1.

Figure 6. 1: Factors that influence smallholders' choice of contracted conventional farming model



Source: Field research data, (October 2018)

From the analysis, the results that are provided in Figure 6.1 indicate that, economic factors lead by 40.0% in influencing smallholder farmers to choose this model followed by other factors which are indicated by 28.6% and land use governance system factors which are indicated by 17.1%. Political factors, social factors and actor conditions also indicate to influence farmers' choices of the model in low percentages whereas ecological factors indicate no influences on farmer choices of the model. The higher indication in economic factors is depicted through land access, farm capital and inputs access facilitation in the model whereas, farm financing mechanisms established in the model slightly contribute to influencing choices. Conversely, the other factors expressed through products prices and farm business incomes and profits dominate in negatively influencing farmers' choices of the model. Furthermore, the indicated land use governance system factors are contributed by the adopted modalities of farmers' land access and ownership in the model.

Factors that influence smallholder farmer choices of this model were also qualitatively expressed. Contributing on smallholder farmers' land access facilitation as one of the economic factors that influence choices of the model, a farmer in Iboya farmer group contends:-

“This is true! The modality of facilitating access to land and undertaking of block tea farming has been an incentive for many of us who joined the modality. We thank this mode of block tea farming that has been established by NOSC. It is very friendly and has been attractive to us. It has been a luck for us as the village authority had land reserves when NOSC came to provide the education on the need to engage in block tea farming. With the current land crises in the village, I see it is very difficult for other farmers to use the same mode of grouping to access land for tea farming as many of the land in the village is occupied by individual owners”.

(Farmer\Iboya Tea Farm Block: 65 - 65 (0))

Moreover, contributing in a discussion on smallholder farmers’ facilitation to access non-financial capital and farm inputs as components of economic factors that influence choices of the model, a farmer in Lwangu farmer group had this to contend:-

“Yes! we also get support for non-financial capital services from NOSC in our group. As said, we get support in cultivation activities by being given tractors and other facilities. We only incur the costs for fuel to run the facilities and after that they provide us with all the required farm inputs”.

(Farmer\Lwangu Tea Farm Block: 86 - 86 (0))

However, the poor price margins of tea and its associated low-income benefits which are components of other factors indicate to negatively influence farmers’ choices of this model and discourage them to join or continue to engage in tea farming under the model. Arguing on this in a focus group discussion, a farmer in Isoliwaya farmer group asserts:-

“I should speak the truth that tea as a commercial crop faces a big challenge called price!! This is a fundamental reason for all these agreements and youths cannot go to engage in this activity because they compare various activities basing on the hardships and difficulties they face against the incurred returns. They compare between timber processing activities and tea farming in their fathers’ plantations. Many see benefits in timber processing than in tea. I believe if tea leaf prices will increase substantially, youths will go back to tea farming”.

(Farmer\Isoliwaya AMCOS: 57 - 57 (0))

Concerning land use governance system factors, discussions with farmers indicated existence of suitable mechanisms for supporting farmers to access and own land. These have driven them to choose the model as one farmer in Lwangu farmer groups explains:-

“As it has been said by the previous speaker, the major focus by NOSC was centered on forming farmer groups, seeking to access land for tea farming and then establishing tea farming blocks. The idea of facilitating access to land from the village authority has contributed so much in formation of this farming mechanism. Some of us do not have land for tea farming and facilitating us to access land has been a very good incentive for us and other farmers to join the farming mechanism that NOSC is using”.

(Farmer\Lwangu Tea Farm Block: 66 - 66 (0))

These are the variations of factors that influence smallholder farmers to choose or discouraged to engage in commercial farming under the contracted conventional farming model found in the study are model. There are contradicting argumentations within the cases, especially due to the existence of the other factors which indicate to negatively influence farmers’ choices of the model. Explanations on these divergences are further made in the discussions part of this chapter.

6.4.2 Reconciliation of diverging results under the model

The above presented findings on drivers of smallholder farmers’ choices of a conventional contracted model in some points indicate divergences between quantitative and qualitative results drawn from the same cases. Quantitative results indicate smallholder farmers’ choices of the model are mainly influenced by land use governance factors, social factors and actor conditions while other factors indicate neutral or no influences on farmers’ choices of the model. On the other hand, qualitative results indicate economic factors, other factors and land use governance factors lead in influencing farmers’ choices of the model. The same qualitative results indicate political factors, social factors and actor conditions to influence farmers’ choices with low percentages.

Giving a critical attention on these findings, results indicate to converge only on the land use governance factors while diverge in the other identified factors. However, the strength of an influencing factor can be derived by the strength of the approach used in identifying it. Concerning the diverging factors, the results between the two approaches diverge with one case contending and identifying economic factors and other factors whereas the other approach does not identify them. Weighing critically these results from the two approaches the in-depth approach used in identifying economic factors and other factors, through discussions gives more strength on the factors identified through this method. Hence, the study recognizes the existence of economic factors and other factors identified by smallholder farmers through discussions. The limit in qualifying the variables used in quantitative identification of factors was possibly a

barrier to farmers perception of the variable and therefore opinion were given depending on their level of understanding.

Moreover, in a quantitative approach, social factors and actor conditions are indicated as leading factors in farmers' choice of the model whereas the same indicate a low influence on farmers' choices of the model. However, the in-depth approach in identifying these factors indicate them with a low influence on farmers' choices of the model. In this regard, still the in-depth methods prevail and therefore these factors have low influence on farmers' choices of the model.

With this concerns from both quantitative and qualitative findings, it is then concluded that, smallholder farmers' choice of the contracted conventional farming model are mainly influenced by land use governance factors, other factors and economic factors with low influence from social factors and actor conditions. Ecological and political factors indicate no influences on farmers' choices of the model.

6.5 Drivers for smallholder farmers' choice of contracted organic farming model

Like in other farming model choices, smallholder farmers are found to opt the contracted organic farming model in their commercial farming in the study area. Quantitative and qualitative data are analyzed to give results from which the drivers for farmers' choice of this model are explained.

6.5.1 Data analysis and explanations of findings under the model

In finding answers on drivers for farmers' choice of this model, quantitative data was collected from 16 representative farmers from Itulike and Wikichi smallholder organic avocado fruits farming groups who work under the facilitation of Tanzanice Agrofoods Limited (Tanzanice). The analysis gave results with variations in responses on categories of questions on the identified factors. These categories represented ecological factors, social factors, land use governance factors, actor conditions, political factors, economic factors and other factors. The descriptive values of these responses are computed as indicated in Table 6.13.

Table 6. 13: Descriptive values of factors that influence choices in contracted organic farming model

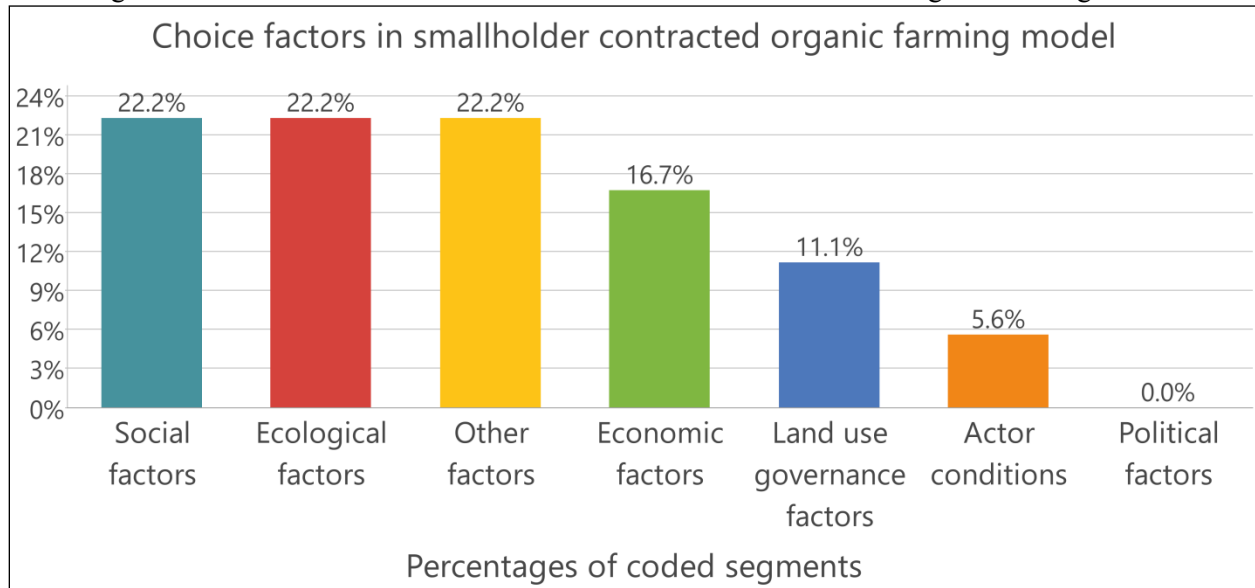
	N	Minimum	Maximum	Mean	Std. Deviation
Ecological factors	16	2.00	3.67	2.8958	.48257
Social factors	16	2.33	4.67	3.8542	.64370
Land use governance factors	16	1.75	4.25	2.7188	.81586
Actor conditions	16	3.80	5.00	4.3500	.38297
Political factors	16	1.00	3.00	1.5417	.63099
Economic factors	16	1.00	3.00	2.0625	.47871
Other factors	16	1.00	1.00	1.0000	.00000
Valid N (listwise)	16				

Source: Field research data, (October 2018)

As presented in Table 6.13, the computed mean values on actor conditions (4.35) and social factors (3.8542) indicate that smallholder farmers agree to be influenced by these factors in their choices of the model. On the other hand, the mean values on ecological factors (2.8958) and land use governance factors (2.7188) indicate neutral influences to farmers' choices of the model. Moreover, results indicate that farmers disagree to be influenced by economic factors (2.0625) and strongly disagree to be influenced by political factors (1.5417) in choosing this commercial farming model. Furthermore, results indicate farmers do not identify other factors (1.0000) that influence their choices of the model.

Equally, qualitative data gathered from group discussions with representative farmers under the model was analyzed and it gave various results. Smallholder farmers recognized economic factors, ecological factors, other factors, land use governance factors and actor conditions as drivers that influence their choices of the model. Despite being qualitatively analyzed, the results on these factors' variations in levels of influencing smallholder farmers' choice of this model are transformed to quantitative formats as presented in Figure 6.2.

Figure 6. 2: Factors that influence smallholders' choice of contracted organic farming model



Source: Field research data, (October 2018)

As presented in Figure 6.2, results indicate that smallholder farmers are influenced by social, ecological and other factors in the same magnitude of 22.2%. The level of influence is followed by economic factors which is indicated by 16.7%, land use governance factor by 11.1% and a low influence by actor conditions which is indicated by 5.6%. Political factors indicate no influence on smallholder farmers' choice of this model. The leading indication of social factors for choice of the model are explained by the farmer safety and welfare mechanisms that farmers have established in the model. Such include the nature of farming that does not use any form of chemicals and the mode of group financing for farmer welfare needs in the model. Being among the leading drivers, ecological factors are clarified to be contributed by the restricted use of chemicals fertilizers in farming and the monitored organic farming practices in the model. However, these drivers appear to be secondary since farmers abide by them as a means to achieve the economic gains attached to the model. As leading drivers as well, other factors are depicted by a reliable market that the model offers to farmers, reasonable product prices and perceptible profits that farmers experience in the model.

Observed in qualitative standpoints that were captured through focus group discussions, smallholder farmers expressed the drivers that influence them to choose the model. Arguing on social welfare mechanisms that are established in the model to the extent that they influence farmers to join the model, a farmer in Wikichi farmer groups contend that:-

“We have money in our group account and emergence of any problem to a farmer that costs less than One Million Shillings, can be solved through that fund. This fund is obtained from the monthly contributions of members”.

(Farmer\Wikichi Farmer Group: 63 - 63 (0))

Arguing on the position of ecological factors in influencing smallholder farmers to engage in organic farming under the model, a farmer in Itulike farmer group verifies this by a contention that:-

“Tanzanice requested us to select a person who was trained on monitoring of organic avocado farming. This person works with us and continually inspects the farms to verify that we are undertaking organic farming by flowing the principles” “We filled agreement forms with Tanzanice and we received guidelines for organic avocado farming. One of the guidelines is to undertake avocado farming without mixing it with other crops no! It has to be an avocado farm alone. If you mix with maize, you will be forced to use insecticides, if you plant vegetables you will use chemicals to spray on vegetables”.

(Farmer\Itulike Organic Farmer Group: 49 - 50 (0))

Furthermore, business profits as contributions to other factors that influence farmers to continue to engage in contracted organic farming model are qualitatively confirmed by members of organic farmer groups in Wikichi who argue that:-

“What I am saying is! The increase in number of group member is an indication of an employment opportunity. A normal avocado farmer receiving an average of four or five Million Shillings in a harvest season must influence others who are lagging behind to join organic fruits farming. A majority of lower scale formal sector employees do not get five Million Shillings. A farmer gets this. So, many are really being attracted”.

(Farmer\Wikichi Farmer Group: 57 - 57 (0))

In general, both quantitative and qualitatively expressed results of analyses indicate that farmers are drawn to get more engaged in organic farming as the model indicates existence of supportive and attractive elements that retain the existing farmers and draw new farmers to join and engage in the contracted organic farming model.

6.5.2 Reconciliation of diverging results under the model

Findings on factors that influence smallholder farmers' choices of a contracted organic farming model differ between the two approaches used in data inquiry and analysis. Quantitative results indicate actor conditions and social factors to mainly influence smallholder farmers' choices of the model. While ecological factors and land use governance factors indicate neutral influences to farmers' choices of the model, smallholder farmers disagree to be influenced by economic factors and political factors and identify no other factors that influence in choosing this farming commercial model. On the other hand, qualitative results indicate smallholder farmers to be mainly influenced by social factors, ecological factors and other factors. Economic factors, land use governance factors and actor conditions indicate a low influence while political factors indicating no influence on smallholder farmers' choice of this model.

Reconciling these results between the two methods used in analysis indicate convergence in findings on social factors between the two approaches. However, the magnitudes of divergence in findings between factors can be looked in a critical way to the extent that reconciling the differences to one whole meaning of influence is attained. Looking on the ecological factors which indicate to be one of the main factors in influencing choices in qualitative approaches, its strength loses power since farmers explained that they are bound to abide by the principles of organic farming to achieve their targets, something that indicates it to be a secondary driver for the choice. With this regard, it falls into the low influences of farmers' choice of the model as it is provided by the quantitative findings. Despite quantitative findings giving no identification of other factors as influencing factors for choices, the fact of identification of other factors in qualitative approaches validates the existence of other factors as influencing farmers' choices of the model. Farmers identify the potentiality of commercial organic farming in business and its substantial contribution in improving financial outcomes which is an attraction for more farmers to join the model.

Centering the attention of these factors to the main influencing factors, this study concludes that smallholder farmers are mainly influenced by social factors, other factors and ecological factors in the choice of the contracted organic farming model. However ecological actors are identified to be secondary in influencing farmers to choose the model as they are not directly attached to the choice but are pre-conditions for farmers to remain in the specific commercial farming model.

6.6 Drivers for smallholders' choice of non-contracted conventional farming model

The study found out that, smallholder farmers choose to use the non-contracted conventional farming model in commercializing their farming. Quantitative and qualitative gathered and analyzed data provide more information on the factors that influence these farmers to choose the model. These factors are further explained.

6.6.1 Data analysis and explanations of findings under the model

The focus of analysis on drivers for farmers' choice of this model was on contracting and farming system characteristics. Quantitative results are obtained by analysis of data from 59 representative smallholder farmers from various groups in three sub-models. These are representative smallholder farmer groups selected from Ninga and Matembwe AMCOS who partner with the public sector for facilitation of conventional maize cultivation and commercialization. Others are from Kichiwa and Igongolo AMCOS who work with NDO with CARITAS in conventional soybeans cultivation and commercialization. Moreover, it included farmers from Matiganjola and Itunduma AMCOS who work with NADO in cultivation and commercialization of conventional Irish potatoes. Results confirm ecological factors, social factors, land use governance factors, actor conditions, economic factors and other factors to vary in degrees of influencing farmers' choices of the model. Computed descriptive values of farmers' responses to the factors are indicated in Table 6.14.

Table 6. 14: Descriptive values of factors that influence choices in non-contracted conventional farming model

	N	Minimum	Maximum	Mean	Std. Deviation
Ecological factors	59	1.00	5.00	3.3333	.81179
Social factors	59	2.00	5.00	3.6667	.67806
Land use governance factors	59	1.50	5.00	3.7246	.66904
Actor conditions	59	1.00	5.00	3.8305	.61902
Political factors	59	1.00	5.00	2.8983	1.28840
Economic factors	59	1.00	5.00	3.7797	.79476
Other factors	59	1.00	2.00	1.0339	.18252
Valid N (listwise)	59				

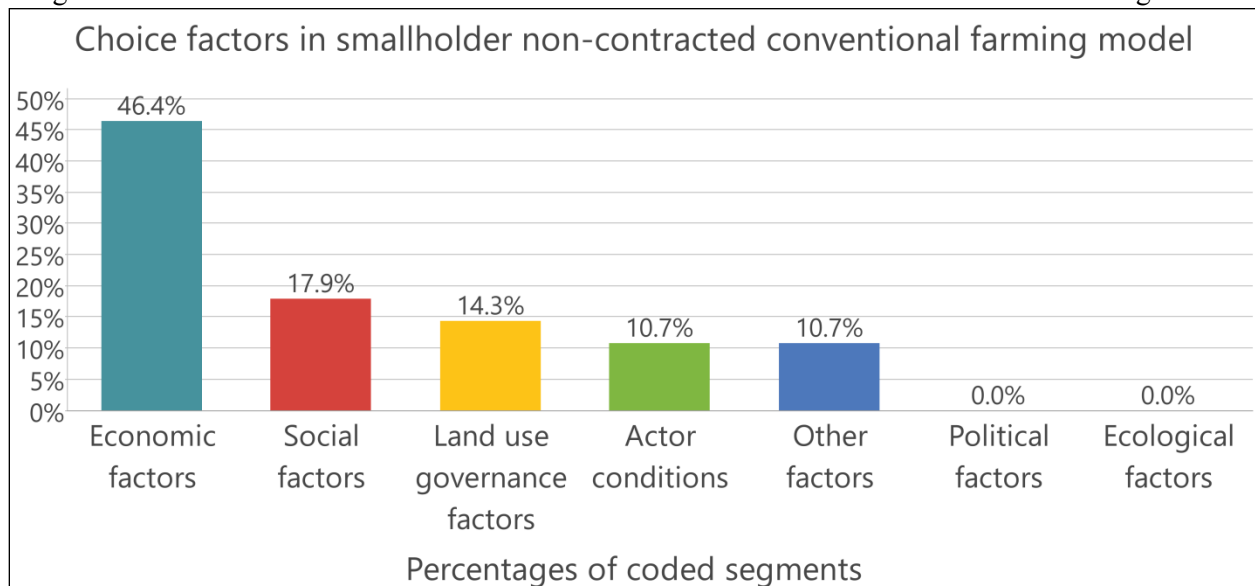
Source: Field research data, (October 2018)

The computed mean values of responses on factors that influence farmers' choices of this model presented in Table 6.14 indicate various results. In these responses, smallholder farmers agree to be influenced by actor conditions (3.8305), economic factors (3.7797), land use governance

factors (3.7246) and social factors (3.6667) in choices of this model. On the other hand, ecological factors and political factors indicate a neutral influence to farmers' choice of the model and farmers identify no other factors that influence their choices of the model.

On the other hand, the qualitative analysis of data obtained from focus group discussions with representative smallholder farmers from various groups in sub-models confirm economic factors, social factors, land use governance factors, other factors and actor conditions to influence smallholder farmers' choices of this commercial farming model. However, these factors vary in degrees of influencing smallholder farmers' choices of the model. The qualitatively analyzed data give qualitative results that are transformed to quantitative representations as indicated in Figure 6.3.

Figure 6. 3: Factors that influence smallholders' choice of non-contracted conventional farming model



Source: Field research data, (October 2018)

The analysis results presented in Figure 6.3 indicate that, smallholder farmers' choice of the non-contracted conventional farming model are mainly influenced by economic factors which lead by 46.4%. Results further indicate that, social factors influence farmers' choices of the model by 17.9% followed by land use governance factors that are indicated by 14.3%. Actor conditions and other factors equally follow in influencing farmers' choices of the model with similar indication of 10.7%. Among the identified factors, political factors and ecological factors indicate no influence on farmers' choice of the model.

Focusing on the most indicated influencing factors, the modalities of farm financing and smallholder farmers access to farm inputs that are established in the model are the highly contributing elements to the indicated level of economic factors. On the other hand, modalities that foster farmers' equity to access, use and own land among others depict the indicated level of social factors. Moreover, modalities that foster farmers land access and ownership depict the indicated level of land use governance factors in the model. Furthermore, the indicated other factors are depicted by reliable markets and levels of incomes that farmers accumulate within the model.

The conditions of drivers that influence smallholder farmer choices of this model were also expressed through qualitative statements that farmers expressed in focus group discussions. Instances of qualitative statements on the most influencing factors depicted from the discussions vindicate the strength of the influencing factors for choices of the model. Contributing on farm financing as one of the economic aspects that facilitate farmers to join the model, a farmer in Kichiwa AMCOS had this to contend:-

“CARITAS/NDO brought us an idea of forming savings and internal lending community services in which we established a group fund on individual contributions. This mechanism can be formed by a group of at least ten members. There is a creation of a fund in which members can access the fund on loan basis with smaller interest rates. The groups generate interests from the loans and members can benefit on this interest. It is a reliable mechanism in which farmers cannot go to other financial institutions or individuals to seek for loans but can use the internal funds for accessing their financial needs. This is what was done by CARITAS/NDO and we are practicing today as one of our financing mechanism”.

(Farmer\Kichiwa AMCOS: 93 - 93 (0)).

Explaining the contribution of equity to land access in the model as a component to social factors that influence farmers to choose a model, a farmer in Igongolo contends that:-

“The mechanism for our society to secure land and provide it to its group members for ownership does not exist but our village government has an option of leasing its land to groups of farmers on annual basis. Priority is given to villagers who are in groups”.

(Farmer\Igongolo AMCOS: 70 - 70 (0)).

Furthermore, education on land access and ownership as components of land use governance have led farmers to survey and legally own land in Matiganjola AMCOS. This is contended by a farmer who argues that:-

“NADO facilitated the training on the rights of women, children and men on land ownership. All are now aware and are informed. This has now been practiced and there are some of us who have surveyed their lands and have title deeds. Even men have their title deeds after surveying their lands. Fellow women also have their title deeds...”

(Farmer\Matiganjola AMCOS: 53 - 53 (0)).

6.6.2 Reconciliation of diverging findings

The presented findings on drivers that influence smallholder farmers’ choices of a non-contracted conventional farming model indicate variations in magnitudes of responses on the identified factors. Quantitative results indicate that smallholder farmers’ choices of the model are influenced by actor conditions, economic factors, land use governance factors and social factors. Ecological factors and political factors indicate neutral influences to farmers’ choice of the model and there are no identified other factors that influence farmers’ choices of the model. On the other hand, qualitative results indicate smallholder farmers’ choice of the non-contracted conventional farming model are mainly influenced by economic factors, social factors and land use governance factors. Actor conditions and other factors indicate low influences whereas political factors and ecological factors indicate no influence on farmers’ choice of the model.

In order to develop one whole meaning on the findings, the reconciliation of the results obtained from the two approaches of data collection and analysis comments. There is an indication of convergence in the main findings from the two approaches. Looking at the results, both quantitative and qualitative findings indicate smallholder farmers’ choice of the model to be mainly influenced by economic factors, social factors and land use governance factors. Despite actor conditions to be found among the main factors in influencing farmers’ choices of the model in quantitative approach, its indicated low percent influence to farmers’ choices of the model in qualitative approach leads to a divergence in the findings on this factor. Qualitative results provide low percentages with no substantial arguments on the strength of actor conditions that were qualitatively explained through in-depth discussions. This opinion makes the factor to lack the strength for it being among the main factors that influence farmers’ choices of the model. Despite being identified as one of the influencing factors to choices of the model in qualitative approach, the other factors are indicated with lower percentages in comparison to other driver factors in the model. However, there is no identification of other factors as drivers that influence choices of the model in quantitative approach. Similarly, this fact denies the strength of the other

factors to fall in the categories of the main influencing factors for choices of the model. With these arguments, actor conditions and other factors lack the strength for influencing choices in the model. This study then concludes that smallholder farmers' choices of a non-contracted conventional farming model are mainly influenced by economic factors, social factors and land use governance factors in the study area.

6.7 Drivers for smallholder farmers' choices of non-contracted organic farming model

Similar to what is explained to be found in other parts of the study area, smallholder farmers in this specific area are driven by various factors to engage in non-contracted organic commercial farming. This study identified these various factors and how they influence farmers in this area to choose this commercial farming model as findings indicate. Explanations of these findings from the quantitatively and qualitatively analyzed data are provided in the following parts of the chapter.

6.7.1 Data analysis and explanations of findings under the model

The analysis of quantitative data collected from 10 representative smallholder farmers from the Madeke Organic and Horticulture Agricultural Producers Cooperative Society (MOHAP-COS) that is managed by the public sector gave results on the question. Responses confirm ecological factors, social factors, land use governance factors, actor conditions, political factors, economic factors and other factors as drivers that influence farmers' choice of the model. However, there are varied responses on the degrees to which each factor influences the choices. Computed in descriptive values, farmers responses to these factors are indicated in Table 6.15.

Table 6. 15: Descriptive values of factors that influence choices in non-contracted organic farming model

	N	Minimum	Maximum	Mean	Std. Deviation
Ecological factors	10	2.00	5.00	3.3000	.99938
Social factors	10	2.00	5.00	4.0333	1.03578
Land use governance factors	10	2.25	5.00	3.9750	.90868
Actor conditions	10	3.00	5.00	4.2600	.61860
Political factors	10	1.00	5.00	3.2667	1.38600
Economic factors	10	1.00	5.00	3.2000	1.18322
Other factors	10	1.00	2.00	1.1000	.31623
Valid N (listwise)	10				

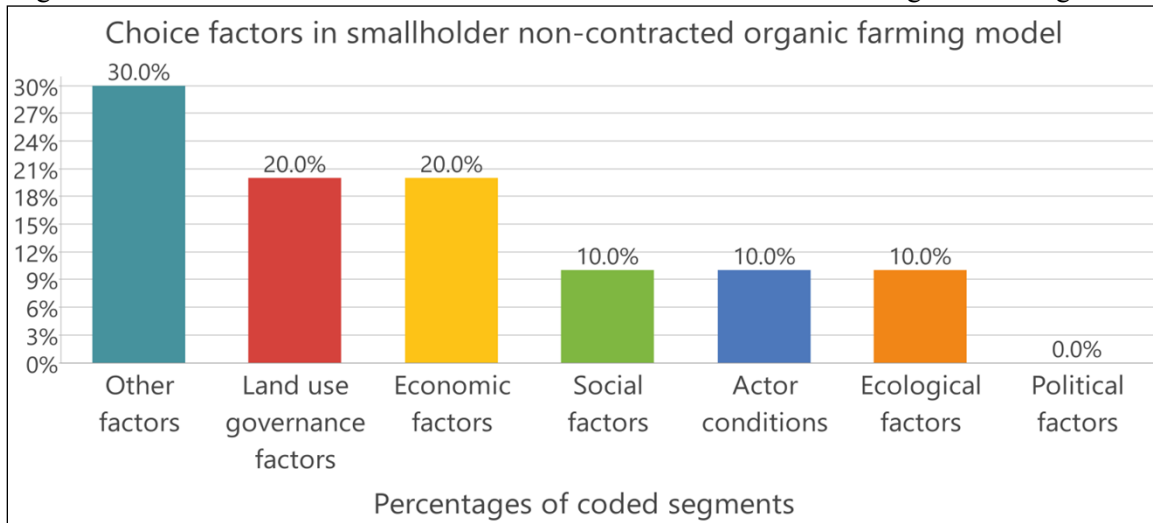
Source: Field research data, (October 2018)

As presented in Table 6.15, the computed mean values of responses on factors that influence farmers' choices of this model indicate varied results. In these responses, smallholder farmers agree that their choices of the model are influenced by actor conditions (4.2600), social factors (4.0333) and land use governance factors (3.9750) that exist within the model. Moreover, results indicate that smallholder farmers assert that ecological factors (3.3000), political factors (3.2667) and economic factors (3.2000) have neutral influences to their choices of the model. On the other hand, results indicate that farmers do not identify other factors that influence their choices of the model.

From qualitative perspectives, the analyses of data from the case confirm smallholder farmers' choice of the model to be differently influenced by other factors, land use governance factors, economic factors, social factors, actor conditions and ecological factors. These drivers with their variations in levels of influencing smallholder farmers' choice of this model are presented in Figure 6.4.

As presented in Figure 6.4, the results show that other factors are leading by 30.0 % in influencing smallholder farmers' choices of the model. Land use governance factors and economic factors both follow in influencing smallholder farmers' choice of the model with the same indications of 20.0%. Social factors, actor conditions and ecological factors are the least in influencing farmers' choice of the model with equal indications of 10.0%. Political factors indicate no influence on farmers' choices of the model.

Figure 6. 4: Factors that influence smallholders' choice of non-contracted organic farming model



Source: Field research data, (October 2018)

The identified other factors are explained to portray a negative influence to smallholder farmers' choice of the model. In many of the contributions on other factors, farmers complained on the ineffective performance of their commercial farming that is mainly due to poor infrastructure and communication facilities which discourage investors in commercial organic farming. Other explained reasons include lack of reliable markets and poor prices of the produces. These states discourage many smallholder farmers to join commercial farming under the model. The other identified factors are contended to positively influence farmers' choices of the model. Such include the well-established mechanisms for smallholder farmers land access and ownership which have land use governance and economic implications as identified by the study.

Moreover, the main influencing factors are vindicated in qualitative opinions from in-depth discussions with farmers. Explaining the ineffectiveness of commercial farming under the model that is caused by poor investments and unreliable markets as elements of other factors that influence the choice of the model, a farmer has this to contend:-

“We do not have any partners who have signed contracts with us. I think this is caused by the fact that there has been no much enough investment in informing markets on the importance of the organic farming activities that we undertake here. Also, some former buyers who came with attempts to buy our products were not good ambassadors of our farming activities. If they could have promoted our organic products, we could have attracted other investors in our organic production”.

(Farmer\Madeke AMCOS: 29 - 29 (0)).

Moreover, arguing on poor prices of their products as a component of other factors that negatively influence farmers to choose the model, a farmer further contends that:-

“Youths are not joining this modality of farming due to the products’ market prices. We sell the products to markets that have lower prices. This can be a reason for other youths to quit farming and seek jobs in towns where they expect to get more paying jobs than farming. Imagine a youth farmer cultivates and ends in leaving the products in farms or selling them without making any profits. Such a farmer may decide to leave farming and go to seek for other jobs in towns”.

(Farmer\Madeke AMCOS: 55 - 55 (0))

There are other identified factors that positively influence farmers to choose the model. Contentions on effective land use governance mechanisms that are established in the model were raised by farmers as vindicated in the statement below:-

“The society has contributed to some members to access land from the village as the village authority has sufficient land compared to the number of residents. For example, a group of women in our society was provided with portions of land from the village authority for pineapples farming. The village authority also supports farmers from all groups to access to land from its village land bank. Any person from within or outside this village can access land from the village. Various people from various places can purchase land from private owners through the village authority without any barriers”.

(Farmer\Madeke AMCOS: 44 - 44 (0))

Furthermore, farmers’ facilitation to access and own land from the village has been vindicated as an economic factor that has been influencing farmers to continue to use this model of farming as contended by a farmer in the society:-

“Women who are members of this society were privileged to own plots of land from the village authority. Despite being members of the society, these women have their own group and it was this group that was given land by the village authority for ownership to facilitate their farming activities”.

(Farmer\Madeke AMCOS: 25 - 25 (0))

6.7.2 Reconciliation of diverging findings

Findings under this model show that, responses from quantitative data indicate smallholder farmers to agree that actor conditions, social factors and land use governance factors influence their choices of the commercial farming model. Findings further indicate that smallholder farmers perceive ecological factors, political factors and economic factors to be neutral in influencing their choices of the model. Moreover, results indicate that farmers do not identify

other factors that influence the choices of the model. On the other hand, qualitative results show that other factors lead in influencing smallholder farmers' choices of the model followed by land use governance factors and economic factors which equally influence smallholder farmers' choice of the model. Social factors, actor conditions and ecological factors have least influences on farmers' choice of the model with political factors indicating no influences on farmers' choices of the model.

Although this study has been undertaken in the same case study, there are variations in results between the two approaches used in data inquiry and analysis. Quantitative results indicate actor conditions, social factors and land use governance factors to mainly influence smallholder farmers' choices of the model. On the other hand, qualitative results indicate smallholder farmers to be mainly influenced by other factors, land use governance factors and economic factors. The main influencing factors under the model only converge on land use governance factors.

Despite actor conditions and social factors being quantitatively indicated as highly influencing factors for choice of the model, they lack qualitative justifications for the status. There are no strong arguments from group discussions which indicate farmers' choice of the model basing on their initiatives and social conditions established under the model. This makes actor conditions and social factors to lose strength within the main influencing factors that influence farmers' choices of the model. With regards to other factors, quantitative findings do not identify other factors that influence farmers' choice of the model. Nonetheless, in qualitative notes, farmers strongly argue on being affected by lack of partnerships and investors in their commercial farming, lack of supportive infrastructure and means of communications, lack of markets and poor prices as lists of conditions which are indications of other factors that influence choice of the model. This qualitative arguments raised in discussions give strengths to the factor as the main influencing factor for the choice of the model. Regarding economic factors, its neutrality in quantitative findings gets more strength through the contended economic benefits that farmers attain through established mechanisms for land access and ownership under the model. With these arguments, this study concludes that smallholder farmers' choices of the non-contracted organic farming model are mainly influenced by other factors, land use governance factors and economic factors that prevail in the study area.

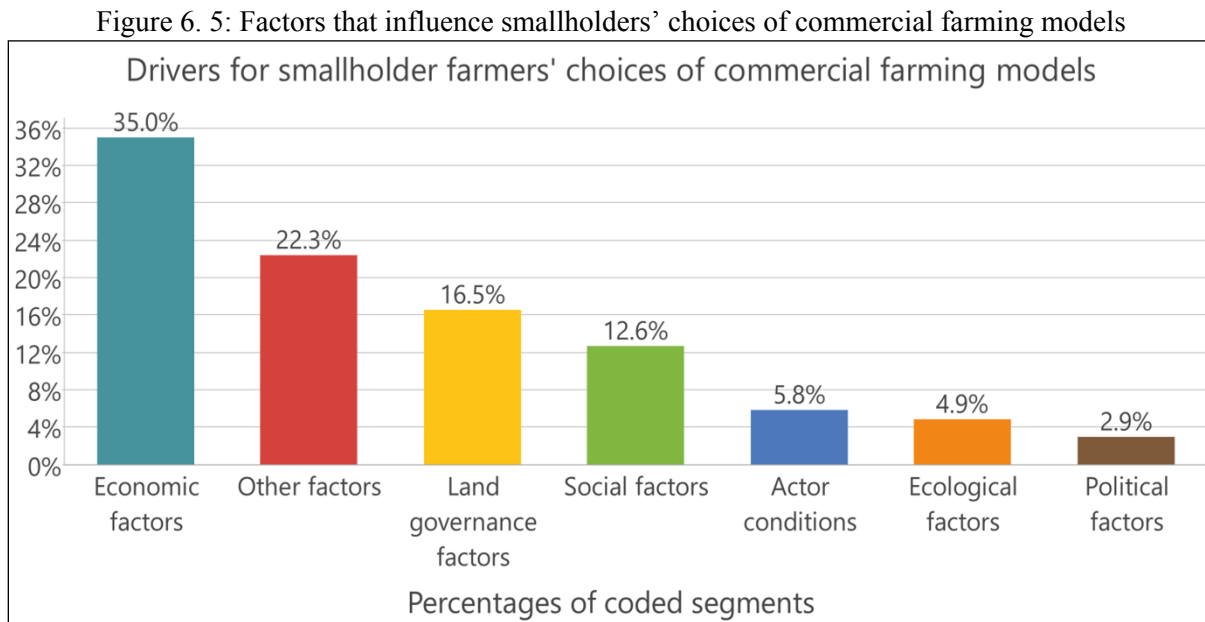
6.8 Discussions and conclusions on the overall results on the question

As it has been presented and explained, the findings have focused on specific models and are not generic due to the fact that commercial farming models differ in characteristics, motives and goals. These differences are the ones that create reasons for farmers to either choose a model, remain to work within a model or get discouraged to continue working under a model. The specific findings on these models can be referred in case there is a need to derive specific conclusions and policy decisions on specific commercial farming models. The variations in criteria/variables within a factor depended on which ones have been so much emphasized by farmers.

Looking on factors that influence smallholder farmers to choose commercial farming models, there are variations in conclusive findings. The contracted conventional farming model indicates farmers' choices of the model to mainly be influenced by land use governance factors, other factors and economic factors. The contracted organic farming model indicates smallholder farmers' choices of the model to be influenced by social factors, other factors and ecological factors. Nonetheless, the latter factors are identified to be secondary in influencing farmers' choices as they are a pre-condition to contractual agreements under this farming model. With the non-contracted conventional farming model, smallholder farmers' choices of the model are mainly influenced by economic factors, social factors and land use governance factors. Moreover, smallholder farmers' choices of the non-contracted organic farming model are mainly influenced by other factors, land use governance factors and economic factors that prevail in the specific model.

Even though the analyses to arrive at the above findings have based on models, the derivation of general findings on the research question basing on inputs from the specific findings on factors that influence farmers' choices of models becomes relevant. In this regard, general findings are derived from the analyses and comparisons of factors as they occur in specific cases. From the recurrence of factors that influence farmers' choices of models, land use governance factors, economic factors, social factors and other factors indicate higher magnitudes of occurrences among other factors in models. Further reflection of the recurrences of these factors indicates a concurrence with the general qualitatively derived findings despite the order. Since the recurrences of the factors is the same, this study then opts the order from the qualitatively extracted results which are derived from many qualitative in-depth inputs and opinions from

farmers. These findings indicate that economic factors (35.0%) have higher influences followed by other factors (22.3%) and land use governance factors (16.5%) in influencing smallholder farmers' choices of commercial farming models in the study area. On the other hand, social factors (12.6%), actors conditions (5.8%), ecological factors (4.9%) and political factors (2.9%) have variations of low influences to smallholder farmers' choice of models. These general results are presented in Figure 6.5.



Source: Field research data, (October 2018)

As the general findings are derived and indicated from the models assessment and comparisons as indicated in Figure 6.5, the general conclusion on the research question is made. This study concludes that, smallholder farmers' choices of commercial farming models in the study area are highly influenced by economic factors followed by other factors and land use governance factors. Social factors indicate a moderate influence whereas actors conditions, ecological factors and political factors have indications of low influences on farmers' choices of commercial farming models in the study area.

Being one of the main drivers for farmers' choices of specific commercial farming models, economic factors are vindicated through the facilitated farmers land ownership in models, established farm inputs financing and farm financing mechanisms that are established in models. Making reference to the non-contracted conventional farming model, economic factors feature as main drivers for farmers' choices of the model due to the loan financing mechanism that is

facilitated by the model. In this model, farmers in Ninga AMCOS as an example have access to a substantial farm loan from a formal bank. Many farmers under this model join the model to benefit this form of financing to enable them to smoothly undertake their commercial maize farming. Also, the established long-term farm loan mechanisms that are established in the contracted conventional farming model have been an economic drivers for farmers to choose the model. Farmers in Iboya and Lwangu Tea Farm Blocks verified their long-term loan contract with NOSC and Unilever. This mechanism facilitate farmers under the model to meet the operational costs in tea farming as it has always been a challenge for smallholder farmers to access credit to facilitate their commercial farming. Also, farmer access to farm inputs and extension services under the same model as verified by farmers in Isoliwaya AMCOS have been motives for farmers to continue engaging in tea farming under the model.

Concerning the other factors, the higher occurrences are portrayed by negative influences to farmers' choices of the models. Such factors are indicated in the contracted conventional farming model and the non-contracted organic farming model. In these models, smallholder farmers remark on poor products prices, poor businesses, lack of reliable investors in business and existence of contractual conflicts in models. These elements among others indicate to discourage the existing smallholder commercial farmers and discourage attraction of new farmers to join commercial farming under the models. Taking examples from Lupembe AMCOS under the model, farmers remark on the long-term contractual conflicts that have existed between farmers and the Lupembe Tea Factory who are parties to the contract. This conflict has existed for quite long and it has been a discouraging factor to farmers' engagement in tea farming under the model. Noting on similar negative influences, farmers in Madeke MOHAP-COS for example contend that the poor prices of their pineapples, lack of partners in business, lack of reliable markets and poor infrastructure discourage their engagement in organic pineapple farming under the model.

On the other hand, land use governance factors indicate to be among the main drivers for smallholder farmers' choices of models due to the established modalities of facilitating smallholder farmers to access and own land in specific commercial farming models. For instance, smallholder farmers verify that models such as the contracted conventional farming model under Njombe Out-growers Services Company (NOSC) have established suitable land use governance mechanisms that foster group formation, groups land access and facilitate formal

land tenure systems to farmers. These mechanisms have been attractive to many smallholder farmers leading them to join commercial farming under the model. Also, land access and ownership mechanisms that are set by some village authorities through farmer societies vindicate suitable land use governance mechanisms that attract farmers to join the models. Such are verified in the Madeke MOHAP-COS. These are among the instances that facilitate suitable smallholder farmers land access, use and ownership means as a requirement for their commercial farming. They are among the elements that cause land use governance factors to be among the leading factors that positively influence smallholder farmers to choose specific commercial farming models in the study area.

Social factors emerge as the moderate drivers for smallholder farmers' choices of specific commercial farming models. These are mainly contributed by mechanisms that foster smallholder farmers equity to access land that are established in models. Farmers in Igongolo AMCOS for example vindicate the equitable access to village lands that are leased to any farmers or farmer groups that need to use land for farming. Similarly, farmers in Madeke MOHAP-COS remark on the equitable mechanisms that are established by the village authority to foster farmers access to land giving priority to women and farmer groups. Social factors are also vindicated by the established mechanism for social support that is established by farmers under contracted organic farming model. Smallholder farmers in Wikichi Farmer group for example are attracted to work in the model due to the established means of social welfare support that farmers access through the established group funding among others.

Disproportionately, findings of this study have indicated actor conditions to have low influences on farmers' choices of models. Ecological factors on the other hand also indicate a low influence to smallholder farmers' choices of the models. The indication of these factors in the contracted organic farming are identified to be secondary and they are not attached to influencing but are otherwise not a motive for choice. Political factors in many cases have indicated extremely very low influences on farmers' choices of commercial farming models in the study area. These are vindicated by cases of statements that are raised by politicians to protect their political interests in their jurisdictions.

With this understanding, the findings have established the basis for suggestion on where policy makers, different actors such as NGOs, partners in commercial farming, agribusiness, private initiatives and farmers can act to enhance commercial farming that meets sustainability. The

implications and suggestions from this findings will to a greater extent contribute in improving smallholder commercial farming and sustainability in the study area.

6.9 Summary on the chapter

The main theme of this chapter was to present answers on a research question that inquired on drivers that influence smallholder farmers' choices of specific commercial farming models in the study area. The chapter begun by presenting the descriptive characteristics of samples of smallholder farmers who were selected from commercial farming groups for the study. These were obtained from thirteen cases of smallholder farmer groups which practice various modes of commercial farming in the study area. The presented characteristics include ages, genders, levels of education, main livelihood activities, main commercial crops cultivated and modes of farmers' land ownership. The chapter has also presented descriptive characteristics of various elements of farmer groups. These include farmers mode of joining groups, management of groups, collaboration of groups with actors and groups modes of contracting and enforcement of contracts and partnerships. These explanations aimed at enlightening the social, economic and organizational information of smallholder farmers and their respective groups for suitability of the study.

Respective analyses and findings on drivers for smallholder farmers' choices of commercial farming models in the four identified commercial farming models have also been presented. Quantitatively and qualitatively analyzed data and their respective findings in every model have been presented. Divergences in findings from quantitative and qualitative approaches used in every model were reconciled in order to arrive at one meaningful conclusion on the findings. In this respect, conclusive findings in every model were attained. These were then used in deriving general answers to the research question. The chapter has also presented discussions on the findings from the commercial farming models. In these discussions, the general findings and conclusions on the research question were derived. These state that smallholder farmers' choices of commercial farming models in the study area are highly influenced by economic factors followed by other factors and land use governance factors. Social factors indicate a moderate influence whereas actors conditions, ecological factors and political factors have indications of low influences on farmers' choices of commercial farming models in the study area. The peculiarity of drivers that influence farmers' choices of the models is emphasized as every model has its characteristic features and elements that attract or retain farmers in the model compared to

others. However, the similarity in some influencing factors that are commonly chosen in some models were identified and discussed. Such include the established modalities of governing land use practices, facilitation in land access and ownership and farm financing mechanisms that are established in some models. These have positive implications to sustainability of smallholder commercial farming in the area. However, many of the other factors that are identified have negative implications to sustainability of smallholder commercial farming in the area since many of them portray negative influences to smallholder farmers' choices of models. The chapter ends by presenting a summary of what is presented in the entire chapter. The next chapter presents on smallholder farmers' considerations of sustainability criteria in chosen commercial farming models in the study area.

CHAPTER SEVEN: SMALLHOLDER FARMERS' CONSIDERATIONS OF SUSTAINABILITY CRITERIA IN COMMERCIAL FARMING MODELS

7.1 Introduction

This chapter presents answers on the research question that sought to identify how smallholder commercial farmers consider sustainability criteria in their commercial farming in the study area. The chapter begins by clarifying the meanings of the terms “considerations” as it is entailed by this study and as were reflected empirically by this study. Thereafter, the chapter presents the specific results of the status of smallholder farmers’ considerations of sustainability criteria in their commercial farming. This is done with respect to specific commercial farming models that are found in the study area. Discussions on the findings from the commercial farming models are done ending with a conclusive discussion on the question. The chapter ends by presenting a summary of what the study has entirely presented.

7.2 Reflections on the use of the term “consideration” in the study

Referring to sustainability sciences, the use of the term considerations is common where there are indications of choices or options or decisions related to sustainability. In this realm, sustainability considerations has been mainly referred to concerns or factors that sustainability practitioners take into account while they make choices or make decisions in order to enhance sustainable choices or decisions (Rindorf et al., 2017; Manfredo et al., 2014; Ban et al., 2013; Gibson, 2006). These concerns or factors may be proposed in terms of criteria or principles that are to be adhered to by practitioners to facilitate the attainment of founded sustainability decisions.

This study does not have a very divergent meaning on the term as it refers to smallholder farmers’ considerations of sustainability criteria in commercial farming models. In this respect, the term refers to smallholder farmers initiatives to take concern on criteria that entail sustainability when they engage in commercial farming activities under specific commercial farming model. The referred criteria emanate from ecological/environmental, social and economic dimensions of sustainability. The study sought to identify how smallholder farmers observe the sustainability practices while they undertake commercial farming under various models. Moreover, the study sought to identify and understand the initiatives that farmers create or opt to choose to perform while they undertake commercial farming under various models. The found elements are the indications of farmers’ concern for sustainability in commercial

farming under various models. Examples of practices which indicate smallholder farmers' considerations of sustainability criteria may include farmers' abidance to rules, principles and guidelines that are established by authority in order to foster sustainable farming practices. Others may include farmers initiatives to form sustainability mechanisms such as establishing by-laws in their groups for environmental protection, formation of credit, savings and lending societies and community banks. Others include farmers initiatives to join group based social security schemes, farmers concern for the welfare of the entire society and the like. These may be formally or informally established by smallholder farmers themselves by using various organizational forms that are within their vicinities.

7.3 Sustainability dimensions adopted in empirical explanations of the research question

Through conceptual identification, this study narrowed sustainability to focus on the triple bottom line dimensions of ecological, social and economic sustainability. It is from these dimensions that smallholder farmers consideration of the respective criteria were sought. The specific variables which define the sustainability criteria that the study selected are detailed in Chapter Three, Part 3.4.5 and summarized in Table 3.1 of this thesis. In order to bridge the gap between methodological identifications and empirical reality, the criteria that were included and sought in answering the research question are also hereunder explained.

The variables from which the criteria under ecological sustainability that are addressed by the question are environmental degradation control and access to climatic information and services. Under social sustainability, equity to land access, equity to land use and equity to land ownership are the variables that are addressed in the question. Others include captivation of healthcare, safety, security and welfare of farmers and creation of farm employment by models. With economic sustainability, variables of farmers facilitation in enduring land demand and supply conditions, facilitation in accessing non-cash farm capital and farmers facilitation in farm financing were the main variables from which the sustainability criteria were sought. These triple bottom line sustainability dimensions provided the bases from which the smallholder farmers' considerations of sustainability criteria in specific commercial farming models were made. The quantitative and qualitative findings on the question are hereunder presented and discussed.

7.4 Findings from the contracted conventional farming model

In explaining the research findings on smallholder farmers' considerations of sustainability criteria under the model, the analyses and explanations of findings from quantitative and qualitative approaches and the reconciliation of the findings are done as provided below.

7.4.1 Data analysis and explanations of findings under the model

Quantitative data was obtained from a total of 27 representative tea farmers who were selected from Isoliwaya and Lupembe agricultural markets cooperative societies (AMCOS) and Iboya and Lwangu tea farm blocks. Varied responses on smallholder farmers' considerations of sustainability criteria under this commercial farming model are found. The analysis of quantitative data give results which vary in farmers responses with respect to consideration of ecological criteria, social criteria and economic criteria in the model. The responses were computed to descriptive values to arrive at final responses on every set of criteria. The finally computed descriptive values on these responses are indicated in Table 7.1.

Table 7. 1: Descriptive values on smallholder farmers' considerations of sustainability criteria in contracted conventional farming model

	N	Minimum	Maximum	Mean	Std. Deviation
Ecological criteria	27	2.71	5.00	4.0847	.52303
Social criteria	27	3.17	5.00	4.0741	.48113
Economic criteria	27	2.50	5.00	3.7901	.73756
Valid N (listwise)	27				

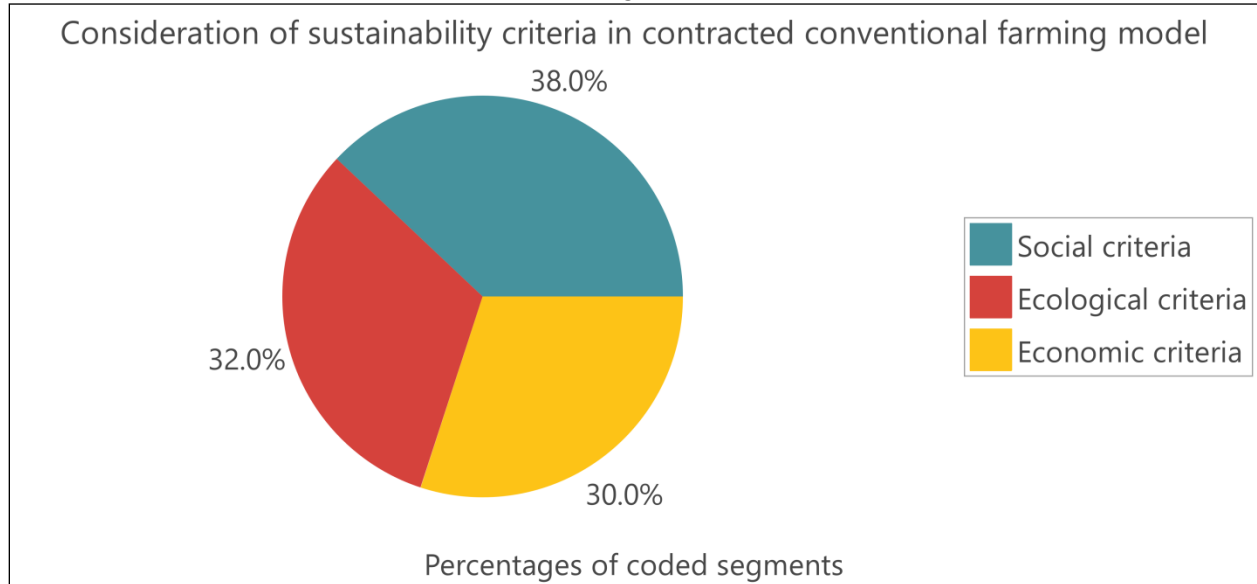
Source: Field research data, (October 2018)

As presented in Table 7.1, the quantitatively computed mean values in every criteria indicate that, smallholder farmers very much consider ecological criteria (4.0847) and social criteria (4.0741) when they undertake commercial farming under the model. Results further indicate smallholder farmers to somehow consider economic criteria (3.7901) when undertaking commercial farming under the model. These results imply that smallholder farmers take more concerns for ecological criteria and social criteria than the economic criteria when undertaking their commercial farming under the model.

On the other hand, the qualitatively analyzed data that was collected from a focus group discussion with famers from the same cases give qualitative results. These results indicate variations in responses to smallholder farmers' considerations of the ecological, social and economic criteria when engaging in commercial farming under the model. The qualitatively

coded, analyzed and transformed data generated quantitative formats of results. The variations in qualitative responses from smallholder farmers' considerations of sustainability criteria under this model are quantitatively transformed and presented as indicated in Figure 7.1.

Figure 7. 1: Smallholder farmers' considerations of sustainability criteria in contracted conventional farming model



Source: Field research data, (October 2018)

From the analysis, the results presented in Figure 7.1 indicate that, smallholder farmers consideration of sustainability criteria when undertaking commercial farming under the model is more in social criteria (38%) followed by ecological criteria (32%) and the least is economic criteria (30%). Despite variations in levels of consideration of sustainability criteria, these results indicate that farmers consider all sustainability criteria when engaging in commercial farming under the model. However, the variations do not indicate a significant gap between them, a situation that may imply the strength in concerns of every dimension of sustainability within the model.

Moreover, the results on the question are qualified by qualitative statements that were expressed by smallholder farmers during focus group discussions conducted in the study area. Contending on the roles that smallholder farmers play to foster access to their health, safety and welfare as an aspect that indicate their consideration of social sustainability in the model, a farmer in Isoliwaya AMCOS states that:-

“It is very difficult to set mechanisms and procedures to support the safety and welfare of members since our society is still in its growth stage. Despite this fact, we recently held a meeting that included all society and farmer groups in Njombe and Britan Company. Concerns for farmers work safety, security and welfare were also issues that were raised in the meeting. The company verified the possibility of implementing these schemes under their financing. They promised to establish special health insurance schemes specific for farmers who are members of a society. The challenge was how to establish inclusive strategies for handling these agreements and contracts”.

(Farmer\Isoliwaya AMCOS: 67 - 67 (0))

Despite farmers not yet attaining the mechanism for the envisaged scheme, they show that they need to set mechanisms that will foster for them ensured health, safety and welfare services as they practice commercial farming under the model.

Furthermore, smallholder farmers concerns for social sustainability in the model was expressed by their anxiety on youths access to farm-based employment opportunities in the area. With this concern, farmers claimed of the decreased engagement in tea farming due to poor prices and general decrease in vigor to invest in this commercial farming as it has indicated to be less paying that it was before. A farmers in Lupembe AMCOS puts it clear by giving arguments as quoted:-

“Our youths formerly saw charcoal burning as a shameful activity but they now value it than engaging in tea farming. We feel we are being treated unfairly by the tea prices. Youths see that they cannot benefit from these prices better not to engage in it. They are ready to be employed as casual labor in timber cutting industries. They are ready to be employed as casual labourers and get a 3000Tshs pay with a bulky of activities done per day than working in tea farming. So, we do not see youths working in tea farming despite being the major activity in our region. It is very unfair and it discourages so much the youths to work from morning to evening in tea farms ending receiving a very small pay. This is a discouraging activity because of its end incomes....”

(Farmer\Lupembe AMCOS: 16 - 16 (0))

Arguing on smallholder farmers’ taking group initiatives to foster environmental protection as an element of ecological consideration, a farmer in Iboya farmer group contends:-

“It is true, we have initiatives for environmental protection practices in our tea farming group. For example, we have the wastes dumping sites that we built in our tea farming premises. Here is where we are to dispose all wastes that we generate from our tea farming activities”.

(Farmer\Iboya Tea Farm Block: 43 – 43 (0))

On the other hand, economic considerations aspects were also points of concern that were raised by smallholder farmers working under the model. Smallholder farmers in Lwangu Tea Farm Block were in processes to secure a communal land title deed. This is proposed to be beneficial to their financial welfare as it is contended by one farmer:-

“As we will get the title deed to indicate the total ownership of the land, we can be in a position to use the land to access loans from different financial institutions and we can use the funds for example to expand our farms and other such activities. Njombe Out-growers Services Company (NOSC) has so much seen the importance of this ownership and is helping us a lot to ensure that we get the title deed”.

(Farmer\Lwangu Tea Farm Block: 58 - 58 (0))

7.4.2 Reconciliation of diverging results under the model

The presented findings on smallholder farmers consideration of sustainability criteria in contracted conventional farming model indicate some slight deviations between qualitative and quantitative approaches used. Quantitative results indicate smallholder farmers to very much consider ecological and social criteria when undertaking commercial farming under the model. The results also indicate smallholder farmers to somehow consider economic criteria when undertaking commercial farming under the model. Qualitative results on the other hand indicate smallholder farmers to consider more of social criteria followed by ecological and economic criteria when undertaking their commercial farming under the model.

These results indicate a convergence where there is both low and somehow considerations of economic criteria by farmers in the model in qualitative and quantitative findings. These indicate that smallholder farmers least consider economic criteria in the model. The divergence exists between the levels of considerations of ecological and social criteria between the two approaches. However, the assessments of the levels of considerations that is provided in quantitative approach indicate similarities in levels of agreements of farmers consideration of ecological and social criteria in the model. This leaves a room for either of the criteria to concur with the varied levels of considerations indicated in qualitative approaches. With these reflections from both quantitative and qualitative approaches, the conclusion is arrived that smallholder farmers consider more social criteria followed by ecological criteria and economic criteria when undertaking commercial farming in contracted conventional farming model in the study area.

7.5 Findings from the contracted organic farming model

Answers on smallholder farmers consideration of sustainability criteria under the contracted organic farming model found in the study area were also sought. Presentations of these answers in both quantitative and qualitative approaches with their respective explanations is as follows.

7.5.1 Data analysis and explanations of findings under the model

Quantitative data was collected from 16 smallholder organic avocado farmers from Itulike and Wikichi groups which represent the model. The data was analyzed to give answers on smallholder farmers consideration of sustainability criteria under the model. The results give variations in responses on farmers' considerations of sustainability criteria with respect to ecological, social and economic criteria. The computed descriptive values of these responses are indicated in Table 7.2.

Table 7. 2: Descriptive values on smallholder farmers' considerations of sustainability criteria in contracted organic farming model

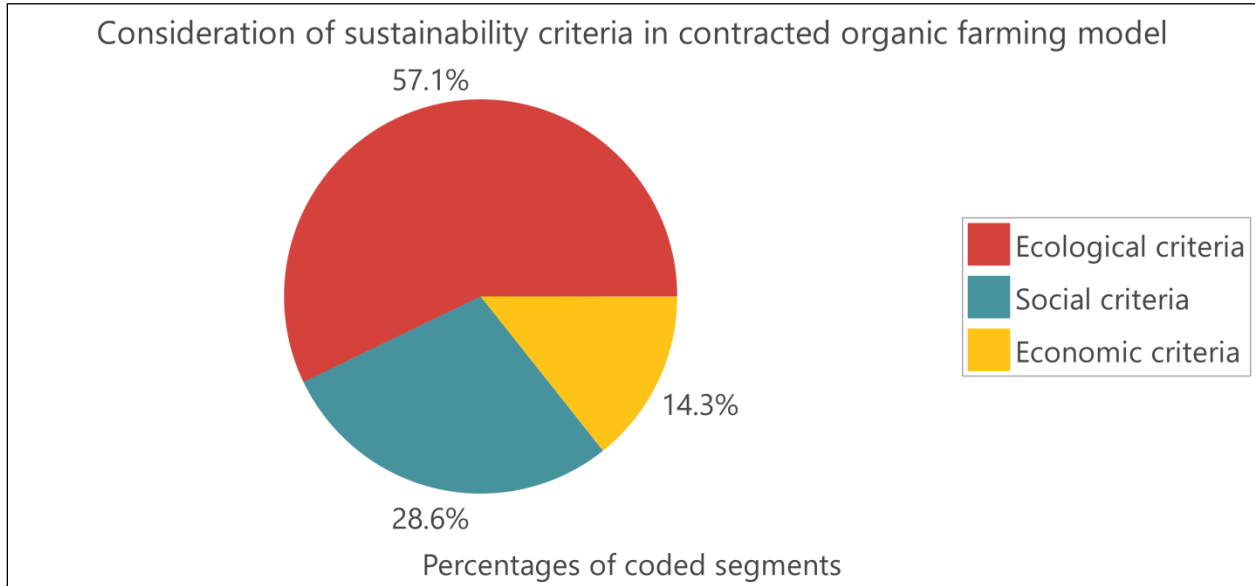
	N	Minimum	Maximum	Mean	Std. Deviation
Ecological criteria	16	1.14	3.57	2.8214	.63567
Social criteria	16	1.67	4.67	2.9167	.84327
Economic criteria	16	1.00	4.83	2.3854	1.11840
Valid N (listwise)	16				

Source: Field research data, (October 2018)

The computed mean values presented in Table 7.2 indicate that smallholder farmers somehow consider social factors (2.9167) and ecological criteria (2.8124) when undertaking commercial farming under the model. Moreover, results indicate that smallholder farmers take a very little position on consideration of economic criteria (2.3854) when undertaking their commercial farming under the model. These results imply that smallholder farmers give more concerns to ecological and social criteria compared to economic criteria under the model.

On the other hand, representative smallholder farmers from the same cases of Itulike and Wikichi gave qualitative responses on the question through in-depth discussions. Farmers contended variations in considerations of ecological, social and economic criteria when undertaking their commercial farming under the model. The analyzed data gave qualitative results that were transformed into quantitative formats as presented in Figure 7.2.

Figure 7. 2: Smallholder farmers’ considerations of sustainability criteria in contracted organic farming model



Source: Field research data, (October 2018)

The results presented in Figure 7.2 show that smallholder farmers have a higher consideration of ecological criteria which is indicated by 57.1% followed by consideration of social criteria which has 28.6%. Results further indicate that smallholder farmers have a lower consideration of economic criteria (14.3%) when they undertake commercial farming under this model. These results indicate a higher percent in smallholder farmers consideration of ecological criteria under the model. This is likely contributed by the nature of commercial farming practices that are adopted in the model. Smallholder farmers under the model are engaged in organic farming, practices that have a contribution to orienting these farmers to take more concerns on sustainable farming that foster ecological sustainability under the model.

Smallholder farmers also made arguments that are in line with their contentions on consideration of sustainability criteria under the model. Arguing in support of consideration of ecological criteria under their model, a farmer in Itulike recognizes the role of the government in fostering environmental welfare and their concerns on environmental protection as it is argued hereunder:-

“The government emphasizes so much and ensures protection of the environment especially in water sources such as rivers. Protection of the natural vegetation in water valleys is emphasized. This fosters for environmental safety in the area. We respond to this by not planting forbidden tress that are not environmental friendly. We farmers are trying to educate each other on these aspects”.

(Farmer\Itulike Farmer Group: 55 - 55 (0))

More than responding to initiatives that are established by the government to foster environmental welfare, smallholder farmers indicate more concern by taking initiatives to educate each other on environmental matters. These indicate their considerations of ecological sustainability in the model.

Smallholder farmers expressed their considerations of social criteria while they undertake commercial farming under the model. This was observed further in focus group discussions where farmers personal care on their safety at work was expressed by two farmers in Wikichi who contend that:-

“Since we do not use fertilizers in our farming activities, we are not so much subjected to chemicals from fertilizers and pesticides. We take care of our safety, by wearing gumboots and gloves to protect ourselves against the effects of manure. Every farmer has to avail these protective gears by him/herself.

We do not have a system where the group purchases and distributes the gears to farmers”

“As said by the other colleague, we urge our farmers in our meetings not to go to work in farms without using and wearing protective gears to protect themselves against hazards”.

(Farmers\Wikichi Farmer Group: 59 - 60 (0))

Yet, arguments on smallholder farmers consideration of economic criteria under the model emerged. Farmers expressed their challenges on facing the land demand rivalry due to higher land demands in their village which is in the vicinity of Njombe town. They were concerned with the foreseen land demands which are affecting their commercial farming. This is contended by a farmer in Itulike who argues that:-

“We are currently going to face land crises in our village as the demand for land is increasing due to the growth of Njombe town that we are very close to. It will not be easy to access a portion of land for purchasing from this village in the near future. People have started to go to other villages to purchase land for farming. Many people from towns who can afford high land prices are coming to buy land here”.

(Farmer\Itulike Farmer Group: 61 - 61 (0))

Although both quantitative and qualitative results have shown farmers’ considerations of sustainability criteria in every sought dimension, it is important to understand the variations in degrees of considerations of the criteria within the model. These variations imply the differences in concerns that farmers have on sustainability criteria and therefore imply which areas need more interventions for ensured sustainability under the model.

7.5.2 Reconciliation of diverging results under the model

The above presented findings on smallholder commercial farmers' considerations of sustainability criteria in the contracted organic farming model indicate minor deviations between the used quantitative and qualitative approaches. The quantitative approach provides that smallholder farmers somehow consider social and ecological criteria with little considerations on economic criteria in their commercial farming under the model. On the other hand, the qualitative method indicate smallholder farmers to have more concerns on ecological criteria followed by social criteria with low considerations of economic criteria in their commercial farming under the model.

The implied deviation is on the varied levels of ecological and social criteria indicated from the two approaches. However, the similarity in levels of ecological and social criteria indicated under the quantitative approach give strengths the ecological and social criteria to be considered in ranks as it is contended in the qualitative approach. On the other hand, the little and lower concerns for economic criteria that are respectively indicated in quantitative and qualitative approaches make the criteria the least in the level of consideration among others. This argumentation provides a conclusion that varies in the levels of considerations between the ecological, social and economic criteria. It is concluded that, smallholder farmers consideration of sustainability criteria is higher in ecological criteria followed by social criteria with low concerns for economic criteria under the contracted organic farming model in the study area.

7.6 Findings from the non-contracted conventional farming model

Sets of quantitative and qualitative gathered and analyzed data from the non-contracted conventional farming model were used in giving answers on the research question. Presentations of the findings from the respective cases and their explanations are provided hereunder.

7.6.1 Data analysis and explanations of findings under the model

Quantitative results are obtained from the analysis of data from 59 smallholder representative farmers groups in three sub-models of the model. These farmer groups are Ninga and Matembwe AMCOS under the public sector, Kichiwa and Igongolo AMCOS under NDO with CARITAS and; Matiganjola and Itunduma AMCOS under NADO. The results extracted from descriptive values of responses on the answers to various questions that compose a criteria indicate similarities in levels of farmers responses to consideration of sustainability criteria as indicated in Table 7.3.

Table 7. 3: Descriptive values on smallholder farmers' considerations of sustainability criteria in non-contracted conventional farming model

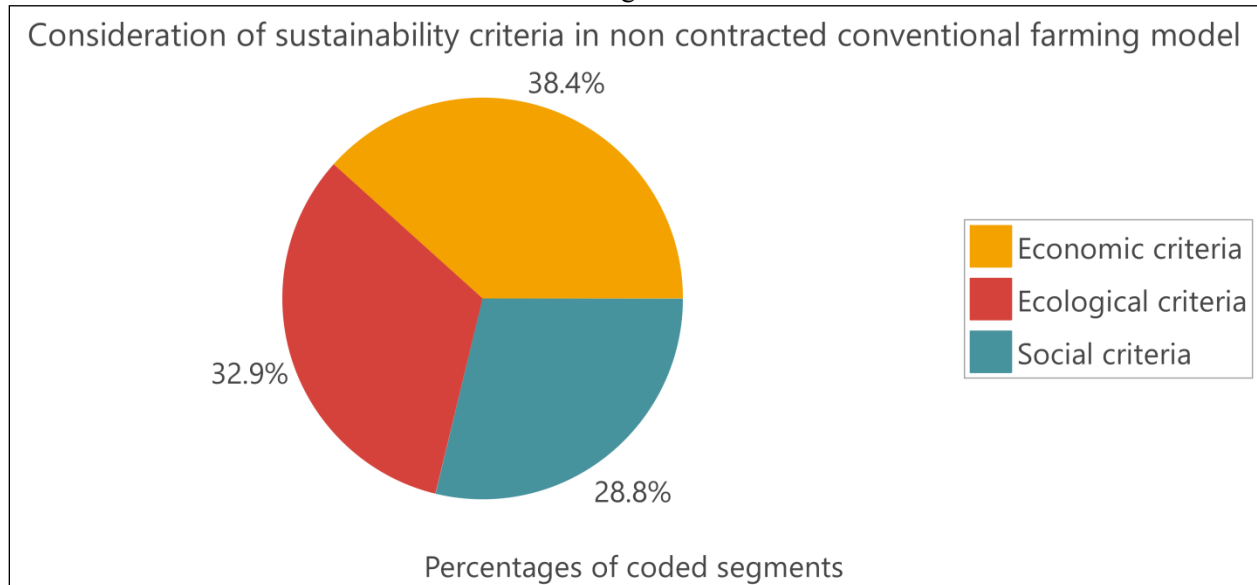
	N	Minimum	Maximum	Mean	Std. Deviation
Ecological criteria	59	1.57	5.00	3.7627	.69562
Social criteria	59	1.67	4.83	3.8079	.66797
Economic criteria	59	2.50	4.83	3.8192	.56840
Valid N (listwise)	59				

Source: Field research data, (October 2018)

Table 7.3 presents results on the computed mean values to responses on the question which similarly indicate smallholder farmers to have higher considerations of sustainability criteria in all three dimensions under the model. In these results, farmers very much consider economic criteria with a mean value of (3.8192), very much consider social criteria with a mean value of (3.8079) and very much consider ecological criteria with mean a value of (3.7679) in their commercial farming under the model. The indicated similarity in responses may be associated with the composition of the model as there are varied commercial farming practices that are undertaken within the model leading to formation of sub-models in it. The sustainability orientations of these sub-models is likely to be influencing factors to the similarity in the indicated responses. Despite this opinion, the findings from the quantitative approach on smallholder farmers consideration of sustainability criteria remains as contended by the computed values as indicated in results.

Likewise, qualitatively collected and analyzed data was obtained from the same cases of farmer groups that represented the model. Smallholder farmers arguments obtained through focus group discussions contend for varied responses on their considerations of sustainability criteria while they undertake commercial farming under the model. With varied levels, data on responses assert farmers to consider ecological, social and economic criteria when they undertake commercial farming under the model. The qualitatively analyzed and transformed data are shown in quantitative formats as presented in Figure 7.3.

Figure 7. 3: Smallholder farmers’ considerations of sustainability criteria in non-contracted conventional farming model



Source: Field research data, (October 2018)

These results presented in Figure 7.3 indicate that, smallholder farmers consideration of sustainability criteria in the model is higher with economic criteria which is represented by 38.4% followed by ecological criteria which is represented by 32.9%. Results further indicate that smallholder farmers consideration of sustainability criteria under the model is the least in social criteria which is represented by 28.8%. Despite the indicated variations in levels of considerations between the three criteria, the differences between the levels of considerations in criteria are not significantly very big. This implies that there is an indication of uniformity in levels of smallholder farmers’ considerations of sustainability criteria in non-contracted conventional farming model in the study area.

The conditions of drivers that influence smallholder farmer considerations of sustainability criteria are also qualitatively expressed through opinions that emanate from in-depth focus group discussions with farmers. These farmers provided different argumentations for the contended sustainability criteria under the model.

Contributing on how smallholder farmers have established their own means of accessing farm inputs as an element to economic criteria and sustainability in the model. Since farmers get challenges of accessing farm inputs, they took concerns on it by devising a mechanism in which they established a shop for selling the inputs to all villagers to ease the availability of the service. Arguing on this matter, a farmer in Matembwe AMCOS has this to say:-

“Yes! we have a mechanism and we have a shop that belongs to the society specifically for selling farm inputs. The society brings fertilizers and sells them to its members. When we sell the fertilizers, we do not only consider society members alone but the entire surrounding community. We do it for the entire farming season in every year”.

(Farmer\Matembwe AMCOS: 79 - 79 (0))

Similarly, another group of farmers under a different sub-model took initiatives to establish a mechanism to facilitate farmers access to farm inputs for their farming activities. It established a mechanism of purchasing farm inputs in a group. This mechanism is advantageous as farmers get incentives from the supplier through free transportation, reduced price and reduced farmers travels for purchases. Farmers in Igongolo AMCOS contend more on the practice as they state:-

“There is a mechanism that we thought to facilitate access to farm inputs in our society. We unite together as groups to make a unified procurement of inputs and implements from identified suppliers. As a society, we emphasize on this mechanism since it is cheap and is a cost reduction mechanism”....

“These sellers bring the procured farm inputs and implements in lump sum for the group and not as to individuals. We collect the amounts of orders and amounts of money from individuals for this combined procurement”.

(Farmers\Igongolo AMCOS: 86 - 87 (0))

Regarding the consideration for ecological criteria under the model, contentions that indicate smallholder farmers to devise and take initiatives that are directed towards environmental protection, farmers in Igongolo AMCOS had this to express:-

“Constant provision of education to us on different environmental aspects is very important. We can for example have farmer field classes on environmental conservation and if we use it well, we can practice well our farming activities. We also need to continue planting trees that are water reserving. If we are to be supported with Mivengi seedlings and pine trees and not eucalyptus trees, we can be in safe position to foster plating of water reserving trees that contribute to preserving our environments”.

(Farmer\Igongolo AMCOS: 95 - 95 (0))

Smallholder farmers also show their concern for social sustainability in the model as indicated. In their arguments on meeting the challenges that are associated to their health, safety and social welfare, farmers explained how they take initiatives to meet these challenges as there are no formally institutionalized and reliable mechanisms that they depend on to meet such services. Farmers in Ninga AMCOS explained their concerns on this aspect by stating:-

“I may say that we only take our own initiatives to protect our health when we do cultivation. Such include wearing masks and boots when we are in farms. We finance these by ourselves. A farmer needs to strive on his or her own to get these protective gears”....

“We have not reached to the point where our society facilitates its members safety, health and welfare schemes. We do not yet have any systems for handling these through the society. We are currently facing the situations using our own means”.

(Farmers\Ninga AMCOS: 48 - 49 (0))

7.6.2 Reconciliation of diverging results under the model

The quantitative and qualitative results presented above indicate slight variations between them. Despite the indicated slight differences in mean values in considerations of sustainability criteria between the three dimensions in quantitative results, the results all contend for higher considerations of sustainability in all criteria. On the other hand, qualitative results portray differentiated levels of responses and ranks in order of higher considerations of economic criteria followed by ecological criteria and then social criteria. However, the variations in levels of ranking in qualitative results is indicated to have slight differences between the criteria.

An examination of results in both quantitative and qualitative approaches indicates a sense of similarities in responses to considerations between the criteria. However, further examination indicates that the similarity in ranking in the quantitative approach is stronger since all responses fall in the same category of mean values despite their variations. This similarity gives freedom to any of the criteria to have a higher rank of consideration. On the other hand, qualitative results indicate variations in ranks despite the fact that there are slight differences between the criteria. These slight differences in ranking are indications of closeness in responses as is also indicated in quantitative results. Since the qualitative results provided room for more insights from respondents, the slight differences in ranking between the dimensions gets strength in sake of differentiating the levels of responses to consideration of sustainability between ecological, social and economic criteria.

In this regard, the study concludes that, the final results on smallholder farmers’ considerations of sustainability criteria in the non-contracted conventional farming model varies slightly with economic criteria indicating more consideration followed by ecological and social criteria in the study area.

7.7 Findings from the non-contracted organic farming model

Smallholder farmers in non-contracted organic farming as one of the found models in the study area also portray their answers as regards consideration of sustainability criteria while they undertake commercial farming under the model. The findings from both quantitative and qualitative sets of analyzed data together with their respective explanations are presented.

7.7.1 Data analysis and explanations of findings under the model

A total of 10 smallholder farmers from Madeke Organic and Horticulture Agricultural Producers Cooperative Society (MOHAP-COS) represented the model by providing quantitative data on inquiries on the question. The results from the analyzed data indicate smallholder farmers to assert varied responses on considerations of ecological, social and economic criteria in their commercial farming under the model. The results are presented in computed descriptive mean values as indicated in Table 7.4.

Table 7. 4: Descriptive values on smallholder farmers' considerations of sustainability criteria in non-contracted organic farming model

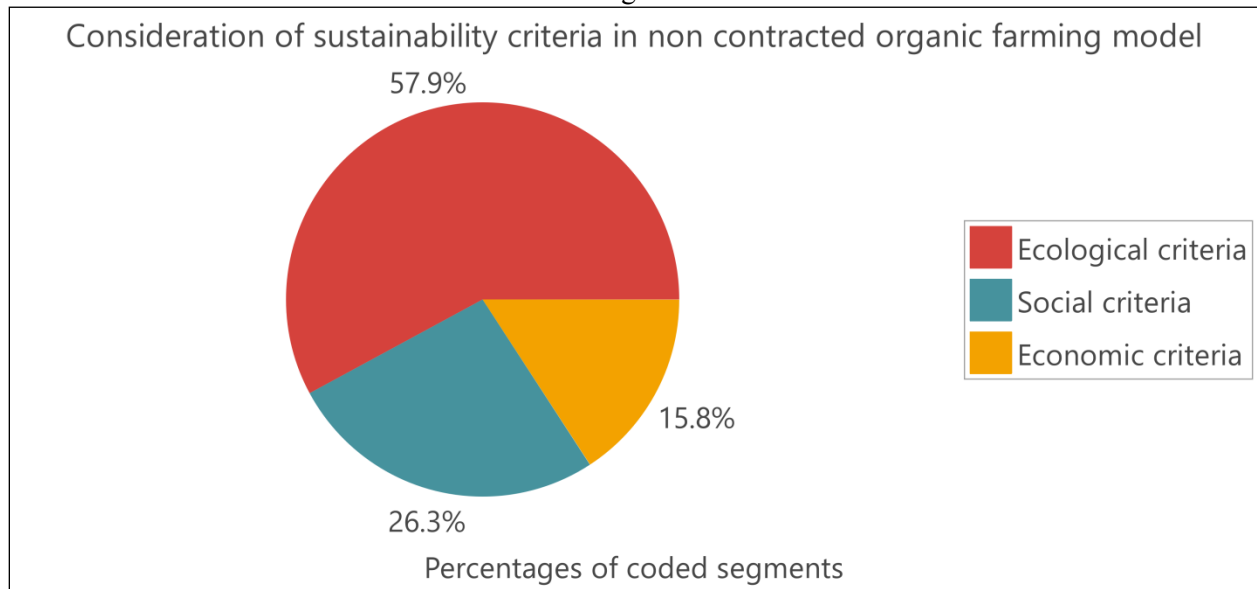
	N	Minimum	Maximum	Mean	Std. Deviation
Ecological criteria	10	3.29	5.00	4.2429	.59495
Social criteria	10	3.17	5.00	4.3000	.70623
Economic criteria	10	2.83	4.33	3.4833	.59030
Valid N (listwise)	10				

Source: Field research data, (October 2018)

The results presented in Table 7.4 indicate smallholder farmers to have a very high consideration of social criteria (4.3000) in their commercial farming under the model. Results also indicate smallholder farmers to similarly have a very higher consideration of ecological criteria (4.2429) in their commercial farming under the model. Moreover, the results indicate smallholder farmers to somehow consider economic criteria (3.4833) in their commercial farming under the model in the study area. These results imply similarities in smallholder farmers higher concerns for social and ecological criteria in their commercial farming under the model. Considerations of economic criteria imply not to be given high concerns by farmers in their commercial farming under the model.

Results under this commercial farming model are also qualitatively presented. Smallholder farmers affirm their varied considerations of ecological, social and economic criteria when they undertake commercial farming under the model. The qualitatively gathered and analyzed data give results that are transformed and quantitatively presented as indicated in Figure 7.4.

Figure 7. 4: Smallholders farmers' considerations of sustainability criteria in non-contracted organic farming model



Source: Field research data, (October 2018)

Quantitatively transformed results presented in Figure 7.4, point out that smallholder farmers have a higher consideration of ecological criteria (57.9%) compared to other criteria when they undertake commercial farming under the model. Moreover, results indicate that social criteria (26.3%) follow to be considered by smallholder farmers as they undertake commercial farming under the model. Results further indicate economic criteria (15.8%) to be the least considered criteria by smallholder farmers when they undertake their commercial farming under the model. These qualitative results in general indicate a significant difference in terms of consideration between the leading ecological criteria and other criteria. This difference and the indicated higher consideration of ecological criteria are implications of the association between the ecological oriented nature of the commercial farming model and farming practices that smallholder farmers undertake in the model. The orientation of a model is likely to be a relating factor for farmers to take more concerns on sustainability practices that are oriented to their commercial farming model.

In line with the provided qualitative results, smallholder farmers also contended on consideration of sustainability criteria in their opinions that were gathered through focus group discussions. Contending on the initiatives that are taken towards safeguarding ecological wellness in the area, smallholder farmers insist on their abidance to guidelines of organic farming that are set by the society. They are not allowed to change the farming practices until there are new stipulations. This indicates their concern for ecological criteria under the model. Arguing on this fact, a farmer in Madeke MOHAP-COS emphasizes that:-

“We have contracted guidelines on organic farming to all members. We agreed in the formulation of the society that organic pineapples farming should not include making any changes on the use of fertilizers and other inputs that are not organic until there are further research results that instruct otherwise”.

(Farmer\Madeke MOHAP-COS: 22 - 22 (0))

On the same ecological sustainability, smallholder farmers express their feelings on the various initiatives that they take to face climatic and weather forecasting challenges in the area. Farmers under this model lack climate information services to facilitate their commercial farming. However, they do not wait to be attacked by the adverse weather impacts but take their initiatives and use their experiences to tap from what the climate provides to enhance their commercial farming. This is situation is explained by a farmer from Madeke who claims that:-

“We use experiences to do weather forecasts. For example, pineapples can be planted any time here. The weather in here allows us to do planting of the pineapples at any time. With the other farming seasons, we also use experience as our area has rains almost all the time of the year. We know well the heavy rain seasons and low rain seasons”.

(Farmer\Madeke MOHAP-COS: 40 - 40 (0))

Concerning access to social welfare services under the model, smallholder farmers indicated to have no formalized mechanisms for supporting their access to health, safety and social welfare. Instead they opt for personal funding mechanisms by forming groups in which they contribute funds that is used to support members to access health and social welfare needs. A farmer contends more on this matter:-

“We do not have any mechanism yet but we use the free and voluntary contributions approach to support a member of our society in case he or she gets a safety or health mishap”.

(Farmer\Madeke MOHAP-COS: 81- 81 (0))

Furthermore, smallholder farmers expressed their qualitative opinions on the considerations of economic criteria when they undertake commercial farming under the model. Despite lack of formally established financing mechanisms that farmers can use to access their farm financial capital under the model, farmers spoke the current informal approaches that they use to mobilize funds for their economic or other uses while they undertake commercial farming. This is emphasized by a farmer who argues that:-

“We have various smallholder farmer groups that we use for developing financial support mechanisms to group members. Our groups have accounts where every member contributes a sum of money monthly. We reserve the money for future farm and social welfare uses when members need”.

(Farmer\Madeke MOHAP-COS: 51 - 51 (0))

7.7.2 Reconciliation of diverging results under the model

The quantitative and qualitative results found on smallholder farmers consideration of sustainability criteria found under the model to a greater part indicate to converge despite a minor divergence. Quantitative results indicate farmers’ high considerations of social and ecological criteria with a low consideration of economic criteria in their commercial farming under the model. Nevertheless, qualitative results portray smallholder farmers to have a higher consideration of ecological criteria followed by social criteria with low consideration of economic criteria in their commercial farming under the model. A critical assessment of these results entail that the similarity in higher considerations of social and ecological criteria under the quantitative approach give room for any of these two dimensions to be ranked higher over the other in terms of consideration. Since the consideration of ecological criteria is indicated to be higher in the qualitative approach, this entails a higher consideration of ecological criteria under the model. Also given that economic criteria is indicated to have a lower consideration by farmers in both qualitative and quantitative approaches, consideration of social criteria takes the rank following ecological criteria. The convergence of consideration of economic criteria remains lower under the model.

In this sense, the study concludes that, smallholder farmers have higher considerations of ecological criteria followed by social criteria with least considerations of economic criteria under the non-contracted organic farming model in the study area.

7.8 Discussions and conclusions on overall findings on the question

The presentation and explanations of findings has been built on the specific commercial farming models that are identified in the study area. This discussion among others contents aggregates the model-based findings to generate general findings that give answers to the research question. Reflecting on the findings that are presented from specific commercial farming models, there is a noticeable clarity in variations of findings between models. However, there are elements which indicate dominance in occurrences in some of the dimensions in models, an implication that the criteria under these dimensions are highly considered by smallholder farmers compared to other criteria in commercial farming models.

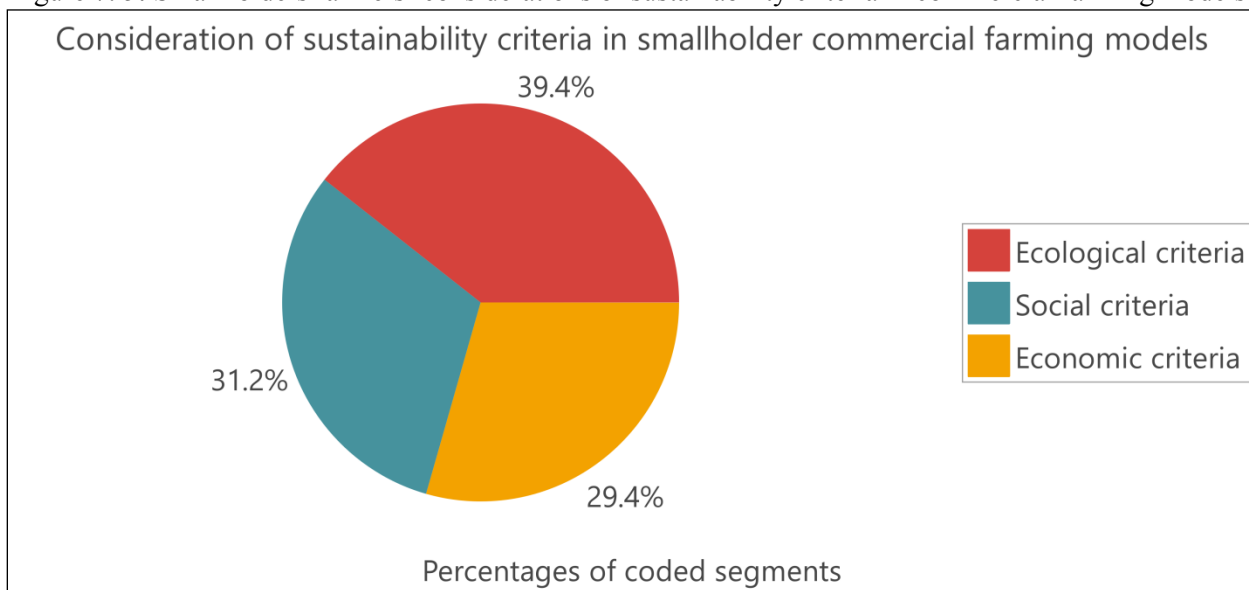
Smallholder farmers consideration of sustainability criteria is indicated in an order of higher social criteria followed by ecological criteria and economic criteria in contracted conventional farming model. The contracted organic farming model indicates smallholder farmers consideration of sustainability criteria to be higher in ecological criteria followed by social criteria with low concerns for economic criteria. Results further indicate smallholder farmers' considerations of sustainability criteria in the non-contracted conventional farming model to vary slightly with economic criteria being highly considered followed by ecological and social criteria. Under the non-contracted organic farming model, smallholder farmers are indicated with a higher consideration of ecological criteria followed by social criteria with least consideration of economic criteria.

In constructing arguments on cross-case assessments of the variations in ranks of considerations of sustainability criteria, there are cases of prevailing occurrences of some criteria among other criteria. Looking at ecological criteria in models, it has indicated higher and mid occurrences in all models. There are no cases where it is indicated to have a lower consideration in any commercial farming model. Social criteria on the other hand has been indicated with higher and lower occurrences in some models but a majority of occurrences are indicated to be mid-level after ecological occurrences. Considerations of economic criteria has been indicated with few higher occurrences while a majority of its occurrences are the least in almost all models. Basing on this cross-case assessment of occurrences of sustainability criteria in commercial farming models, conclusive and generalized findings on the question are derived. In this sense, smallholder farmers consideration of sustainability criteria is indicated to be higher with

ecological criteria followed by social criteria. Economic criteria are indicated to be the least considered criteria in commercial farming models in the study area.

This derived conclusion converges with the qualitatively generated and transformed general findings on the research question. These findings portray similar distribution of responses on smallholder farmers consideration of sustainability criteria in commercial farming models as indicated in Figure 7.5.

Figure 7. 5: Smallholders farmers' considerations of sustainability criteria in commercial farming models



Source: Field research data, (October 2018)

In the distribution presented in Figure 7.5, there are slight indications of differences in levels of smallholder farmers consideration of sustainability criteria in commercial farming models. Despite the indicated slight differences, ecological criteria indicate to be leading in consideration (39.4%) followed by social criteria (31.2%). Economic criteria (29.4%) indicate to be the least considered criteria by smallholder farmers in commercial farming models in the study area. This distribution of results on the question converges with the specific aggregation of findings from specific commercial farming models as discussed.

With detailed impressions on the generalized findings on the question, the discussions begin by unpacking the ecological criteria that indicate a higher considerations by smallholder farmers in models. The multiple experiences of practices that are oriented to ecological wellness expressed in models and others practiced by farmers in various models justify the higher ecological concerns indicated. The two models used in this study, which are the contracted organic and the

non-contracted organic farming models are specifically engaged in organic farming practices. A majority of farming practices in these models are focused on ecological wellness and environmental protection. Many responses from farmers on considerations of sustainability criteria in these models are oriented to ecological wellness of farming practices in the area.

Despite other models being conventional, the findings indicated by higher concerns for ecological criteria are contributed by the fact that, farmers have been identified to engage in practices that foster ecological sustainability. Farmers provide experiences of observing the laws that are emphasized by responsible organs and agencies in safeguarding ecological sustainability. There are also personal and deliberate initiatives that farmers take for environmental protection. Such include afforestation as an environmental safeguarding mechanism and a business and at the same, contour farming practices, use of runoff water barriers and abiding to controlled fire setting. Others include planting environmental friendly tree such as Pine trees, “Mivengi” trees and “Magwatali” weeds which are special weeds for controlling soil erosion. Farmers in other models also manage solid wastes in farms and have toilets and bath facilities at farms for private services and hygiene.

Also, farmers in various models have indicated concerns in fostering access to climatic information and services as components of ecological sustainability. There are cases where farmers use their experiences to forecast weather, rain, drought and assess soil quality. They buy newspapers, radios and televisions and use them for accessing weather forecasts and climatic information. These practices are many and widespread. That is why they indicate smallholder farmers to have higher concerns on them. This signifies for higher concern for ecological sustainability in their commercial farming models in the study area.

Concerning farmers consideration of social criteria, the indicated levels of consideration in the findings are more related to farmers access to healthcare, safety, security and social welfare. Due to the nature of business models that are adopted in the area, many models have not yet captivated farmers access to healthcare and social welfare schemes. Nevertheless, smallholder farmers indicate the need for these services and there are possibilities for these models to captivate the services. Findings indicate some smallholder farmers establishing group or individual mechanisms that enable them to access healthcare, safety and social welfare services. Cases of smallholder farmer groups forming and joining into Savings and Credit Cooperative Societies (SACCOS) are evident in models. These SACCOS serve to reserve funds that farmers

can use for healthcare, safety, social welfare needs or any other economic needs that arise. Examples from Isoliwaya AMCOS and Lupembe AMCOS under the contracted conventional farming model indicate smallholder farmers to have gone further in negotiating with partners for securing health and social security schemes in their commercial farming models.

Smallholder farmers concerns for social sustainability in models that are indicated in findings are also directed on commercial farming as an opportunity for employment creation. There are exemplar cases of farmers concerns on commercial farming models that negatively influence the youths to join in commercial farming. Smallholder farmers contend on how poor products prices in some commercial farming models are discouraging engagements commercial farming. Examples from smallholder farmers in Lupembe AMCOS under the contracted conventional farming model claim on how poor prices negatively influence the current and new engagements in tea farming. Smallholder farmers are concerned on youths employments and they are anxious on the sustainability of commercial tea farming since it is the dependable source of employment in the area. These are some of the found cases that vindicate smallholder farmers concerns on social sustainability while they undertake commercial farming in the study area.

Regarding economic sustainability, more concerns that farmers have raised as indicated in the findings on the question are related to farm financing. Many of the identified smallholder commercial farming models do not captivate farm financing through loans or any other financing means. Moreover, smallholder farmers are identified with limited access to formal and institutionalized farm financing mechanisms such as access to loans from banks and microfinance institutions. In this sense, farmers in almost all commercial farming models are observed to opt for group-based financing mechanisms such as joining SACCOS and internal lending and credit or personal savings schemes. In concern of this economic need, they are evidenced to use these mechanisms which seem to be only available within their capabilities and vicinities.

The indicated level of smallholder farmers concern on economic criteria in findings is contributed by limited access to land that is asserted by smallholder farmers in some models. There is evidence of increased land demands in villages nearby Njombe Town which are causing some farmers in these villages to fail to access land in case of need. Smallholder farmers in Itulike and Wikichi farmer groups under the contracted organic farming model for example raised the concerns that they are incurring high costs to purchase land in their villages. They

cannot compete within the land demand rivalry that is compelled by the growth of Njombe Town. Also, they cannot compete in land purchases with newcomers from other places who have higher financial ability to purchase land. The observed land use changes cause smallholder farmers in these areas to take concern on land demands and its impacts to economic sustainability of under their commercial farming model.

The indicated findings on consideration of economic criteria by smallholder farmers is also contributed by their concerns to access farm inputs. Access to farm inputs becomes a problem in commercial farming models that do not facilitate it. Findings have indicated smallholder farmers opting for initiatives and mechanisms that facilitate their access to farm inputs. For example, smallholder farmers in Igongolo AMCOS under the non-contracted conventional farming model assert to purchase farm inputs as a group as a mechanism that facilitates ease access to farm inputs. Smallholder farmers in Matembwe AMCOS under the same model are also indicated to establish a society shop in which farm inputs are sold to farmers to facilitate ease access of the inputs. Since these farmers are facing challenges in accessing farm inputs, they take concern to this economic need in their commercial farming by devising mechanisms that facilitate them to access the service.

In a nutshell, the discussions on the research findings on the question have extensively unpacked how smallholder farmers consider sustainability criteria when they undertake commercial farming under various farming models. The indicated variations in the levels of consideration of sustainability criteria have been explored and the areas that need interventions have been observed. These have provided the bases on what smallholder farmers, different partners, stakeholders and the respective models have been recommended to do to foster sustainability and ultimately contribute to sustainability of smallholder commercial farming in the study area.

7.9 Summary on the chapter

This chapter has presented answers on a research question that sought to answer how smallholder farmers consider sustainability criteria when they undertake commercial farming in specific commercial farming models in the study area. The chapter has clarified on the meaning and scope of the term “consideration” as it is being used in the study. It then defined the variables that were sought by the study in which the scope of sustainability criteria focused on the triple bottom line dimensions of ecological, social and economic sustainability and their receive criteria. The chapter then gave the analyses and explanations of quantitative and qualitative

results on smallholder farmers' considerations of sustainability criteria in each of the four commercial farming models that are used in the study. Reconciliation of the research results from the quantitative and qualitative approaches was made in every farming model. The reconciliations brought one whole meaning of the research findings in which conclusions of findings on every model were derived and presented.

With the derived findings in every commercial farming model, it was concluded that, smallholder farmers consider more social criteria followed by ecological criteria and economic criteria when undertaking commercial farming in contracted conventional farming model in the study area. It was also concluded that, smallholder farmers consideration of sustainability criteria is higher in ecological criteria followed by social criteria with low concerns for economic criteria under the contracted organic farming model. Moreover, it is concluded that smallholder farmers' considerations of sustainability criteria in the non-contracted conventional farming model varies slightly with economic criteria indicating more consideration followed by ecological and social criteria in the study area. Furthermore, it is conclude that, smallholder farmers have higher considerations of ecological criteria followed by social criteria with least considerations of economic criteria under the non-contracted organic farming model in the study area.

Furthermore, the chapter presented discussions on the research findings from every model in which these findings are aggregated into general findings on the research question. In these generalized findings, the study concluded that, smallholder farmers consideration of sustainability criteria is higher with ecological criteria followed by social criteria whereas economic criteria are indicated to be the least considered criteria in commercial farming models in the study area. Further discussions on this general findings on the research question were made in which exemplar cases with various arguments that justify each of the varied levels of considered sustainability criteria are made. The chapter provided an opinion that the found variations in levels of smallholder farmers consideration of sustainability criteria form the bases for recommendations for improving smallholder commercial farming in the study area. The chapter ended by presenting a conclusive summary of what it has entirely presented. The next chapter presents on smallholder farmers perceived performance of commercial farming models with respect to sustainability criteria in the study area.

CHAPTER EIGHT: SMALLHOLDER FARMERS' PERCEPTIONS ON THE PERFORMANCE OF COMMERCIAL FARMING MODELS WITH RESPECT TO SUSTAINABILITY CRITERIA

8.1 Introduction

This chapter presents answers on perceptions of smallholder farmers on the performance of commercial farming models with respect to sustainability criteria in the study area as it was inquired in the research question. The chapter first explains the boundaries of the term “performance” as it is adopted in the study. It then defines the sustainability dimensions and their respective variables that are used in the study. The chapter presents the quantitative and qualitative results on smallholder farmers’ perceived performance of commercial farming models with respect to sustainability criteria for every selected commercial farming model. The results from every model are reconciled to arrive at one set of findings for every model. The chapter further presents derived conclusions on the findings on the research question followed by detailed discussions on the general findings. The chapter finally ends by presenting a summarized note on what has been entirely presented.

8.2 Impression on the use of the term “performance” in the study

The term “performance” when used with reference to sustainability literature is more connected to the expected functioning of a system as per established set of criteria or principles through which the system is evaluated. In this respect, performance with respect to sustainability criteria refers to the overall observed functioning of a systems that is evaluated by using pre-established criteria or principles that define the function of a system (Coutinho et al., 2018; Dave et al., 2017; Shen et al., 2016; Costa and Menichini, 2013; Lirn et al., 2012).

In line with the explained scope of using the term performance, this study then sought to understand the evaluation and opinion that smallholder farmers bear as regards the functioning of commercial farming models in connection to ecological, social and economic criteria. Since the study sought to understand how farmers evaluate the commercial farming models, the evaluation did not exclude smallholder farmers as they are part and parcel of the models. In this sense, the evaluation was all encompassing covering the sustainability functions that are established by the initiatives of smallholder farmers themselves. Therefore, the evaluation that farmers were asked to make was reflected on the performance that is instilled by agribusiness firms or companies or initiatives and smallholder farmers themselves in fostering sustainability in specific commercial

farming models in the study area. The evaluation sought to understand the forms or types of sustainability practices that exist in their commercial farming model. An in-depth understanding on the forms or types of sustainability practices that were identified within a model was also made. The variations in forms of sustainability practices that existed between ecological, social and economic dimensions determined the perceived level of performance of a model with respect to the sustainability criteria.

8.3 Sustainability dimensions adopted in empirical explanations of the research question

In searching for answers to the research question, the study narrowed down the scope of sustainability dimensions to the triple bottom line dimensions which are ecological, social and economic dimensions. The specific variables which define the sustainability criteria under these dimensions specific for the research question are detailed in Chapter Three, Part 3.4.5 and summarized in Table 3.1 of this thesis. However, this part highlights the distribution of variables that the study specifically used in making inquiries for answering the research question. This is done here in order to bring the link between the what the study sought and what has been empirically found out.

In addressing the research question, the variables of environmental degradation control and access to climatic information and services are the ones in which the criteria for assessing performance of models on ecological sustainability were derived. Equity to land access, equity to land use and equity to land ownership are the variables that provided the criteria for assessing the performance of models with respect to social criteria. Others variables under social sustainability include captivation of healthcare, safety, security and welfare of farmers and creation of farm employment by models. On the other hand, variables of farmers facilitation in enduring land demand and supply conditions, facilitation in accessing non-cash farm capital and farmers facilitation in farm financing were the variables from which the criteria for assessing perceived performance of models on economic sustainability were derived. Basing on these variables and their criteria, data on the research question were sought and analyzed and; respective quantitative and qualitative findings of every specific commercial farming model are presented.

8.4 Findings from the contracted conventional farming model

Research findings on smallholder farmers' perceptions on the performance of commercial farming models with respect to sustainability criteria under the contracted conventional farming model are referred. The quantitative and qualitative findings on the question with reconciled differences between them are presented.

8.4.1 Data analysis and explanations of findings under the model

A total of 27 representative tea farmers randomly selected from Isoliwaya and Lupembe agricultural markets cooperative societies (AMCOS) and Iboya and Lwangu tea farm blocks provided quantitative data for the study. The data was analyzed and the results on smallholder farmers' perceptions on the performance of the model with respect to ecological, social and economic criteria are found to vary. These results are provided through descriptive mean values on the responses on the criteria as indicated in Table 8.1.

Table 8. 1: Descriptive values on perceptions of smallholder farmers on the performance of contracted conventional farming model with respect to sustainability criteria

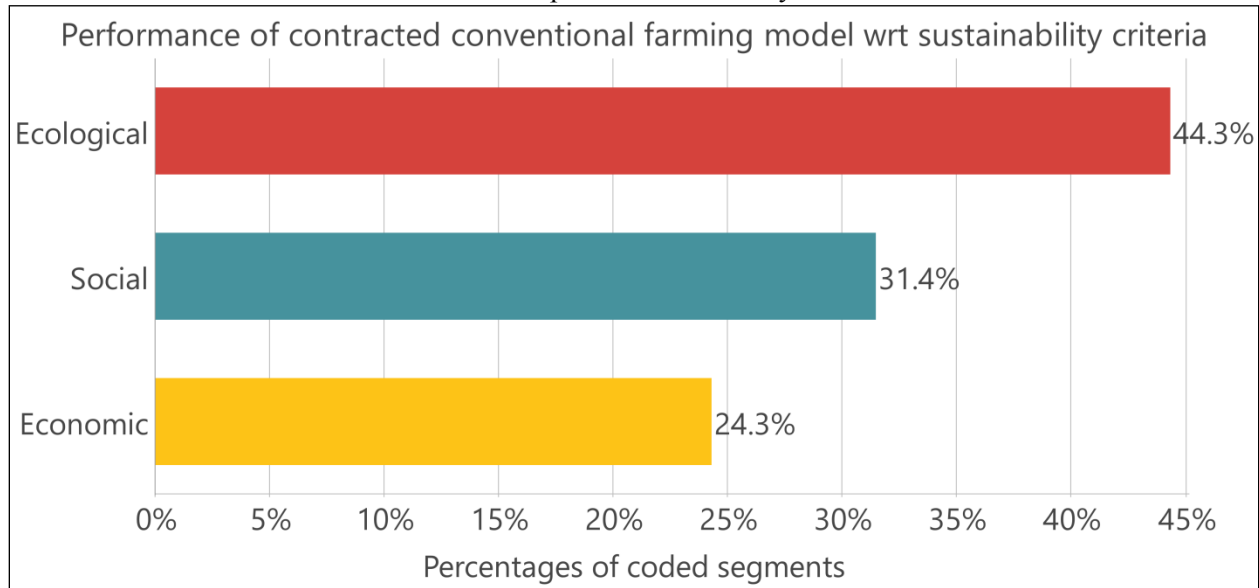
	N	Minimum	Maximum	Mean	Std. Deviation
Ecological performance	27	2.86	5.00	4.1005	.57528
Social performance	27	1.83	5.00	3.7593	.87135
Economic performance	27	1.00	5.00	3.6358	.96303
Valid N (listwise)	27				

Source: Field research data, (October 2018)

The quantitatively presented results in computed mean values shown in Table 8.1 indicate that, smallholder farmers agree for an equal performance of the model with respect to ecological criteria (4.1005), social criteria (3.7593) and economic criteria (3.6358). With the indicated agreements in all sustainability criteria in the model, these results imply that smallholder farmers perceive almost an equal performance of the model in ecological, social and economic criteria.

From the qualitative approach that addressed the research question through in-depth focus group discussions, the qualitatively collected and analyzed data give results which indicate variations on smallholders farmers' perceived performance of the model with respect to ecological, social and economic criteria. These qualitative results with their varied responses are transformed from qualitative to quantitative formats and presented as indicated in Figure 8.1.

Figure 8. 1: Smallholder farmers’ perceptions on the performance of contracted conventional farming model with respect to sustainability criteria



Source: Field research data, (October 2018)

The results presented in Figure 8.1 point out that, smallholder farmers’ perceive the performance of the model to be higher in ecological criteria (44.3%) followed by social criteria (31.4%) and is the least in economic criteria (24.3%). These results imply that more of sustainability undertakings in the model are ecological as perceived by smallholder farmers who undertake their commercial farming under the model. These are followed by social undertakings and economic undertakings are perceived to be least undertaken in the model.

Additionally, qualitative results on the research question are supported by opinions that were captured during focus group discussions. Smallholder farmers explain how they access weather and climate information as ecological services through mechanisms that are initiated by one of the institutions that manage the commercial farming model. These services are perceived to be available in the model under the support of the institution. A farmer in Lupembe AMCOS substantiates this argument by stating that:-

“These activities are done by the agricultural extension officers who are employed by the government in every village. Extension officers are the experts who usually help and advise us on various weather and climate changes that are anticipated to occur. For example, this year, there were outbreaks of harmful insects that attacked our farms. These were observed and extension officers advised us accordingly on this matter. The government helps us much on this”.

(Farmer\Lupembe AMCOS: 83 - 83 (0))

Similarly arguing on enhanced availability of ecological practices in the model, smallholder farmers acknowledge the access of ecological and environmental practices from the agribusiness firms that partner with in commercial farming. Farmers contend on the role that a firm that they are contracted to and a sustainability agency in the model play in fostering ecological wellness. This is expressed by a farmer in Isoliwaya who had this to argue:-

“Ikanga Tea Company and the Rainforest Alliance people teach us on how to practice environmental protection for the sake of preventing adverse climate change impacts in our region”.

(Farmer\Isoliwaya AMCOS: 88 - 88 (0))

Smallholder farmers also perceived the existence of social sustainability practices which are indications of perceived performance of the model with respect to social criteria. A farmer in Iboya Farm Block contends on the presence of lightning and thunder conducting rods that are installed in tea farms by Njombe Out-growers Services Company (NOSC) to enhance safety of farmers when they undertake farming activities as said:-

“Yes! there are services that are provided to ensure our safety at work. For example, there are so many thunders and lightning strikes in this area during rainy seasons. To see this, Njombe Out-growers Services Company installed thunder and lightning rods to protect us from the hazards of being stricken by thunders”.

(Farmer\Iboya Tea Farm Block: 59 - 59 (0))

Furthermore, smallholder farmers argued their perceptions on the existence of practices that are linked to social sustainability under the commercial farming model. Farmers argue on the lack of institutional mechanisms that captivate access to healthcare, security and social welfare services in the model. They contend on the use of personal or group-based mechanisms to foster access to these services incase farmers need. This is expressed by a farmer in Iboya Tea Far Block who puts it clear that:-

“Concerning health services and social welfare issues, we do not have any specific mechanisms from the group or any support from NOSC. There is no any funding mechanism that comes from the group to support members in case of health or social needs. Instead, we contribute spontaneously to support any member who falls in any health service needs”.

(Farmer\Iboya Tea Farm Block: 62 - 62 (0))

Perceptions on the performance of the model with respect to economic criteria also featured in smallholder farmers qualitative opinions. This included arguments on how farmers access farm financial services through loans. This is identified to be provided by agribusiness companies that partner with farmers in commercial farming by integrating them into a business model. Farmers are provided with farm inputs and additives on a long-term recoverable loan for purchases of tea leaves. This is a contended farm financing performance that has been used by farmers in the model as farmers in Isoliwaya confirm:-

“Ikanga Tea Factory took the responsibility to purchase our tea leaves. On provision of farm inputs, the same Ikanga Tea Factory provides farm inputs to tea farmers on loan basis”....

“The loan is gradually recovered from the sales of tea leaves by deducting 100Tshs per kilogram. So, the deductions will depend on the number of kilograms that a farmer sells to the factory. The deductions will continue depending on the amount of a loan that a farmer acquired for inputs access”.

(Farmers\Isoliwaya AMCOS: 34 - 35 (0))

8.4.2 Reconciliation of diverging results under the model

The presented quantitative and qualitative results on the question to a greater extent indicate concurrence between the two approaches. In varied levels of agreements, quantitative results show that smallholder farmers observe existence of practices that related to ecological, social and economic sustainability in the model. These agreements vary with indications that there is more performance in ecological sustainability followed by social and economic sustainability performances in the model. Yet, qualitative results indicate that smallholder perceive the performance of the model with respect to sustainability to vary with ecological, social and economic criteria. The results indicate perceived existence of higher ecological performances followed by social performances. Economic performances are indicated to be the least performances within the model.

Assessing the results from the two approaches, they indicate concurrence on the levels of perceptions on the performance of the model with respect to sustainability criteria. This concurrence creates the basis for concluding the results that smallholder farmers perceive the performance of the contracted conventional farming model to be higher in ecological criteria followed by social criteria. Economic criteria indicates to have the least perceived performance in the model.

8.5 Findings from the contracted organic farming model

This part presents and explains on the research results on smallholder farmers' perceptions on the performance of the contracted organic farming model with respect to sustainability criteria in the study area. Results and explanations from both quantitative and qualitative approaches are made hereunder.

8.5.1 Data analysis and explanations of findings under the model

A total of 16 smallholder farmers from Itulike and Wikichi organic avocado farming groups provided quantitative data for the study. The analyzed data from the sample gave results which aimed to answer the question on perceptions of smallholder farmers on the performance of the model with respect to ecological, social and economic criteria. The results which are presented in computed descriptive mean values indicate variations on responses on the question. These results are presented in Table 8.2.

Table 8. 2: Descriptive values on perceptions of smallholder farmers on the performance of contracted organic farming model with respect to sustainability criteria

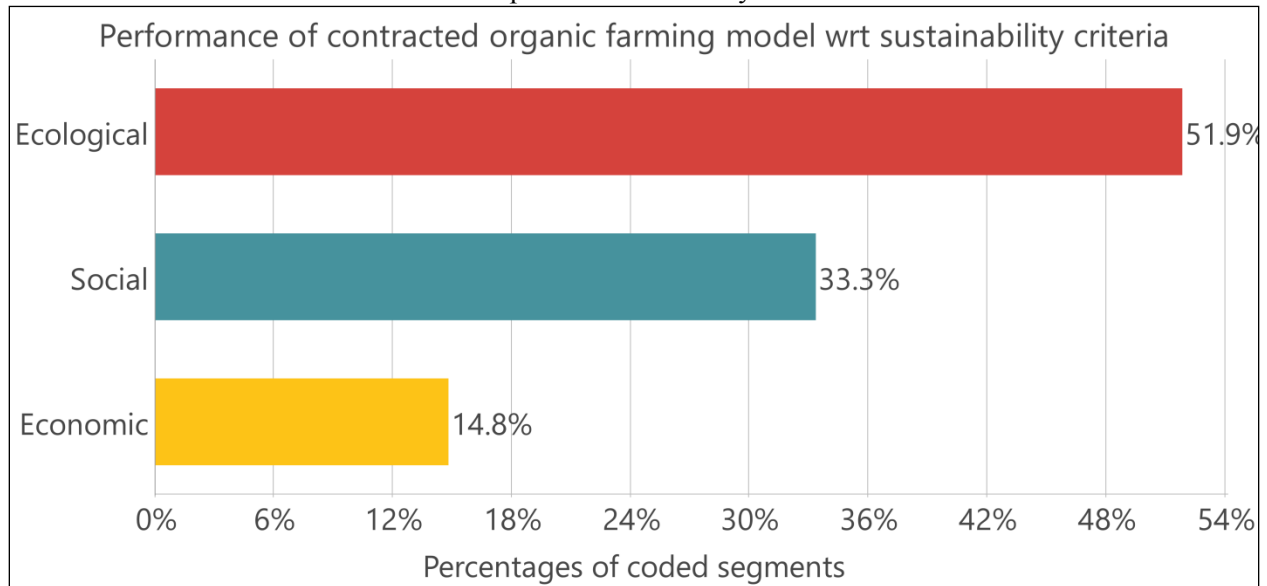
	N	Minimum	Maximum	Mean	Std. Deviation
Ecological performance	16	1.00	3.14	2.2946	.60490
Social performance	16	1.00	3.83	2.2396	.93287
Economic performance	16	1.17	3.83	1.9688	.72831
Valid N (listwise)	16				

Source: Field research data, (October 2018)

The computed mean values presented in Table 8.2 indicate that smallholder farmers perceive a disagreed performances of the model with respect to ecological sustainability (2.2946), social sustainability (2.2396) and economic sustainability (1.9688) as all the indicated mean values align to a disagree choice. These results create a notion of uncertainty as to whether farmers do not actually observe the performance of the model with respect to any of the sustainability criteria. This signifies that farmers perceive weaker presence of sustainability practices within the model. Instead, the justification for these responses are likely to be related to farmers' perceptions on the role of the model in facilitation of sustainability practices as an enabler. To be specific, the indicated results are likely to be related to farmers' perception on the role that Tanzania plays in facilitating sustainability performance in the model. With this notion, farmers' perceived rarity in sustainability performances within the model becomes significant.

Besides, the study gathered qualitative data from representative smallholder farmers from the same organic avocado farmer groups who gave their in-depth opinions through focus group discussions. These farmers presented their perceptions on the performance of the contracted organic farming model with respect to ecological, social and economic criteria. The qualitative results from the analyses were transformed into quantitative forms as shown in Figure 8.2.

Figure 8. 2: Smallholder farmers’ perceptions on the performance of contracted organic farming model with respect to sustainability criteria



Source: Field research data, (October 2018)

Figure 8.2 shows results that indicate smallholder farmers’ perceptions on the performance of the contracted organic farming model to be higher in ecological criteria (51.9%) followed by social criteria (33.3%). Results further indicate that smallholder farmers perceive the least performance of the model with respect to economic criteria (14.8%). The nature of organic farming practices that smallholder farmers undertake within the model are likely to be the contributing elements to the indicated higher perceived performance of the model on ecological criteria.

In line to the quantitatively transformed responses from focus group discussions presented above, smallholder farm stated their qualitative opinions to verify some of the responses to the qualitative results. Smallholder farmers for example, argue on the roles that various authorities under the model play to ensure access to weather forecasts and climate information as components of ecological sustainability. Contending on this fact, smallholder farmers in Itulike organic farmer group say:-

“There has been no big weather and climate changes in our area but for any critical changes, we get informed through the media sources such as television and radios and extension officers”....
“The village authorities also notify us of any forecasted big weather and climatic changes”.

(Farmers\Itulike Farmer Group: 79 - 80 (0))

As said above, smallholder farmers perceive existence of mechanisms that enable them to access weather forecasts and climate change information. Mainly, extension officers and village authorities in jurisdictions play their roles to inform farmers when there are any critical weather and climate changes that are worthy to be understood by all farmers in the area.

With regard to perceived performance of social sustainability in the model, smallholder farmers also gave their qualitative opinions to acknowledge the lack of formally institutionalized mechanisms by their enabling company to foster healthcare services at work. However, farmers contend on existence of group established mechanisms to support farmer members who fall in an emergent social need. With this mechanism, every farmers pays a monthly contribution to this common fund for future use in case of any social need. These opinions were presented by farmers in focus group discussions by smallholder farmers in Wikichi as they contend:-

“For cases of group members who need support in healthcare, we said that every member has to bear that task him or herself. It is difficult for us to take care of every members social and health needs. I think we will do that later when we will be in a good position. Every member has to take his or her own responsibilities for that at the moment and can be supported by other family members”....

“Concerning our social security and welfare, we have a traditional mechanism where we save funds in our account to support members who happen to be in great social needs. We have money in our account and if there is any problem that costs less than one million shillings, we can solve that through that fund.

This fund is obtained from the monthly contribution of funds by members”.

(Farmer\Wikichi Farmer Group: 62 - 63 (0))

Concerning performance of the model with respect economic sustainability, smallholder farmers spoke their perceptions on the matter. Farmers for example, contend on the lack of a formally established mechanisms for financing their access to farm inputs which is a great need in their commercial farming. Instead, farmers opine to opt for their own mechanisms to access farm inputs and fertilizers. A farmer in Itulike farmer group who deals with production of organic avocados confirms this by stating:-

“There are no any mechanisms for our farmers to get support in accessing farm inputs. Tanzania has neither provided any farm inputs to farmers nor has the group a system of supporting farmers to access farm inputs. Every farmer uses his or her own savings to grow or purchase avocado nurseries and buying manure from livestock keepers”.

(Farmer\Itulike Farmer Group: 82 - 82 (0))

Looking on the qualitative statements that are provided in support of the qualitative results found under the model, they verify farmers’ perceptions on the performance of the model with respect to sustainability criteria. These statements indicate existence of both institutionalized and informal initiatives that aim at making farmers undertake sustainable commercial farming under the model. Disregarding the formality or informality of the adopted mechanisms, farmers perceive the performance of the model with respect to sustainability is played by the enabling company and farmers themselves.

8.5.2 Reconciliation of diverging results under the model

The quantitative and qualitative results on the research question that are found under the model indicate divergences between them. Quantitative results indicate smallholder farmers to perceive disagreed performances of the model with respect to ecological, social and economic criteria. These results signify that farmers perceive a weaker presence of sustainability practices within the model. On the other hand, qualitative results indicate farmers’ perceptions on the performance of the model with higher ecological performance proceeded by social performance and economic performance being the least.

In making a critical analysis of these results, the weaker perception on the performance of the model indicated in quantitative results is not explained. The orientation of farmers responses on the question could not be ascertained as to whether were based on presence of practices that are institutional and enhanced by the agribusiness enabling company or were oriented to presence of farmers sustainability initiatives or on both within the model. Nevertheless, qualitative results are supported with qualitative in-depth arguments to express the practices under the model leading to differences in perceptions on performance of the model. With this understanding, the results indicated under the qualitative approach hold more strength on the perceived sustainability performance of the model. The order in levels of occurrence of criteria concurs to the quantitative results whose similarity in disagreement decreases in order of ecological, social and economic criteria as indicated in their respective computed mean values.

With this argumentation, the study concludes that smallholder farmers perceive the performance of the contracted organic farming model to be higher in ecological criteria, followed by social criteria and economic criteria being the least performance in the study area.

8.6 Findings from the non-contracted conventional farming model

The non-contracted conventional farming model is one of the models whose smallholder farmers contributed in providing data in answering the research question. A set of quantitative and qualitative data was collected and analyzed. Quantitative and qualitative sets of results from the analyses are extracted and presented with respective explanations as follows.

8.6.1 Data analysis and explanations of findings under the model

A total of 59 smallholder representative farmers from three sub-models of the model contributed in providing quantitative data for answering the research question. The three sub-model groups under the model used for the study are Ninga and Matembwe AMCOS under the public sector, Kichiwa and Igongolo AMCOS under NDO with CARITAS and; Matiganjola and Itunduma AMCOS under NADO. Quantitative results extracted on responses to the research question show answers in a similar category of value on farmers perceived performance of the model with respect to sustainability criteria. These results are presented in descriptive mean values as indicated in Table 8.3.

Table 8. 3: Descriptive values on perceptions of smallholder farmers on the performance of non-contracted conventional farming model with respect to sustainability criteria

	N	Minimum	Maximum	Mean	Std. Deviation
Ecological performance	59	1.00	4.57	3.2978	.90751
Social performance	59	1.33	4.67	3.3305	.80616
Economic performance	59	1.00	4.67	3.0650	.87921
Valid N (listwise)	59				

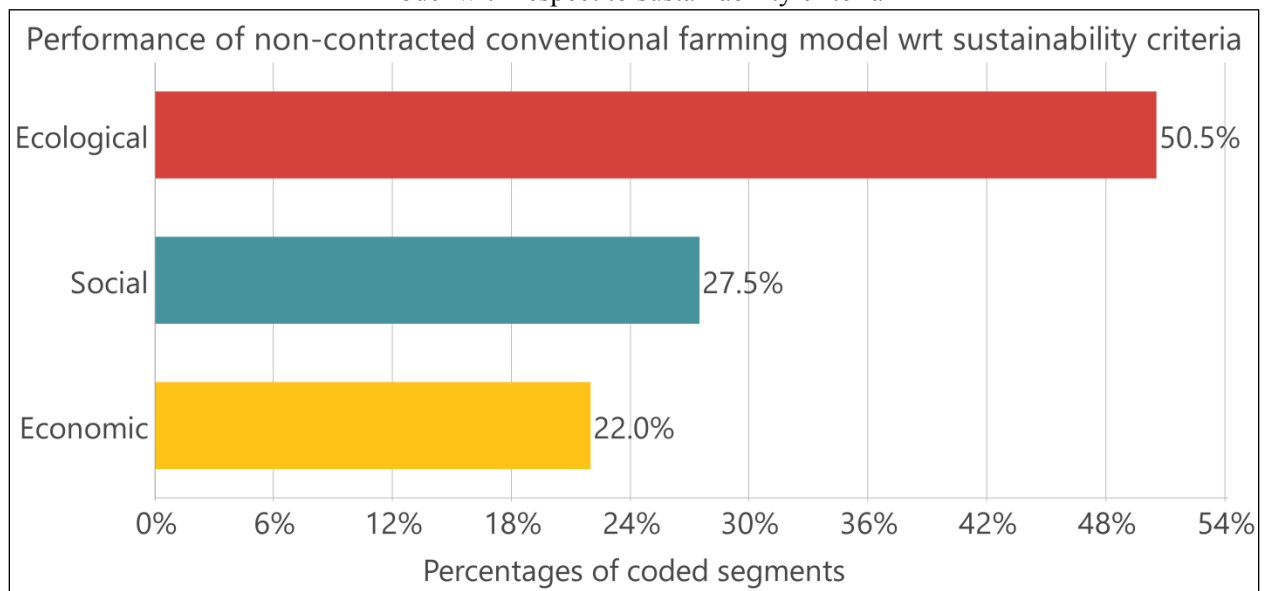
Source: Field research data, (October 2018)

The results presented in computed mean values to responses on the question shown in Table 8.3 indicate that smallholder farmers perceive neutral performances of the model in each of the analyzed sustainability criteria. In these results, farmers perceive a neutral performance of the model in social criteria (3.3305), a neutral performance in ecological criteria (3.2978) and similarly a neutral performance in economic criteria (3.0650). Despite the indication of slight

variations in mean values between the criteria, all responses fall within the neutral category leading to a neutral perception on the performance of the model with respect to sustainability.

Likewise, responses to answer the research question were collected through qualitative means in focus group discussions in similar farmer groups under the model. Responding to the question, smallholder farmers give varied replies on their perceptions on the performance of the model with respect to ecological, social and economic criteria. These are results from the data that was qualitatively analyzed and then transformed into quantitative forms as presented in Figure 8.3.

Figure 8. 3: Smallholder farmers’ perceptions on the performance of non-contracted conventional farming model with respect to sustainability criteria



Source: Field research data, (October 2018)

These results presented in Figure 8.3 indicate that, smallholder farmers perceive the performance of the non-contracted conventional farming model to be higher in ecological criteria which is represented by 50.5% and is followed by social criteria which is represented by 27.5%. The results further indicate smallholder farmers to perceive the performance of the model to be the least in economic criteria among the criteria with a 22.0% representation. These results portray a significant difference in levels of performance between ecological criteria and the other two with the ecological performance indicating the higher performance. This is likely to be an implication of many ecological oriented practices that are being undertaken within the model taking not that there are many sub-models within the model which might have also many ecological oriented practices within them.

Still, smallholder farmers provided opinions that justify the qualitative results on the research question as obtained from the model. These were extracted from focus group discussions that were conducted to smallholder farmers who represented the model.

Regarding the ecological performance, smallholder farmers in various groups which are managed by different agribusiness enabling firms or initiatives admit the roles that are undertaken by these firms to foster ecological welfare under the model. A farmer in Ninga AMCOS as an example, asserts the role of the Njombe District authority in enforcing farmers' abidance to environmental laws in their area as quoted below:-

“There are general environmental guidelines that are given by the district environmental authorities that we adhere to. For example, guidelines on not cultivating within 60 meters distance from water sources are clearly stipulated and we are obliged to adhere to”.

(Farmer\Ninga AMCOS: 65 - 65 (0))

Contending on the roles of that Njombe Development Office (NDO) with CARITAS play in facilitating environmental welfare in the model, a farmer in Igongolo had this to say:-

“CARITAS through the Soya ni Pesa Programme trained us on soil quality retention practices. It is through for example by adopting crop rotation mechanism, by advising us to plant soybeans this year and next year rotate to planting maize in order to retain the soil quality and ensure sustained soil fertility”.

(Farmer\Igongolo AMCOS: 78 - 78 (0))

Furthermore, farmers recognize the roles that Njombe Agricultural Development Organization (NADO) plays in fostering environmental protection in smallholder commercial farming in the model. This is contended by a farmer in Itunduma AMCOS who asserts that:-

“NADO taught us on the proper farming methods especially on sloping lands. We practice these and we are not allowed to cultivate parallel to the sloping land but cultivate against the sloping terrain. This method contributes in controlling soil erosion”.

(Farmer\Itunduma AMCOS: 43 - 43 (0))

These presented opinions indicate the existence of formal ecological enhancing mechanisms that are set within the model. These are among the opinions that contribute to smallholder farmers' perceived higher ecological performance of the model as results ascertain.

Concerning farmers opinions on performance of the model with respect to social criteria, smallholder farmers perceive lack of institutional mechanisms that they can adopt to access health, safety, social welfare and security schemes. Instead, farmers indicate to opt group formed

initiatives to foster their access to these services. Farmers in Kichiwa AMCOS argue on this as quoted:-

“On healthcare concerns, we have not reached the ability to join health insurance schemes in our society. NDO with CARITAS trained us on the importance of securing proper mechanisms for healthcare but it did not manage to establish us to a formal mechanism for health insurance. It suggested for us to establish our own fund in our society where every member can contribute a certain amount of money to the fund for healthcare. In case a member falls into a health problem, a certain non-refundable amount of money will be provided to him or her to cater for health support. That is what we are doing now”.

(Farmer\Kichiwa AMCOS: 66 - 66 (0))

Farmers opinions on economic performance of the model were also captured through in-depth discussions. Commenting on various alternatives to farm financial capital access under the model, farmers perceive it to be oriented to initiatives that are based on farmers contributions and not from the enabling firms or formal financing institutions. Arguing on this point, a farmer in Kichiwa AMCOS assert that:-

“There are no supports on access to financial services that are fostered to members by our society. However, with the access to financial services, the society can guarantee a farmer who is a member to access financial services to a nearby SACCOS at Ibumila Village. The society has the ability to guarantee farmers to access loans from this SACCOS”.

(Farmer\Kichiwa AMCOS: 91 - 91 (0))

In support of the same argument, a farmer in Matiganjola AMCOS justifies the idea as quoted:-

“We do not yet have any financial supports from financial institutions that NADO has linked us to. Instead, NADO educated us on the mechanism of generating our own funding system through savings and depositing shares in the Matiganjola SACCOS. They educated and instructed us to deposit a certain amount of funds after selling the produce. They also educated us on the importance of opening savings accounts in banks where a member would go to withdraw money from the bank if there are any needs of funds for next farming season. The savings are the ones that will enable members to borrow money and use it for their financial support”.

(Farmer\Matiganjola AMCOS: 88 - 88 (0))

8.6.2 Reconciliation of diverging results under the model

The results presented from quantitative and qualitative approaches above indicate a deviation between them. Whereas quantitative results indicate that smallholder farmers perceive neutral performances of the model with respect to each of the analyzed sustainability criteria, qualitative results on the other hand indicate smallholder farmers perception on the performance of the model to be higher in ecological criteria followed by social criteria and then by economic criteria.

The neutral perception of smallholder farmers on sustainability performance of the model indicated in quantitative results imply that farmers assign neither a higher nor a lower performance of the model to the respective sustainability criteria. This neutrality then gives strength for consideration of the results indicated in the qualitative approach as they are categorized in various ranks which are assigned with values on sustainability criteria. With this assessment between the two approaches, the results from the qualitative approach are then adopted as model results. This makes the study to conclude that smallholder farmers' perceptions on the performance of the non-contracted conventional farming model is higher in ecological criteria, followed by social criteria and economic criteria in the study area.

8.7 Findings from the non-contracted organic farming model

Non-contracted organic farming is one of the models that are found in the study area. It indicated to be a scarcely represented model though worthy examining the responses of its farmers on the research question. Presented with respective explanations are sets of results from both quantitative and qualitative approaches which give answers on smallholder farmers' perceptions on the performance of the model with respect to sustainability criteria.

8.7.1 Data analysis and explanations of findings under the model

The Madeke Organic and Horticulture Agricultural Producers Cooperative Society (MOHAP-COS) represented the model. A total of 10 smallholder farmers from the model gave quantitative data as was inquired in the question. Quantitatively analyzed data give results which show smallholder farmers responses that indicate varied values on their perceptions on performance of the model with respect to ecological, social and economic criteria. The results are presented in computed descriptive mean values as indicated in Table 8.4.

Table 8. 4: Descriptive values on perceptions of smallholder farmers on the performance of non-contracted organic farming model with respect to sustainability criteria

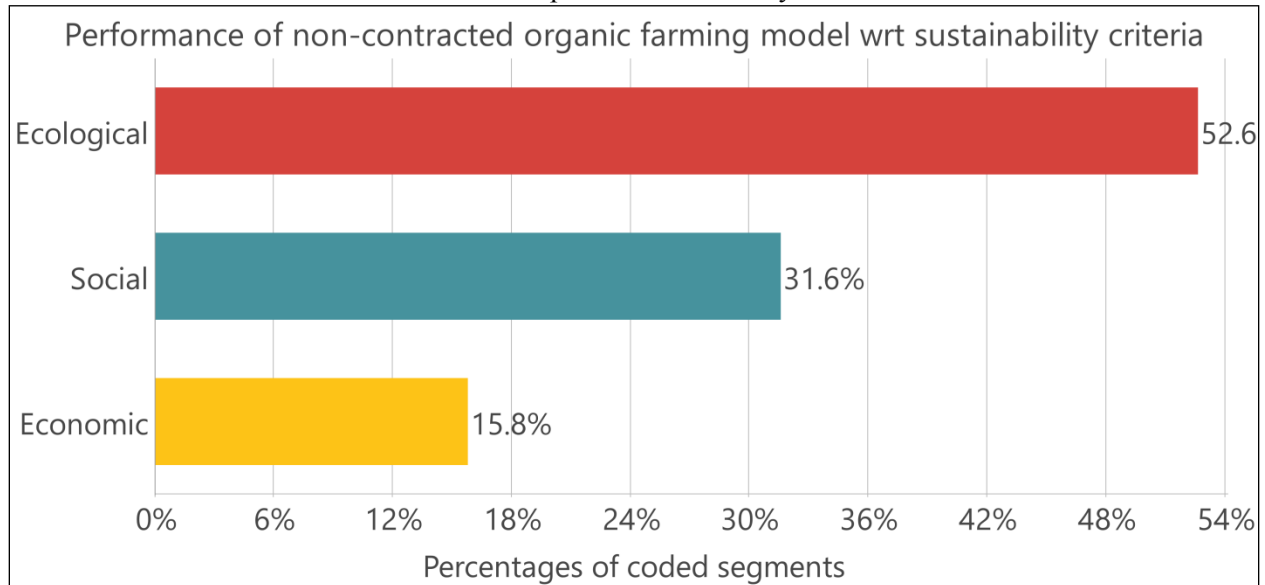
	N	Minimum	Maximum	Mean	Std. Deviation
Ecological performance	10	2.14	5.00	3.2857	1.07116
Social performance	10	2.33	5.00	4.1333	.87065
Economic performance	10	1.50	5.00	3.1333	.96481
Valid N (listwise)	10				

Source: Field research data, (October 2018)

As presented in Table 8.4, the results indicate that, smallholder farmers agree on the performance of the model in social criteria which is represented by a mean value of 4.133. Results also show that, smallholder farmers indicate a neutral performance of the model in ecological criteria which is represented by 3.2857. Furthermore, results indicate smallholder farmers' perceptions on the performance of the model to be neutral in economic criteria which is represented by 3.1333. These results imply a differentiated agreed performance of the model with respect to social criteria compared to other criteria which are assigned no any performance values. The agreed performance of the model in social criteria that is perceived by smallholder farmers is likely to be associated with the modalities of enhancing equity to land access, use and ownership mechanisms that are asserted to be practiced in the model.

The study also presents qualitative results on the question as were derived from data that was collected through focus group discussions in the same case study under the model. Smallholder farmers confirm on the varied perceptions on the performance of the model with respect to ecological, social and economic criteria. The qualitative results from the analyzed data are transformed and presented by using a quantitative form as shown in Figure 8.4.

Figure 8. 4: Smallholder farmers’ perceptions on the performance of non-contracted organic farming model with respect to sustainability criteria



Source: Field research data, (October 2018)

As shown in Figure 8.4, qualitative results presented in quantitative formats indicate that smallholder farmers perceive a higher performance of the model in ecological criteria that is indicated by 52.6% compared to other criteria. Social criteria indicate to follow in order with a representation of 31.6%. Further results point out that, economic criteria which are represented by 15.8% are perceived to be the least in performance among others in the model. As the results in general show, the higher perception in performance of ecological criteria in the model is likely to be associated with the characteristic feature of the model which deals with organic farming. It is most likely that the ecological considerate practices that are undertaken within the model contribute to the perceived higher ecological performance.

In line with the provided qualitative results, smallholder farmers also contended on consideration of sustainability criteria in their opinions that were gathered through focus group discussions. Concerning the perceived performance of the model with respect to ecological criteria that is indicated in qualitative results, smallholder farmers vindicate the roles that is played by the government in fostering environmental protection as their enabling institution in the model. Presenting opinions on this matter in a group discussion, a farmer in Madeke MOHAP-COS had this to say:-

“We are trained by our agricultural experts on how to protect the soil and reducing water speed by using contour farming. Our land has a sloping terrain, so a lot of water flow from plateaus downwards. The erosive capacity of the water is reduced by contouring. This slows down the water speed and water flows slowly directly to farms. This system also protects the washing away of applied manure”

(Farmer\Madeke AMCOS: 39 - 39 (0))

Moreover, adding on other means of environmental protection, farmers verify on the existence of strict rules and by-laws that are set by the local authorities to protect the environment and property in the area. The region is characterized by presence of many tree plantations. These need to be protected as they protect the environment. To do so, rules and guidelines are set to guide villagers on which procedures to follow to the local authority to seek permission for setting fire as it is verified:-

“That is given very much priority in our society. For example, when a farmer wants to set fire to a cleared farm should not do so without seeking permission from the village authority. This should be informed in advance and the authority will issue the guidelines for setting fire like how, when and who should help the person in managing the fire”

(Farmer\Madeke AMCOS: 64 - 64 (0))

With respect to performance of social criteria in the model, smallholder farmers express their integration into the Community Health Fund Program which is established by the government. As all citizens are beneficiaries of the fund, farmers in this area also benefit from it although it is not established and facilitated by the model. This is contended by a farmer who puts it clear that:-

“As a society, we do not have any specific mechanism that provides healthcare services to members. Instead, there is an indirect mechanism for supporting health welfare to our members. The village has a dispensary where every member gets the health services by using the community health scheme where members contribute an amount of 10,000.00 Shillings per year. With this mechanism, members do not get troubles to access health services in the village”.

(Farmer\Madeke AMCOS: 48 - 48 (0))

Regarding the perceived performance of the model with respect to economic criteria, farmers confirm the lack of deliberate group or intuitional initiatives that aim at integrating them to formal farm financing. This is confirmed by a farmers under the model who claims that:-

“The society currently does not have such a mechanism. If it could have been formed earlier, it could have been stable to provide such services. The decrease in the strength of the society due to unreliability of products prices and markets is causing lack of establishing strategies to access financial and non-financial capital by the society”.

(Farmer\Madeke AMCOS: 60 - 60 (0))

8.7.2 Reconciliation of findings under the model

Results that are extracted from quantitative approach indicate an agreement of smallholder farmers on the performance of the model in social criteria. The results indicate neutral performances of the model in ecological and economic criteria as perceived by smallholder farmers. On the other hand, qualitative results indicate that smallholder farmers perceive a higher performance of the model in ecological criteria followed by social criteria. Economic criteria are perceived to indicate the least performance in the model.

Making a critical observation on these results, they indicate a divergence between them on the ecological and social criteria. The two criteria indicate to be equal in levels of perceived performance as each features to lead in perceived performance in the alternative approaches. If the study relies on adopting social criteria as the highly perceived performance in the model as provided in the quantitative approach, its justification will rely more on informal practices that are established by farmers for social services access in the model. Nevertheless, if the study relies on adopting ecological criteria as the highly perceived performance in the model as provided in the qualitative approach, its justification will be more relied on availability of formal and informal mechanisms that are established by farmers and institutions in fostering ecological welfare in the model. For this matter, the contention on higher performance in ecological criteria under the model holds more strength over the social criteria as there are justifications on the existence of formal and informal practices that foster ecological welfare in the model compared to social practices. Concerning the performance of economic criteria, the lower performance indicated in qualitative approach and the neutral performance indicated in the quantitative approach all give credit to a perceived lower performance of the criteria.

With these viewpoints, this study concludes for adoption of the perceived higher performance of the non-contracted organic model in ecological criteria followed by social criteria and further indication of the least perceived economic performance in the model.

8.8 Discussions and conclusions on overall findings on the question

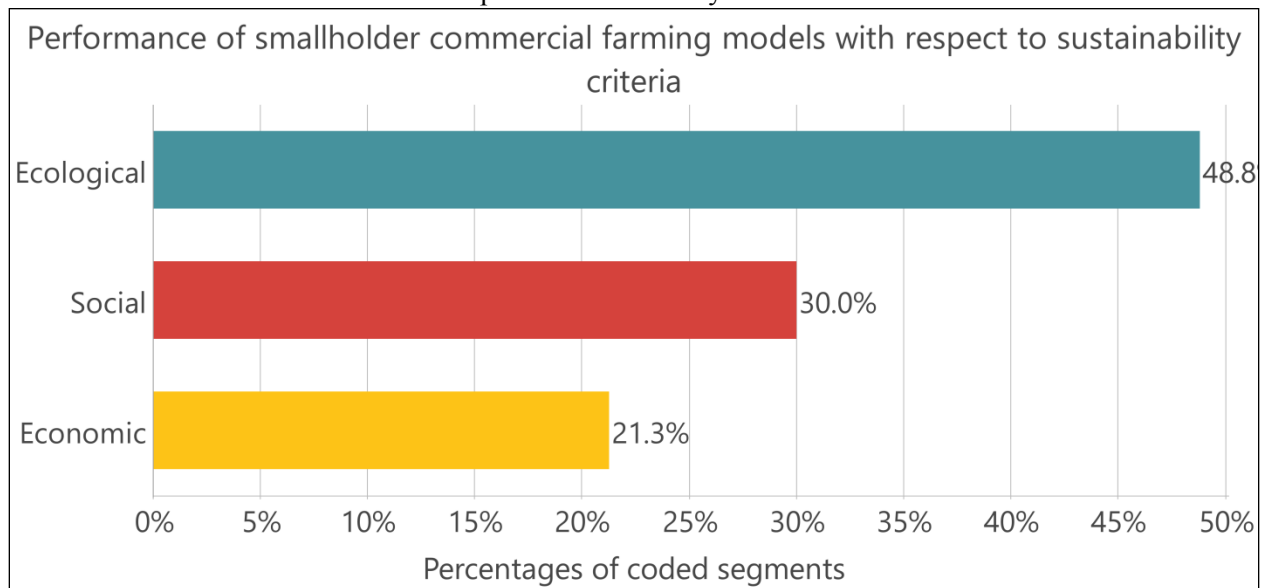
Similar to other presentations of research results in specific questions that focused on specific models, this general discussion reflects on the results extracted from specific model to aggregate the findings of the study with their respective explanations. The results to this topic of the study have been focusing on identifying smallholder farmers' perceptions on the performance of commercial farming models with respect to sustainability criteria in the study area. This general conclusion will revolve around these results to derive a conclusive answer to the research question in concern.

In making a recap for the results that are derived from the four models of the study, they stand out that, smallholder farmers perceive the performance of the contracted conventional farming model to be higher in ecological criteria followed by social and economic criteria. Under the contracted organic farming model, smallholder farmers perceive the performance of the model to be higher in ecological criteria followed by social criteria while economic criteria indicating the least perceived performance. Moreover, the study concludes that smallholder farmers' perceptions on the performance of the non-contracted conventional farming model is higher in ecological criteria followed by social criteria and economic criteria. With respect to the fourth model, the non-contracted organic farming model, the study concludes that, smallholder farmers perceive the higher performance in ecological criteria followed by social criteria. Economic criteria indicate a lower perceived performance among other criteria in the model.

Reflecting on these results, the convergence or similarity in responses on the perceived performances of the models with respect to sustainability criteria is very explicit. This entails that all models indicate the same responses as far as their sustainability performances are concerned. In this sense, all results in all models respond with the perceived higher performance of the models in ecological criteria followed by social criteria while economic criteria indicating the least perceived performance. This then implies that farmers perceive existence of more practices and initiatives that focus on enhancing ecological welfare in the model compared to other engagements despite their existence. Farmers also perceive a comparatively moderate existence of practices and initiatives that aim at enhancing social wellness in the model. Still, farmers perceive a comparatively lower existence of practices and initiatives that are oriented to enabling economic wellbeing of commercial farming in the model.

The reflection on the above converging cases on the results leads to derivation of a general answer to the research question. This conclusion contends that, performance of commercial farming models is perceived to be higher in ecological criteria followed by social criteria while economic criteria indicate the least perceived performance among models in the study area. Still, this derived conclusion portrays a direct correspondence with the overall results that are generated from a combination of qualitative viewpoints on the research question. These qualitative results are generated from a combined analyses of in-depth ideas, opinions and argumentations that were independently derived from smallholder commercial farming models presented before. The qualitative results that are transformed into quantitative results portray the similar distribution of responses on smallholder farmers’ perceptions on the performance of commercial farming models with respect to sustainability criteria as indicated in Figure 8.5.

Figure 8. 5: Smallholder farmers’ perceptions on the performance of commercial farming models with respect to sustainability criteria



Source: Field research data, (October 2018)

As the distribution of responses are shown in Figure 8.5, there is an indication of smallholder farmers’ higher perceived performance of models on ecological criteria (48.8%) followed by social criteria (30.0%) and economic criteria indicating the least perceived performance. These qualitatively generated results add the significance of the generally derived results on the models as the two sets of results converge.

This discussion brings an intention to inquire deep into the general results portrayed on perceived performances of the models with respect to sustainability criteria in the study area. The intention commences with the higher perceived performance of the model on ecological criteria. Looking on this perception critically, the fact on the existence of variety of commercial farming models whose engagements are related to fostering ecological sustainability in the study area is likely to be associated to the identified perception. By design, smallholder farmers in contracted organic farming and non-contracted organic farming models are engaged in commercial farming practices that need them to take concern on principles that are necessary for organic farming. Many of these farming practices foster ecological welfare in the areas. For example, there is evidence from smallholder farmers in Wikichi farmer group who contend on their abidance to the established guidelines for practicing organic farming by Tanzanice, a company that has contracts with farmers in the group for organic commercial farming. Such are the situations which make farmers to perceive for the higher performance of models with respect to ecological criteria in the study area.

The perceived higher performance in ecological criteria is also contributed by existence of deliberate initiatives and practices that are instituted by relevant authorities, environmental agencies and other agribusiness firms in organic and conventional farming models. The study has revealed existence of deliberate initiatives that are set by the government and local authorities to foster environmental protection in the study area. There are provided exemplar cases of institutions such as district authorities and local governments that enforce farmers' abidance to environmental protection laws and guidelines. Such include protection of water sources, not cultivating along riverbanks, avoiding planting trees that are not environmental friendly and protection of natural and planted forests by not setting fires haphazardly. Other institutional practices are based on responsibilities of authorities such as providing extension services by respective extension officers and other experts in the area.

The identification of practices of private initiatives that foster environmental welfare is an aspect that contributes to the perceived performance of ecological criteria under models. For example, the study has such experiences from smallholder tea farmers in Lupembe and Isoliwaya AMCOS who are operating under the contracted conventional farming model. These farmers contend on their partnership with the Rainforest Alliance which is a global Non-Governmental Organization that fosters forest protection, agricultural growth and promotion of improved social welfare,

livelihoods and human rights. This is an example of formal agencies that work with farmers in any forms of farming systems to promote the welfare goals in the respective areas.

Still, models are endowed with agribusiness firms or companies or initiatives that engage farmers or initiate programs that are oriented to safeguarding the environment. The models include agribusiness initiatives such as the Njombe Agricultural Development Organization(NADO) which is verified to engage in fostering environmental welfare in the non-contracted conventional farming model. The organization is vindicated providing sustainable farming trainings to farmers which include practices like contour farming, manure composting, undertaking soil tests in farms and other such practices that foster environmental protection.

Farmers have expressed the presence of sustainable farming practices that are fostered by agribusiness firms such as Njombe Out-growers Services Company (NOSC) under the contracted conventional farming model. For example, the company is proved to provide facilitation in planting tree hedges in tea farms, facilitation in soil quality testing in farms, facilitation in proper management of solid wastes generated in farms, facilitating in managing chemical wastes that are generated in farms and other similar activities. These are among the obvious ecological sustainability practices that are initiated or undertaken by firms, institutions or agencies and engage smallholder commercial farmers in respective models. Through their observations and engagements, farmers perceive the higher performance of models in ecological criteria as indicated in general results of the study.

Regarding the perceived performance of models with respect to social criteria as is indicated in the conclusion of the study, more experiences that build the perception are linked to the healthcare, safety, security and social welfare of farmers in models. Smallholder farmers' access to healthcare, safety, security and social welfare is indicated to be a challenge in models. Undesirably, many commercial farming models indicate lack of captivation of farmers access to these services. The low perceived performance of the models with respect social criteria are likely contributed by farmers' perceive on the lack of captivation of social welfare services by their respective models. The study has indicated existence of many smallholder farmers groups in models who opt personal or group enhanced mechanisms to foster access to healthcare, safety, security and social welfare. Taking examples that were expressed by farmers on this matter, Wikichi Farmer Group members contend on farmers taking personal responsibilities for their

healthcare. Farmers from Kichiwa and Matiganjola AMCOS confirm to establish group funding mechanisms for supporting members healthcare and social welfare needs.

Also, the perceived performance of commercial farming models with respect to social criteria indicated in the general results is related farmers safety enhancement at work. The study has verifications of initiatives that are taken by the firms in fostering safety of farmers in commercial farming models. Taking as a justifying example, smallholder farmers in Iboya and Lwangu Farm Blocks under contracted conventional farming model are protected from the hazards of lightning and thunder to befall on them while undertaking farming activities in farms. NOSC company facilitated the installation of lightning and thunder rods in these farm blocks. Also, the company facilitates in managing chemical fertilizers, pesticides and additives and their respective wastes in farm blocks. Also, women farmer members under these groups are exempted from spraying pesticides and additives in farms to safeguard their gender and family roles.

Facilitation of equity to land access and ownership in smallholder commercial farming also features as one of the components that contribute to the perceived performance of models with respect to social criteria. The results portrayed on the criteria are likely to be from what smallholder farmers perceive on the facilitation of equity to land access in some commercial farming models. For example, the verified existence of suitable practices to land access and ownership in block farming system that are facilitated by NOSC company are indications of the perceived social performance in models. All smallholder farmers members in groups of block farms had access to joining the model and are now benefiting on the equitable mechanism of access and owning land in their blocks as it was established by NOSC in partnership with local governments.

Similarly, facilitation of equity to access and own land in smallholder commercial farming is justified with farmers in Madeke MOHAP-COS where smallholder farmer groups are provided with allocations of land for conducting their commercial farming. Due to availability of land in the village, the local authority facilitates for equitable access to land of any farmer and farmer groups that need to access land for farming from the village.

These discussed cases contribute to the moderate smallholder farmers' perceived performance of models with respect to social criteria as reflected from the general results. Greater parts of the practices and initiatives on facilitation of farmers healthcare, safety, security and social welfare portrayed from the findings indicate adoption personal or group-based mechanisms. However,

captivation of other social sustainability practices within models are observed and they are likely to be the contributing factors to the moderate perceived performance of models with respect to sustainability criteria.

Concerning the perceived performance of models with respect to economic criteria, the observed contributing factors within models are much oriented to farm financing mechanism and access to farm inputs. The study provides experiences of challenges in smallholder farmers access to farm financing. Many smallholder commercial farming models are not endowed with mechanisms that captivate farm financing to enable smallholder farmers to increase their investments in commercial farming. In such cases smallholder farmers are observed to either opt for group-based initiatives or financing mechanisms such as forming or joining in SACCOS, internal lending and credit groups, forming Village Community Banks (VICOBA) and the like as means of financing their farming activities.

Examples of smallholder farmers in Kichiwa and Matiganjola AMCOS are among the farmer groups that opt SACCOS financing as a means to access to farm financing. Smallholder farmers in Igongolo AMCOS are among the farmers in models who utilize the Savings and Internal Lending Community (SILC) to finance their commercial farming. Many other smallholder farmer groups formulate informal group and personal saving mechanisms to support their access to funds for extending their commercial farming.

Farmers' access to farm inputs perceived as an economic criteria is contended to be mainly constrained by inputs availability and farmers ability to purchase due to financial constraints. This study identifies existence of cases where smallholder farmers are facilitated to access farm inputs by their contracting companies through institutional mechanisms. Smallholder farmers in Isoliwaya AMCOS, Lupembe AMCOS, Iboya and Lwangu Farm Blocks all under the contracted conventional model justify existence of facilitation in tea farmers with farm inputs on loan basis. Nevertheless, experiences of group-based farm inputs accessing mechanism in smallholder farmer groups is vindicated by farmers in Igongolo and Matembwe AMCOS. Respectively, these farmer groups enhance farmers access to farm inputs through purchasing the inputs as a group and establishing a community shop for selling the inputs. The discussed cases that assert the existence of practices within commercial farming models are among many that lead to the lower perceived performance of the models with respect to economic criteria in the study area.

To conclude, the discussion has made a detailed exploration of scenarios that together with others enlighten the ingredients that make the general results of the study. The results have directly shown the variations in higher, moderate and lower smallholder farmers' perceptions on the performance of models with respect to sustainability criteria. However, the varied perceptions in performances of criteria that farmers portray have been explained with justifications that bring the reality on the perceived performances on the models. The discussion has explored the areas that are perceived to have lower and moderate performances compared to others and the need for interventions. It is in these areas that the study recommends for intervention to enhance a reliable performance of models with respect to sustainability criteria in the study area.

8.9 Summary on the chapter

This chapter has presented answers on a research question that sought to capture the perceptions of smallholder farmers on the performances of commercial farming models with respect to sustainability criteria in the study area. The has begun by explaining the meaning and scope of the term "performance" as it is adopted in the study. The chapter also defined the scope of sustainability criteria that the study adopted. This focused on the triple bottom line dimensions of ecological, social and economic sustainability and their respective criteria. The analyses and explanations of research results on the question from quantitative and qualitative approaches followed to be done. The varied research results were reconciled to develop a single standpoint on the answers to the questions on every commercial farming model.

The conclusions on the results from the assessments in every commercial farming model stand out that, smallholder farmers perceive the performance of the contracted conventional farming model to be higher in ecological criteria followed by social and economic criteria. Under the contracted organic farming model, smallholder farmers perceive the performance of the model to be higher in ecological criteria followed by social criteria while economic criteria indicating the least perceived performance. Moreover, smallholder farmers' perceptions on the performance of the non-contracted conventional farming model is higher in ecological criteria followed by social criteria and economic criteria. On the non-contracted organic farming model, the study concluded that, smallholder farmers perceive the higher performance in ecological criteria followed by social criteria. Economic criteria indicate a lower perceived performance among other criteria in the model.

The chapter made discussions on the research results leading to an aggregation of the results in general results that answer the research question in concern. The general results concluded that, smallholder farmers performance of commercial farming models is perceived to be higher in ecological criteria followed by social criteria while economic criteria indicate the least perceived performance among models in the study area.

Furthermore, the chapter made a discourse on the responses to the results in which the varied levels of performances with respect to sustainability criteria were reflected to empirical justifications to link the perceived performances with the reality. Examples of cases that feed into smallholder farmers' perceptions on performance of models were highlighted. The chapter wrapped up by presenting a summary on the contents of the entire chapter. The next chapter presents summaries of research findings with their respective discussions and conclusions. It presents the contributions of the study to the body of knowledge and makes policy and strategic recommendations.

CHAPTER NINE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS, CONTRIBUTIONS AND POLICY RECOMMENDATIONS

9.1 Introduction

This chapter summarizes and briefly discusses the research findings with their respective conclusions as found in specific research questions. The chapter also makes a general conclusion of the study. In line with the summary, discussions of the findings and conclusions, this chapter also presents the general contribution of the study to the body of knowledge and research. It then presents the policy and strategic recommendations to various actors who have roles to play in enhancing sustainability in smallholder commercial farming in the study area. The latter is a summary of answers to a research question that sought to highlight policy implications and recommendations derived from the research findings. The chapter presents the encountered limitations ending with a summary of what is has entirely presented.

9.2 Summary, discussions and conclusions of research findings

As hinted above, the findings for this study are explained in outcomes that were derived from the analyses of data that was inquired through specific research questions. These findings lead into providing conclusions on the questions that were sought. The summaries of the research findings, the discussions of these findings in reflection to theory and literature and their respective conclusions are explained in the following parts.

9.2.1 Summary on the main theme and research questions of the study

The theme of the research undertaken by this study revolved around finding answers on commercial farming models, smallholder farmers' choices and sustainability in the Highlands Agro-Ecological Zone in Njombe District in Tanzania. The research interest on theme comes this time when the emphasis for transformation of agriculture from subsistence farming to commercial farming is given supreme importance in developing countries for enhancing economic growth and development (Grow Africa, 2014; Vanlauwe et al., 2014; Fan et al., 2013). However, the quest for understanding the concerns that various smallholder commercial farming models take into account to foster sustainability when they undertake commercial farming in their environments is also paramount (Alexandratos and Bruinsma, 2012; Connolly, 2012; De Schutter, 2010; Bruinsma, 2003).

In endeavours to meet the desire for this investigation, this study designed questions that sought answers to theme. The search was led by the main research question which sought to understand the drivers for smallholder farmers to choose specific commercial farming model when they undertake commercial farming. It also sought to understand how various commercial farming models take concerns on sustainability criteria through farmers' considerations of the criteria and models performances with respect to these criteria. The main research question was then clarified by five specific questions. The first questions inquired on different types of smallholder commercial farming models that are practiced in the study area. The second inquired on drivers that influence smallholder farmers to choose specific commercial farming models that are practiced in the study area. The third question asked how smallholder farmers consider sustainability criteria in chosen commercial farming models. The fourth question asked how smallholder farmers perceive the performance of chosen commercial farming models with respect to sustainability criteria. The fifth question sought to derive appropriate policy implications from the findings and provide strategic recommendations to enhance promotion of sustainability in smallholder commercial farming in the study area.

Conceptual methods assisted in finding and postulating answers on the research question which sought to identify different types of smallholder commercial farming models that are practiced in the study area. The answers to other research questions were empirically sought by using in-depth interviews, administration of questionnaires and conducting focus group discussions with target respondents in the study area. The sets of quantitative and qualitative data were analyzed by using respective tools of analysis, the process that was assisted by MAXQDA and SPSS Software. The results from the analyses which entail findings of the study were derived, presented and explained in details in their respective chapters. A summary of findings and explanations on the findings with reflections to theory and literature are presented in the next parts of the chapter.

9.2.2 Summary of findings, discussions and conclusion on research question one

The first research question carried the theme of types of smallholder commercial farming models that are practiced in the study area. Inquiries in search of answers was guided by a postulated framework that combined three concepts which are smallholder farmers organizational forms, smallholder commercial farming contractual mechanisms and smallholder farming systems. Leaving the individual form of farmer organization to selection of group-based farmer

organizational form, the combined concepts resulted into formation of four conceptual models which were then sought through in-depth inquiries from key informant officers in the study area. The study found out that smallholder commercial farming in the study area is practiced in seven categories which are classified into four types of commercial farming models. These four types of models are the contracted conventional farming model, the contracted organic farming model, the non-contracted conventional farming model and the non-contracted organic farming model. The contracted conventional farming model was found to exist in two categories of sub-models. These are the publicly and privately managed contracted conventional farming models. The contracted organic farming model existed in one category of privately managed contracted organic farming model. The non-contracted conventional farming model was found to exist in three categories of sub-models which are the publicly managed non-contracted conventional farming model, and two different privately managed non-contracted conventional farming models. The non-contracted organic farming model existed in one category as the publicly managed non-contracted organic farming model. These seven categories formed the contents of the four types of group based commercial farming models found in the study area.

The models were found to exist as was postulated in the designed conceptual framework. However, the models were found to vary in terms of representation as there are models with varieties of sub-models of representation while others exist without varieties of categories. The differences in numbers of representations portrays the variations in magnitudes of farmers' engagements in specific commercial farming models. In this regard, the non-contracted conventional farming model has indicated the higher percent of 42.8% in its occurrences due to its various sub-models compared to other models. The contracted conventional farming model follows in occurrences with 24.3% and the contracted and non-contracted organic farming models show the least occurrences each indicating 14.3%.

These findings entail more engagements in smallholder non-contracted conventional commercial farming compared to other models. On the other hand, the models with lower percentages of occurrences signify less engagements in smallholder organic farming whether through contractual or non-contractual agreements. The study suggested that the variations in engagements in smallholder commercial farming models are too likely to be the contributing factors to the variations in ecological, social and economic sustainability responses that are indicated in findings in other research questions of the study.

The findings of the study on this research theme portray the various commercial farming models as contents of the action situation in the study area. The combined Institutional Analysis and Development and Social Ecological Systems (IAD-SES) Framework defines an action situation as a set of actors who interact when undertaking activities and processes with the aim of achieving different goals and outcomes. It stipulates rules which require actors' reasoning when making decisions and choices (McGinnis and Ostrom, 2014; Epstein et al., 2013; Cole et al., 2014; McGinnis, 2011; Ostrom, 2011). The distinct interactions and outcomes in smallholder commercial farming activities within models define the action situation and their respective sustainability outcomes as they are examined and portrayed by the study.

The higher indications of varied farmers' responses in non-contracted conventional farming and lower indications in contracted and non-contracted organic farming are consistent with the views of other researchers. Bakewell-Stone, (2008) reveals that, market risks, product quality requirements, lack of farmer empowerment and household food security needs discourage farmers to adopt organic farming, hence remain conventional. Eyinade and Akharume, (2018) contend on the non-viability of organic commercial farming due to limited synergy between farmers and actors and low investment in organic farming making farmers to remain conventional. Mgbenka et al., (2015) identify that, lack in organic farming technical knowhow, lack of standardization in organic substance and lack of markets for organic products cause many farmers to remain conventional. These exemplar cases among others decrease farmers' intentions to engagement in organic farming despite its potentialities in developing countries. This leads to prevalence of conventional farming mechanisms than organic farming despite other factors as this study found out.

In a nutshell, this study concludes that, smallholder commercial farming is undertaken in seven categories which are classified into four types of farming models in the study area. These four commercial farming models are the contracted conventional farming model, the contracted organic farming model, the non-contracted conventional farming model and the non-contracted organic farming model. The models vary in magnitudes of farmers' engagements indicating others to have more categories of engagements and the others having lower engagements. The variations are likely to contribute to differences in ecological, social and economic sustainability responses that are explained as findings in other research questions in this study. Despite these variations, the models reveal to be effectively managed and organized and they make great

potentials for partnerships between farmers and actors. This state can contribute to promotion and development of ecological, social and economic sustainability in smallholder commercial farming in the study area.

9.2.3 Summary of findings, discussions and conclusion on research question two

The second research question of this study carried a theme concerning drivers that influence smallholder farmers' choices of specific commercial farming models in the study area. The inquiries to access data for answering this question were guided by seven proposed factors that indicated the possibility of influencing farmers' choices. These were conceptually derived from literature and it is from these factors that the influence of farmers' choices on the model were found. The study made an empirical examination on the applicability of these factors. The study also gave an option for respondents to identify other factors that were not among the identified factors but seem to influence their choices of the models. The list of factors used in the study are ecological factors, social factors, land use governance factors, actor conditions, political factors, economic factors and other factors.

Following the inquiries of quantitative and qualitative data and their respective analyses on the question, the study found out that, all the identified factors have influences to smallholder farmers' choices of specific commercial farming models in the study area. However, there are variations in findings of the magnitude of influencing factors in every model. Since the data inquiries and analyses used the quantitative and qualitative approaches, the study made reconciliations in cases where there were divergences in results.

Basing on models, the findings to every specific commercial farming models are concluded that:- Smallholder farmers' choices of the contracted conventional farming model are mainly influenced by land use governance factors, other factors and economic factors. Smallholder farmers are mainly influenced by social factors, other factors and ecological factors in choices of the contracted organic farming model. Nonetheless, ecological factors are identified to be secondary in influencing farmers to choose the model as they are pre-conditions for farmers to remain in the specific commercial farming model. On the other hand, the study found out that, smallholder farmers' choices of the non-contracted conventional farming model are mainly influenced by economic factors, social factors and land use governance factors in the study area. Furthermore, the study found out that, smallholder farmers' choices of the non-contracted organic farming model are mainly influenced by other factors, land use governance factors and

economic factors that prevail in the study area. Although the intension of the analysis is to find answers on the entire question, these specific findings are referred whenever there is a need to derive specific conclusions and policy decisions on specific commercial farming models.

The cross-case assessments and comparison of findings from the specific commercial farming models led to derivation of general findings to answer the research question. These focused on the occurrences of influencing factors in models and the reflections to the general findings from qualitative in-depth discussions obtained from models. These assessments brought the findings that smallholder farmers' choices of commercial farming models are highly influenced by economic factors (35.0%) followed by other factors (22.3%) and land use governance factors (16.5%). Social factors show moderate influences indicated by (12.6%) whereas actors conditions (5.8%), ecological factors (4.9%) and political factors (2.9%) indicate low influences on farmers' choices of commercial farming models in the study area.

The study observed that, smallholder farmers' drivers to choose models due to economic factors are highly contributed by the formal and institutional mechanisms of farm financing that are established in some of the models. These are revealed for example in farm loans facilitation by NOSC to Iboya and Lwangu farmer groups and Ikanga Tea Factory to Isoliwaya and Lupembe farmer groups and the public sector to Ninga farmer groups. Farmers' access to farm inputs from similar agribusiness partners also contributes to the higher economic drivers indicated in the findings. Leaped cost barriers to farmers' land access also contributes to the indicated economic drivers. Examples of such facilitations are also portrayed in Iboya and Lwangu Farm Blocks and Madeke MOHAP-COS.

Concerning other factors, they are observed to imply negative influences as many are claims that farmers do not access in their commercial farming. Such include poor product prices, lack of reliable markets, poor business incomes, lack of partners in business, lack of supportive infrastructure and existence of contractual conflicts in business between parties. An example of business contractual conflicts between Muungano wa Vyama Vya Ushirika Lupembe (MVYULU) and Lupembe Tea Factory was noted to discourage farmers' engagement in tea farming under the contractual conventional farming model.

As indicators of farmers' drivers to choices of commercial farming models in the study area, the higher influences indicated in land use governance factors are contributed by the modalities of facilitating smallholder farmers to access and own land that are established in commercial

farming models. Experiences of land access and ownership facilitation by NOSC in block tea farming and village authority facilitation to Madeke MOHAP-COS farmers and other groups are suitable land use governance mechanisms that attract farmers to join the respective models.

Not least, the study found out that smallholder farmers' choices of commercial farming models are moderately influenced by social factors. Moreover, smallholder farmers' choices of commercial farming models are lowly influenced by actors conditions, ecological factors and political factors in the study area.

The discussed findings on the question concur with the provisions of the combined Institutional Analysis and Development and Social Ecological Systems (IAD-SES) Framework adopted by the study. The framework addresses the links between the tier variables, the pre-existing conditions, the action situation and their associated outcomes in a social ecological system (Cole et al., 2014; McGinnis and Ostrom, 2014). In this regard, the study used the ecological factors, land use governance factors and actor conditions as the first-tier variables and the social factors, political factors, economic factors as the pre-existing conditions in the study.

Reflecting the findings to other literature work, farmers' drive to choose a model due to its financing mechanism concur with the findings by Donkoh, (2019) who explains the strength of farmers' access to credit in influencing the adoption of sustainable farming in Sub-Saharan Africa (SSA). The role played by the government and other private credit institutions in facilitating farm credit access to farmers is highlighted. The same findings also accord to contentions by Poulton et al., (2010) who reveal the positive impacts of incentivizing smallholder farming in farm capital access, inputs and output markets access and technical information access. These incentives reduce the associated transaction costs and therefore ease farmers engagement in farming.

Observations on performance of nucleus out-grower schemes as alternatives to traditional smallholder agriculture in Tanzania by Brüntrup, et al., (2018) accord to findings on other factors. Among others, the authors remark on investors' failure to implement collective compensation and corporate social responsibilities (CSR), delays in workers payments, poor working conditions and lack of information to farmers. These fuel conflicts between the investors and smallholder farmers in the out-grower schemes, a concern that is observed to feature as other factors that influence choices found by this study.

Findings that indicate smallholder farmers being lowly influenced by ecological factors in models choices concurs to the contentions by Pyk and Hatab, (2018) who express farmers' low environmental motivations to choose Fair Trade Certification in coffee farming. The findings also concur to Altenbuchner et al., (2015) who argue on smallholder farmers' lack of motivations to adopt organic farming on environmental or ecological reasons due to their status of poverty. They can adopt the organic farming but not due to environmental reasons.

Concluding on the findings on this research question, this study puts it clear that smallholder farmers' choices of commercial farming models are highly influenced by economic factors. The prevalence in economic factors in influencing the choices are to greater extent contributed by the farm financing and farm inputs access mechanisms that are facilitated by firms or companies or initiatives in some of the model. The modalities of promoting cost reduction to farmers in land access by facilitating land access also indicate to cause the higher occurrences in economic factors. The study also indicates smallholder farmers' choices of commercial farming models are highly influenced by other factors. The occurrences indicated in other factors are shown to have negative influences to farmers' choices of the models. Farmers' complaints on poor product prices, lack of reliable markets, lack of partners in business, poor infrastructure and contractual conflicts in some models discourage the undertake commercial farming in such models.

It is further concluded that, smallholder farmers' choices of commercial farming models are highly influenced by land use governance factors that prevail in the in the study area. These factors are contributed by suitable land access, use and ownership mechanisms that are established in some models. Such include fostered farmers access, use and formal ownership of land to smallholder farmer groups that are facilitated in models. Due to the existing land needs in the area, facilitation of land access creates an incentive for farmers to participate in commercial farming and hence a driver for choices of the models. While social factors indicate to have moderate influences, actor conditions, ecological factors and political factors have very low influences to smallholder farmers' choices of commercial farming models in the study area. Generally, these concluded findings then make grounds for the derived policy recommendations on fostering sustainable smallholder commercial farming in the study area.

9.2.4 Summary of findings, discussions and conclusion on research question three

The theme of the third research question of this study was on smallholder farmers' considerations of sustainability criteria in chosen commercial farming models in the study area. The factors that laid grounds for assessing considerations of sustainability criteria based on the Triple Bottom Line dimensions of sustainability which are ecological, social and economic criteria. Due to quantitative and qualitative approaches that were used in gathering and analyzing data, various cases of divergences in results between the approaches emerged. These were reconciled to attain a single set of results in every model. The results that were derived from specific commercial farming models portray that, smallholder farmers' considerations of sustainability criteria is indicated to be higher in higher social criteria followed by ecological criteria and economic criteria in contracted conventional farming model. The contracted organic farming model indicates smallholder farmers' considerations of sustainability criteria to be higher in ecological criteria followed by social criteria with low concerns for economic criteria. Results further indicate smallholder farmers' considerations of sustainability criteria in the non-contracted conventional farming model to vary slightly with economic criteria being highly considered followed by ecological and social criteria. Under the non-contracted organic farming model, smallholder farmers are indicated with a higher consideration of ecological criteria followed by social criteria with least consideration of economic criteria. These results therefore suit cross case analyses to understand the variations in considerations of sustainability criteria in various commercial farming models. They also create bases for making policy recommendations in order to improve the performance of specific commercial farming models with respect to sustainability criteria.

The results have been used in deriving general findings on the respective research question. With this understanding, the study made cross case analyses and comparisons of the specific results from the commercial farming models. The basis for derivation of the general findings considered the number of occurrences of considered criteria in models. These were also reflected to the general qualitative findings that were derived from opinions and inputs from in-depth discussions with farmers in models. The general findings on the research question therefore indicate that, smallholder farmers' considerations of sustainability criteria is higher with ecological criteria (39.4%) followed by social criteria (31.2%). Economic criteria (29.4%) indicate to be the least considered criteria by smallholder farmers in commercial farming models in the study area.

The leading impression in smallholder farmers' considerations of ecological criteria is contributed by existence of organic farming models that typically foster ecological criteria. Authorities' enforcement and farmers' abidance to laws, principles and by-laws that safeguard the environment also contribute to the indicated impression. Presence of personal and group-based initiatives that foster environmental protection indicate how farmers take concern on ecological sustainability in the area. Such include afforestation programs, adoption of sustainable farming practices in erosion-prone areas and deliberate management of solid wastes in farms. Such are vindicated by farmers through for example planting "Mivengi" trees to retain soil water and "Magwatamali" weeds to control soil erosion. Moreover, where weather and climate information services are not available, farmers' use of their local and indigenous knowledge to forecast weather, rain, drought and assess soil quality. They also buy newspapers, radios and televisions and use them for accessing the services. These signify the concern and need for these services for their sustainable commercial farming in the area.

With farmers' considerations of social criteria, the indicated findings signify to be mainly attributed by farmers establishment of individual or group mechanisms to access healthcare, safety and social welfare services. Uses of SACCOS and VICOBA's funding mechanisms serve for farmers' access healthcare, safety and security services in many commercial farming models. In the similar manner, the findings are also attributed by some farmer groups such as Isoliwaya AMCOS and Lupembe AMCOS who make initiatives to join formal health insurance and security schemes. Concerns for employment creation in commercial farming models attribute to the indicated findings on considerations of social criteria. Farmers in Lupembe AMCOS for example verify the decline in youths engagements in commercial tea farming due to poor prices that tea farmers under the model are currently experiencing.

Yet, findings on considerations of economic criteria are contributed mainly by the modes of farm financing that farmers experience. Low captivation in institutional farm financing in models make farmers to opt personal or group-based financing mechanisms such as SACCOS and internal lending and credit schemes. Also, smallholder farmers' limited to access land due to land use changes in the vicinities of the villages that are closer to Njombe Town verify the indicated findings. These affect farmers' ability to compete in land demand rivalries in their respective areas. Furthermore, the group-based access to farm inputs in commercial farming models contribute to the impression on economic criteria that is indicated in findings. Examples from

Igongolo and Matembwe farmer groups who respectively designed the group farm inputs purchasing and establishing a society shop for selling farm inputs indicate their concerns for lack of formal farm inputs access in commercial farming.

The processes of analysis and attainment of the above discussed findings on the research question are a reflection on the application of the Social Ecological Systems (SES) Framework. This is a component to the combined Institutional Analysis and Development and Social Ecological Systems (IAD-SES) Framework adopted by the study. The findings are a result of assessments of functioning of a complex social ecological system with respect to social, economic and ecological aspects (Cole et al., 2014; McGinnis and Ostrom, 2014; Basurto et al., 2013; Epstein et al., 2013). Interactions of various actors (smallholder farmers in commercial farming models in this sense) in an action situation (the study area) are assessed to see how they take concerns of ecological, social and economic sustainability in their interactions. The findings of this study are outcomes of the interactions in commercial farming models as is also contended by the framework.

Looking from other literature viewpoints, various components of the findings on the research question are reflected. Concerning consideration of ecological criteria through farmers' taking individual initiatives towards environmental protection, these findings concur to what is argued by Thierfelder et al., (2017). The authors verify smallholder farmers' adoption of conservation agriculture through crop rotation, agro-forestry and intercropping in farming activities in Southern Africa. The practices reduce the impacts of climate variability, increase infiltration and reduce evaporation in the area. Nonetheless, the same findings contravene to what is contended by Williamson et al., (2014). The authors reveal land use changes that increased deforestation, land fragmentation, soil denudation and excessive use of water in Rungwe Volcanic Province in Tanzania. These have led to the destructive impacts on natural resources and agro-ecosystems in the area. The contravening findings indicate more quests on what causes farmers in the study area to manage and take concern for ecological criteria different to the other areas.

Social comments on youths' shift from engaging in commercial farming to other business due to poor prices of farm produces concurs to the findings by Bezu and Holden, (2014). The authors contend on youths to migrate from villages to towns in search for better paying jobs. A combination of push and pull factors such as land scarcity, poor farm incomes, poor credit and market insurance contribute to the migrations.

Economic concerns on farmers' access to farm inputs in models where the services are not facilitated concur to opinions by Adjognon et al., (2017). The authors identify farmers who are not contracted or partnered with processors to use the tied credit-output relations, labour-output markets for labour inputs and own non-farm employment savings to access farm inputs. Despite the means, the fact is on farmers who are not serviced with farm inputs to take concern to access farm inputs by using means that see them suitable.

To wind up on the findings, this study affirms smallholder farmers' to have a leading considerations in ecological criteria than others when they undertake commercial farming under various models in the study area. The existence of environmental and ecological safeguarding models in the area contribute to this indication. Also, the observed farmers' compliance to established laws, principles and by-laws and adoption of farming practices that safeguard the environment and the entire ecological system in the area contribute to the impression. These experiences together portray the extent of smallholder farmers' consideration of ecological criteria in the area.

The study also affirms farmers' considerations of social criteria to be moderate compared to other criteria in commercial farming models. Smallholder farmers establishment of individual or group mechanisms to access healthcare, safety and social welfare services indicate their social concerns in their commercial farming. Some cases indicate smallholder farmers to make group initiatives to join formal health insurance and security schemes. Moreover, decline in youths' engagement in commercial farming in the area is an observed concern that is affecting employment creation in commercial farming models. All these actions indicate concerns that smallholder farmers face due to lack in mechanisms that captivate access to social needs in commercial farming models.

With respect to economic criteria, the study affirms existence of low considerations of economic criteria by smallholder farmers in commercial farming models. Low captivation of institutional farm financing in commercial farming models portray smallholder farmers opting personal or group-based means of financing. Smallholder farmers also verify their limited ability to compete in accessing land due to land use changes in some models. Moreover, lack of facilitation in farm inputs access vindicate smallholder farmers opting group-based mechanisms to enable them to access farm inputs. These raised cases indicate smallholder farmers' concerns as initiatives to access the needs for enhancing sustainable economic performance in commercial farming.

Reflecting more on these findings and their respective conclusions, there is a conception that most of the mechanisms that smallholder farmers take in concerns for social and economic sustainability are individual or group based. Many of the taken choices indicate to be grounded on the potentialities of smallholder farmers themselves and their groups or societies. This indicates low captivation of formal and institutional mechanisms that are reliable to enhance social and economic wellbeing in commercial farming models. The understanding of these findings has provided grounds through which policy recommendations to address the gaps for enhancing ecological, social and economic sustainability in smallholder commercial farming models in the study area are made.

9.2.5 Summary of findings, discussions and conclusion on research question four

Smallholder farmers' perceived performance of sustainability criteria in specific commercial farming models in the study area is the theme that was carried by the fourth research question of this study. Ecological, social and economic criteria as Triple Bottom Line dimensions of sustainability formed the basis for evaluating smallholder farmers' perceptions on the performance of the criteria in models. Sets of quantitative and qualitative data that were empirically gathered and analyzed were reconciled into single sets of results in every commercial farming model found in the study area.

The results that were derived from the analyses in models explain variations in farmers' responses on their perceptions on the performance of models with respect to sustainability criteria. These results state that, farmers perceive the performance of the contracted conventional farming model to be higher in ecological criteria followed by social and economic criteria. Under the contracted organic farming model, smallholder farmers perceive the performance of the model to be higher in ecological criteria followed by social criteria while economic criteria indicating the least perceived performance. Moreover, the study found that, smallholder farmers' perceptions on the performance of the non-contracted conventional farming model is higher in ecological criteria followed by social criteria and economic criteria. With respect to the non-contracted organic farming model, the study found that, smallholder farmers perceive the higher performance in ecological criteria followed by social criteria. Economic criteria indicate a lower perceived performance among other criteria in the model.

The models-based analyses on this research question provide an understand of the variations in farmers' perceptions on the performance of models with respect to sustainability criteria. The results form the foundation for making policy recommendations for improvement in performance of specific commercial farming models on sustainability criteria. Besides, the results formed the foundation for deriving the general findings on the respective research question.

In deriving the general findings to the research question, cross case analyses and comparisons of results from the commercial farming models were made in which the number of occurrences of perceived performances with respect to the criteria was also referred. The strength of the findings from the qualitative approach that was used in deriving general findings on the question were as well reflected. The general findings on the research question state that, smallholder farmers perceive a higher performance of models on ecological criteria (48.8%) followed by social criteria (30.0%). Smallholder farmers indicate the least perceived performance of models with respect to economic criteria (21.3%) in the study area.

The perceived higher performance of models with respect to ecological criteria is attributed by presence of organic farming models that by design foster ecological sustainability in the area. For example, commercial organic farming activities found under Tanzanice Agrofood Company create a perception of an appropriate ecologically performing model in the area. The perception is also contributed by existence of government authorities and local authorities that enforce actors' compliance to laws, principles and by-laws that safeguard the environment in the area. Still, existence of private initiatives that foster environmental welfare is an aspect that contributes to the higher perceived performance of ecological criteria under models. Agencies such as the Rainforest Alliance which partner with tea farmers in Isoliwaya and Lupembe AMCOS are experiences of global private initiatives that portray reputable performances of models with respect to ecological criteria in the area. Despite being conventional oriented, companies such as NOSC and agribusiness initiatives such as NADO are also observed to facilitate practices that protect the ecological systems in the area. Such include contour farming, farm hedging, manure compositing, soil testing, weather forecasting and management of solid and chemical wastes. All these portray farmers' recognition of ecological performances in commercial farming models.

Various experiences from the area attribute to the perceived moderate performance of models with respect to social criteria. Cases of village authorities and some private companies partnering with district authorities to facilitate smallholder farmers' equity to access and own land vindicate the social sustainability performances in models. These are for example verified by farmers in Madeke MOHAP-COS and Iboya and Lwangu Farm Blocks. Also, the installations of lightning and thunder rods, managing the use of chemical fertilizers, pesticides and additives, exempting women from spraying pesticides and additives in farms by NOSC are all examples of initiatives to safeguard farmers health and safety when they undertake farming activities. The perceived moderate performance of models with respect to social criteria is also attributed by the modes that farmers use to access healthcare, safety, security and social welfare services in models. Lack of captivation of social welfare services in many commercial farming models make smallholder farmers to opt personal or group enhanced mechanisms to access these services. Such kinds of mechanisms in many cases are informal and un-institutionalized and indicate the limitations in model's facilitation of sustainable social performance in the area.

Additionally, the lower perceived performance of models with respect to economic criteria is attributed by the mode of farm financing that smallholder farmers use in models. A majority of farmers are observed to opt individual or group-based farm financing mechanisms such as SACCOS, internal lending and credit groups and Village Community Banks (VICOBA). Smallholder farmers in Igongolo and Kichiwa AMCOS are among the users of the Savings and Internal Lending Community (SILC) financing facilitated within the model for commercial farming. These are opted due to low captivation in institutional farm financing from institutions or formal arrangements in the area. Mechanisms of farm inputs access in models also contribute to the indicated impression on the perceived economic performances of models. There are experiences of facilitation in farm inputs access which is done by commercial farming contracting companies through institutional mechanisms. For example, tea farmers under the contracted conventional farming model are supplied with farm inputs on loan basis by the contracting firms under the model. Nonetheless, there are experiences of farmers who are not facilitated to access farm inputs in models. These opt for group-based farm inputs accessing mechanisms that are not institutionally facilitated. Existence of un-institutionalized practices lower the performance of the models with respect to economic criteria in the study area.

The inquiries to answer this question and the respective analyses were guided by the combined Institutional Analysis and Development and Social Ecological Systems (IAD-SES) Framework adopted by the study. The question evaluated how the interactions of smallholder commercial farmers in various models function on the basis of ecological, social and economic aspects in a complex social ecological system. These are in line with what the IAD-SES Framework contends (Cole et al., 2014; McGinnis and Ostrom, 2014; Basurto et al., 2013; Epstein et al., 2013). Therefore, the findings of this study on the question are reflections of outcomes that smallholder commercial farming interactions portray as far as the functioning of the interactions with respect to ecological, social and economic aspects are concerned.

The findings of this study are also reflected in other scholarly works undertaken in developing countries. Findings on the perceived higher performance of models with respect to ecological criteria correspond to Bergius et al., (2017) who verify the existence of the Green Resources, the Agrica and EcoEnergy companies as firms that facilitate environmental sustainability and welfare with smallholder farmers and local communities in the SAGCOT agricultural corridor. Nindi et al., (2014) explain the partnership of smallholder farmer groups, local governments and a government institution in implementing an environmental conservation project in the Matengo Highlands. Furthermore, protection of the East Usambara Mountains provides evidence of performances of the national level government initiatives and decisions towards safeguarding important ecosystem corridors as Hall et al., (2014) assert.

Concurring to the findings on smallholder farmers facilitation to land access and ownership, reorienting the traditional land ownership mechanisms fosters equity to land access to disadvantaged women in African societies (Tsikata, 2016). Effective land rent markets foster equity to land access to disadvantaged smallholder youth farmers in Tanzania (Gilbert-Ricker and Chamberlin, 2018). However, Kijima and Tabetando, (2019) further contend that, ownership land access provides more equity to smallholder farming than land renting mechanism.

The mode of farm financing that is indicated in findings concur with literatures that verify barriers that smallholder farmers encounter in accessing formal credit from financial institutions and other formal arrangements (Uronu, 2018; Mmasa, 2017; Stein et al., 2016). The barriers include lack of collateral, low knowledge on credit, distance from financing institutions among others. Instead, farmers resort to access credit from semi-formal and informal mechanisms such as SACCOS, VICOBA, rotational credit savings and other local credit arrangements.

In a nutshell, this study observes a higher smallholder farmers' perception on the performance of smallholder commercial farming models with respect to ecological criteria. This perception is attributed by conditions such as presence of organic farming models that by design foster ecological sustainability in the area. It is also contributed by the observed roles of government and local authorities in enforcing compliance to laws, principles and by-laws that safeguard the environment and the presence of agencies and private companies that foster environmental welfare in the area.

The study also decisively observes a moderate performance of models with respect to social criteria as perceived by smallholder farmers. Cases of farmers' equity to access and own land that are facilitated by village authorities and some private companies contribute to this state. However, the low captivation of social welfare services verified in many models make smallholder farmers to opt personal or group enhanced mechanisms to access these services. Many of these mechanisms are informal and un-institutionalized, a situation that indicates the limitations in facilitation of sustainable social performance by models in the area.

The study also concludes that, smallholder farmers perceive a lower performance of models with respect to economic criteria. This is attributed by the modes of farm financing of which many are individual or group based due to low captivation in institutional farm financing from institutions or formal arrangements. Also, the perception is contributed by the modes of farm inputs access of which many are group based despite existence of some which are facilitated through contractual and institutional mechanisms with agribusiness companies in models.

The general impressions on these findings and their respective conclusions on the question portray the performance of commercial farming models on ecological criteria to base on inclusive mechanisms in which firms or companies or initiatives and smallholder farmers work together to enhance sustainable practices that enhance and promote ecological sustainability in the area. On the contrary, performance of models on social and economic criteria is portrayed to be grounded on mechanisms that are individual or group based. Comparatively, few mechanisms in these criteria are formal, institutional and captivated by commercial farming firms or companies or initiatives that work with smallholder farmers in the area. These insights have formed the bases for which the study made policy recommendations and interventions for enhancing considerable performance of smallholder commercial farming models with respect to ecological, social and economic sustainability in the study area.

9.3 General conclusions on the overall research problem

Drawing from the background information on the problem that led to undertaking this study, the emphasis in transformation of smallholder farming from subsistence farming to commercial farming in developing countries is raised (Grow Africa, 2014; Vanlauwe et al., 2014; Fan et al., 2013). Attached to this emphasis, smallholder farmers' concerns for sustainable choices in their commercial farming is given paramount importance. This is to make sure that the emerging investments in smallholder commercial farming are simultaneous to sustainability practices that enhance sustainable development of farmers and the areas where the investments are operated (Alexandratos and Bruinsma, 2012; Connolly, 2012; De Schutter, 2010; Bruinsma, 2003). That entails, investments in smallholder commercial farming need not to consider economic gains at the expense of other criteria.

The background information indicated the existence of widespread knowledge on sustainability and on the importance of undertaking sustainable choices in smallholder commercial farming in developing countries (Hart et al., 2014a; King and Thobela, 2014; Flint, 2013; Hansmann et al., 2012; SAGCOT, 2012; Wagner and Marcelo, 2009). The research problem of this study aimed to address how the widespread knowledge on sustainability practices and its importance has been contributing to orient smallholder farmers to make or engage in commercial farming choices that consider sustainability in Tanzania. Basing on the findings on the research questions, the general theme of the research problem is discussed to examine the ways in which sustainability orientations are generally expressed in research findings.

Reflecting on the findings on drivers that influence smallholder farmers' choices of commercial farming models, economic factors indicate the higher influences to the choices followed by other factors and land use governance factors. Social factors show moderate influences whereas actors conditions, ecological factors and political factors indicate low influences on farmers' choices of commercial farming models in the study area. Looking on the main influencing factors, they have economic connotations since all aim at enhancing welfares that make farmers to attain economic gains. The indication of farmers to be driven to choose the models under the influence of these factors implies the prevalence of farmers' economic orientations to farming choices over other orientations.

Looking further on the findings of the study on farmers' consideration for sustainability criteria and perceived performance of models with respect to sustainability criteria, there is a consistent match in weights on the criteria between the questions. In these weights, ecological criteria prevail in consideration and performance followed by social and economic criteria in farming models. Nevertheless, the considerations and perceived performances in social and economic criteria indicate to be grounded on individual and group-based mechanisms. Despite the ground, there is an indication of a spread in considering sustainability criteria in models. If commercial farming models could have optimal choices, farmers could choose the optimal and sustainable models. The prevalence in consideration and perceived performance of ecological criteria indicates the orientation of farmers to these practices despite them not being drivers for choices of the models. Also, the intention of farmers to devise individual and group-based mechanisms to avail the social and economic services in case of lack of captivation in models indicate their concern for welfare in these aspects. This state indicates their transformation to sustainable choices and practices in models.

With these arguments it can then be concluded that, there is an indication of transformation of smallholder farmers to consideration of sustainability criteria in commercial farming models despite the prevalence of being driven by economic factors in their choices of over other criteria. The variations in responses on choices imply the understanding that farmers on the importance of other sustainability welfares in their farming models. Enabling more sustainability choices will make more transformation from being driven by economic factors but also being driven by choices that consider economic, social and ecological criteria in the study area.

9.4 Theoretical and empirical contributions of the study

The overall knowledge contribution of this study is based on various aspects that it covers. These include the theoretical contribution, the empirical contribution, contribution of the study to various actors who are involved in fostering sustainable smallholder commercial farming and its contribution to future research. These are explained in details as follows.

This study has made a conceptual review of smallholder commercial farming practices through which various mechanisms that smallholder farmers use to commercialize farming are concerned. In these reviews, farmer organizational mechanisms, contractual mechanisms and farming systems were reviewed and referred in the study. Basing on these conceptual reviews, modeling of a conceptual framework for deriving empirical smallholder commercial farming

models was formulated. This approach contributes to the conceptual knowledge on smallholder organizational forms, contractual mechanisms and farming systems to facilitate analysis of smallholder commercial farming from multiple viewpoints. This can contribute in finding answers to many sustainability challenges that smallholder farmers face in their commercial farming endeavours.

Moreover, this study is built on the theoretical contentions of the combined Institutional Analysis and Development and Social Ecological Systems (IAD-SES) Framework. Various scholarly works have been done by using this framework to explore the sustainable use of common pool resources in social ecological systems in developing economies (Fundi, 2017; McCord et al., 2016). However, there are scant scholarly works that have used the framework to assess sustainability in agriculture and in use of land related resources as common pool resources in an agro-ecological zone that defines a social ecological system in Tanzania. This study has used the contentions of the framework to undertake such an analysis. This contributes to the theoretical knowledge as other similar studies can rely on the operational aspects of the framework with respect to specific studies.

Concerning the empirical contribution of the study, the methodological aspects adopted together with the findings derived by this study provides evidence to the empirical body of knowledge concerning commercial farming models, smallholder farmers' choices and sustainability considerations in social ecological systems in developing countries. The study made references to institutional and social ecological systems theories and identified the empirical commercial farming models in an agro-ecological zone. Using the identified models, the study assessed the responses of farmers on the factors that influence their choices of the models. It also assessed how smallholder farmers consider the ecological, social and economic sustainability criteria in their chosen models. It also assessed the perceptions of smallholder farmers on the performance of models with respect to economic, social and economic sustainability. The findings from these questions add to the empirical body of knowledge on the states of responses to sustainability practices by smallholder farmers commercial farming models in the study area. This knowledge is beneficial to the world of researchers and practitioners as it highlights the actual understanding on the performance of sustainability practices from a specific social ecological system in developing countries.

Furthermore, this study has a strong contribution to various actors who are involved in fostering sustainable development that is based in smallholder commercial farming. These include policy and decision makers, various agencies, agribusinesses, non-governmental organizations and other initiatives that are engaged in smallholder commercial farming. The other category of actors are smallholder commercial farmers in Tanzania. This study contributes knowledge to these groups of actors through the specific recommendations that have been addressed to them. Adoption of the insights by the specific groups will be of great importance to these groups as it will enhance effective performance of smallholder commercial farming in respective areas, an aspect that will be the ultimate contribution of this study to the sector.

Lastly, this study adds value to future research as there are areas that are related to smallholder commercial farming and sustainability that it has not managed to explore provided the limit in resources and scope. Ventures by researchers in these areas will add value and contribute to enhancing sustainability in smallholder commercial farming in developing countries.

9.5 Contribution of the study to future research

This study has provided a contribution to knowledge through its theoretical and empirical grounds as detailed. However, the study has observed several elements that it did not cover and therefore proposes for other research undertakings to find answers on these elements.

This study came across varied responses of smallholder commercial farming models on sustainability but it has not managed to find answers on the tradeoffs of sustainability between models. Despite this study identifying the states of sustainability responses on commercial farming models, comparative analyses to discuss the tradeoffs and highlight the variations in sustainability strengths between models has not been undertaken. This missing analysis can provide a basis for comparing strengths of sustainability practices between models in order to categorize the suitability of models with respect to sustainability criteria. This will enable to make founded recommendations on which models are appropriate for choice.

The other element worth researching is that this study has provided a foundation on sustainability of smallholder farmers commercial farming models practiced in a specific social ecological system in Tanzania. Looking at the nature of the study, it has evaluated on the elements that influence sustainability choices, how farmers consider sustainability in their commercial farming choices and how they perceive the performance of sustainability criteria in their chosen models. These questions are foundations to sustainability of commercial farming practices in the study

area. In order to inquire for the impacts of the observed practices on sustainability in the study area, other studies can be conducted by measuring the actual impacts of various models on sustainability in the area. This can be done by conducting actual measures of the impacts of smallholder commercial farming models on ecological, social and economic sustainability in the study area.

9.6 Recommendations

The research findings, conclusions and respective implications create bases for recommending interventions and actions to be taken to bring impacts on sustainability of smallholder commercial farming in the study area. These recommendations are directed to various actors which include policy and decision makers, agribusinesses, non-governmental organizations, farmer support initiatives and smallholder farmers as explained.

9.6.1 Recommendations to policy and decision makers

The study findings indicate smallholder farmers to be highly influenced by economic reasons in choices of commercial farming models and are there is more of functioning in ecological criteria, moderate functioning of social and low functioning of economic criteria in models. This state of performance leads to various recommendations to policy and decision makers. To contribute in improvement of sustainability in smallholder commercial farming in the area, policy and decision makers are advised to:-

- Strengthen the practicability of mutual land access, use and ownership policies in rural areas. Such include increasing the pace of developing participatory village and regional land use plans and delineation of land reserves for future use to avoid conflicts in current and future land needs.
- Strengthen the enforcement of policies on control and protection of the environment (vegetation, water and land) especially in areas that are prone to be destroyed with environmental degradation through agriculture.
- Develop policies that encourage youths and other groups to engagement in agriculture by including incentives that encourage farmers to engage in agriculture through practices such as farmer incubation programs, land access facilitation, production facilitation and improvement of post-production value chains.

- Facilitation of an enabling environments for agribusiness firms or other investors to accommodate and captivate smallholder farmers health, safety and social security by designing special packages that are suitable to smallholder farmer groups, a majority of whom are disadvantaged to access such schemes.
- Facilitation of the enabling environments for informal and semi-formal credit mechanisms such as SACCOS and SILC to upgrade to formality to enable them to access financing from microfinance and banking institutions. They also need to foster recognition of farmer groups, their collaterals and land title deeds to enable farmers to access credit from formal financial institutions.
- Strengthen the policies to safeguard farmers as parties to contracts due to their low capacity to enter and manage commercial farming contracts to avoid conflicts that emanate from farming contracts.

9.6.2 Recommendations to agribusinesses, NGOs and private farmer support initiatives

Smallholder commercial farming in the study area has indicated gaps related to existing models of commercial farming, drivers that make farmers choose models, the extent of smallholder farmers consideration of sustainability criteria and the perceived performance of models with respect to sustainability criteria. Agribusiness firms, non-governmental organization, and any other private farmer support initiatives can use the gaps as either opportunities for investments or as grounds for mutual facilitation of commercial farming with smallholder farmers. In this respect, these groups are encouraged:-

- To venture more in organic farming as it indicates not yet a strongly tapped investment by agribusinesses and smallholder farmers despite its economic potentials and possibilities in the area.
- To redesign their commercial farming models to mutually cater for business needs at the same time meet the ecological and social needs such as absorbing the large quantities of youths who are unemployed and are not interested to venture in agriculture.
- To venture in captivating smallholder farmers health, safety and social security through tailor made schemes as enablers for them to access health and social security schemes.

- To devise mechanisms that will attract youths and smallholder farmers to engage in commercial farming through mechanisms such as land access facilitation, credit captivation, access to farm inputs and access to markets.
- To establish more ventures in smallholder farmer capacity enhancement in business, investment, legal, safety, security and social welfare matters.

9.6.3 Recommendations to smallholder farmers, smallholder farmer groups and societies

Smallholder farmers have varied responses on the models of commercial farming, the influencing factors for chooses of models and their considerations and perceived performance of models with respect to sustainability criteria as findings indicate. Despite higher performances in some sustainability aspects, there are needs in improving sustainability of their commercial farming. In this regard, farmers and their respective groups or societies are advised:-

- To reorient their commercial farming practices to mutually serve for business needs at the same time meet the current and future ecological and social needs while they undertake commercial farming in various models.
- To dare to incur costs for their health, safety and social security. No agribusiness co-venture will be ready to incur 100% costs for their health, safety and social security. They can adopt in their constitutions the use of formal agencies to join schemes for health, safety and social security while undertaking commercial farming with other agribusiness firms.
- To adopt in their constitutions the development of mechanisms that foster access to farm credit. Such include maintaining strong groups or societies, securing land title deeds, strengthening their local credit facilities such as SACCOS and SILC. This will give them stability to access formal and informal financing facilities.
- To make an overall change in mentality to orient commercial farming as a venture. They need to collaborate with government and other agencies to adopt business skills from production to supply of the products to markets. Such include seeking for business partners, searching for farm financing, negotiating and bargaining, seeking legal help in contracts, looking for markets and other such business practices.

9.7 Limitations of the study

In processes of its undertaking to its completion, this study faces the following details of limitations. There are two major limitations that indicate to confine the replication of the knowledge that is derived from this study. The first limitation that is portrayed by this study is on its contention of smallholder commercial farming models. This study made a conceptual derivation of smallholder commercial farming models after undertaking a literature review. The emanated smallholder commercial farming models were defined through combinations of smallholder farmer organizational forms, contractual mechanisms and farming systems. The use of smallholder commercial farming model concept under this respect is to be understood within the contention that is provided by this study and not to other provided meanings. Adoption of the contention of smallholder commercial farming models as per this study with a generic thinking of smallholder commercial farming models might be deceptive. This fact limits the replication of smallholder commercial farming model knowledge to other models as its meaning is confined to the understanding of this study. However, replication of smallholder commercial farming models knowledge of this study to other areas is possible and applies if the models concerned bear the similar contentions as it is defined by this study.

The other limitation of this study is on the replication of the research findings that is limited by the case study approach which is an agro-ecological zone. This is a specific case that was purposefully chosen for undertaking the study. Despite using mixed methods approach to undertake inquiries and analyses on the questions, the fact of using a case study limits the replication or generalization of findings to other areas which do not have similar characteristics with selected case (Creswell, 2014, Flick, 2014, Tracy, 2013). The quantitative data collected through a survey was not meant for representation of the entire population but was extracted for a random representation of quantitative opinions. Therefore, it limits the representation of the entire population. Nonetheless, transferability of findings from a case study to other study areas that portray similar characteristics is applicable (Guba and Lincoln, 1985 in Flick, 2014; Tracy, 2013). In this case, the adoption of the findings from this study for replication needs to understand the nature of an agro-ecological zone that has been used and it has to understand that the replication of the findings are to be to a case study that depicts similar characteristics to the Highlands Agro-ecological Zone in Njombe District in Tanzania and the context of the study has base on sustainability of commercial farming models in that particular zone.

9.8 Summary on the chapter

This chapter the contents of what is covered in this research thesis. It has presented summaries and discussions of the research findings with their respective conclusions as found in specific research questions. These findings and discussions have been presented on the basis of specific commercial farming models which are thereafter generalized into one whole answer to every specific research question. The general conclusions on every specific research question are summed up that, smallholder farming is undertaken in four types of commercial farming models that are found in the study area. The findings also state that, smallholder farmers are highly influenced by economic factors, other factors and land use governance factors in choices of commercial farming models. Social factors show moderate influences whereas actors conditions, ecological factors and political factors indicate low influences on farmers' choices of commercial farming models in the study area. The study also stated that smallholder farmers' considerations of sustainability criteria is higher with ecological criteria followed by social criteria. Economic criteria indicate to be the least considered criteria by smallholder farmers in commercial farming models in the study area. The part also concludes that smallholder farmers perceive a higher performance of models on ecological criteria followed by social criteria and findings indicate the least perceived performance of models with respect to economic criteria in the study area. From these general findings, the chapter concluded that there are indications of transformation of smallholder farmers to consideration of sustainability criteria in commercial farming models despite the prevalence of being driven by economic factors in choices over other criteria in the study area.

The chapter has also presents the theoretical, empirical and future research contribution of the study. Presentations of policy and strategic recommendations to policy and decision makers, to agribusiness firms, NGOs and other private farmer facilitation initiatives has been done. The chapter highlights the limitations that this study encounters. The chapter ends by summing up all what has been presented in this concluding section.

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APPENDICES

Appendix 1: Research instrument for empirical data collection

THE FIRST COMPONENT:

Guide questions for in-depth interviews with the District Agriculture and Irrigation Management Officer, District Cooperatives Management Officer, Land/Natural Resources Management Officer and Environmental Management Officer in the study area.

Part I: Land use aspects under smallholder commercial farming in the study area explained with respect to the IAD-SES Framework

1. Would you briefly give explanations on what is all about the Highlands Agro-Ecological Zone as a Resource System available in Njombe District?
2. What is the overall coverage of the Highlands Agro-Ecological Zone in the District?
3. What are the prominent resource dynamics in the zone? Which mechanisms do you use to adapt to these dynamics?
4. How is the overall carrying capacity to resource uses within the zone?
5. Would you briefly explain on the agricultural land use system as a resource unit in the zone?
6. How do you explain the interactions between land and other resource units in terms of its strength or weaknesses and vitality or destructive characteristics in the zone?
7. Would you briefly explain on the economic value of land as a resource unit in the zone?
8. Are there any distinctive characteristics of land in the zone? (e.g. special markings or behavioral patterns or any) Explain.
9. What are the authorities that are responsible for land use governance in the zone? Govt., NGOs, Agencies?
10. What type of land use governance structure do you use in the zone? Centrality, connectivity?
11. Would you briefly explain on the land ownership systems practiced in the zone?
12. Would you briefly elaborate on the land use governance rules used in the zone? Operational, Collective choice rules, norms?
13. Which systems do you use in monitoring land use and sanctioning improper land uses in the zone?
14. What is the population of the smallholder farming land users in terms of size and homogeneity attributes in the zone?
15. How do you explain smallholder farmers' socio-economic attributes (economic levels, culture, entrepreneurship, leadership) in the zone?
16. Would you briefly explain how smallholder farmers' land access, land use and dependence have historically been in the zone?
17. Are there any land use norms, social capital or mental models that smallholder farmers have emulated in the zone? Explain.

18. Would you briefly explain on land demand and supply conditions for smallholder farmers in the zone?
19. How are the demographic trends for smallholder farmers' land demands in the zone indicated over time?
20. Would you briefly explain on smallholder farmers' demographic flow in and out of the zone for land access?
21. Are smallholder farmers among the prominent sellers and buyers of land in the zone?
22. Would you briefly explain on the overall ability for smallholder farmers to compete on land markets in the zone?
23. What are the major transaction costs that smallholder farmers encounter on land access in the zone?
24. Are there any land market incentives for smallholder farmers in the zone? Explain.
25. Would you explain on smallholder farmers' land use based economic developments that are prominent in the zone?
26. How does the National/Regional/Local political situation influence smallholder farmers' land use in the zone?
27. Are there any land degrading patterns (land degradation, land pollution, soil erosion) that are affecting smallholder farmers' land use in the zone? Explain:
28. Are there any climate change patterns(drought, floods) that are affecting smallholder farmers' land use in the zone? Explain:

Part II: Interactions within various smallholder commercial farming models in the study's social ecological system

1. May you briefly explain on the different forms of individual based smallholder commercial farming that exist in the Highlands Agro-Ecological Zone in Njombe District?
2. May you briefly explain on the different forms of group-based smallholder commercial farming that exist in the Highlands Agro-Ecological Zone in Njombe District?
3. Would you briefly explain on the institutional or policy land use deliberation (considerations) processes in smallholder commercial farming groups in the zone?
4. Are there any established land apportionment mechanisms (land as a harvested resource unit) to foster group-based smallholder commercial farming in the zone? Explain.
5. What are the major land use conflicts that involve smallholder commercial farmer groups in the zone? Explain.
6. Which mechanisms do you use to resolve the identified land use conflicts in the zone?
7. Are there any specific initiatives for land use investments for smallholder commercial farming groups in the zone? Explain.
8. Are there any specific land use lobbying activities that involve smallholder commercial farming groups in the zone? Explain.

9. Are there any specific self-organizing activities on land use that involve smallholder commercial farming groups in the zone? Explain.
10. Are there any networking activities on land use that involve smallholder commercial farming groups in the zone? Explain.
11. May you briefly explain on the institutional mechanisms that are used in monitoring land use aspects in different types of smallholder commercial farming groups in the zone?
12. May you briefly explain on the institutional mechanisms that are used in monitoring environmental aspects in different smallholder commercial farming groups in the zone?
13. May you briefly explain on the institutional mechanisms used in monitoring social aspects in different types of smallholder commercial farming groups in the zone?
14. May you briefly explain on the institutional mechanisms for evaluating land use, environmental and social aspects under smallholder commercial farming groups in the zone?
15. What policy opinions do you suggest to foster sustainable interactions among different types of smallholder commercial farming groups in the zone?

Part III: Smallholder commercial farming models and sustainability in the study area

1. Would you briefly explain on the extent of engagement of smallholder farmer groups in commercial farming initiatives in the zone?
2. Would you briefly explain on the status of land degradation management under different types of smallholder commercial farming groups in the zone?
3. How are farmers' climatic and ecological information needs met in different types of smallholder commercial farming groups in the zone?
4. How are equity and fair practices between land needs promoted in different types of smallholder commercial farming groups promote in the zone?
5. How are land users' social welfare and safety schemes promoted in different types of smallholder commercial farming groups in the zone?
6. How do the different types of smallholder commercial farming groups facilitate farm labour engagement at the local/regional level in the zone?
7. Would you briefly explain how the different forms of smallholder commercial farming groups meet land market demands in the zone?
8. How are farmers' access to land needs facilitated under different types of smallholder commercial farming groups in the zone?
9. How suitable are farm capital and financing mechanisms in different types of smallholder commercial farming groups in the zone?
10. What are the major challenges that you encounter in endeavors to foster sustainable smallholder commercial farming in the zone?
11. What policy opinions do you propose in order to enhance smallholder commercial farming choices that are considerate to sustainability criteria in the Highlands Agro-Ecological Zone in Njombe District?

THE SECOND COMPONENT:

Guide questions for in-depth interviews with responsible officers in purposefully selected commercial farming firms/companies/initiatives that involve smallholder farmers in the study area

Part I: General information on specifically selected group-based smallholder commercial farming models in the study area

1. What is the name of your commercial farming company/agency/independent initiative?
2. What form of corporation do you belong? A Government entity, a Company, a Private initiative, an Agency, an NGO, an FBO, an Independent Social initiative?
3. When did you start your commercial farming activities with smallholder commercial farmer groups in the Highlands Agro-Ecological Zone in Njombe District?
4. How many groups of smallholder farmers do you currently work with in the zone?
5. Which crops do you grow with smallholder commercial farmer groups in the zone?
6. May you briefly explain on the mode of organizing smallholder commercial farmer groups that you work with in the zone?
7. Would you briefly explain the types of contractual mechanisms that you use in your commercial farming activities with smallholder commercial farmer groups in the zone?
8. Would you briefly explain the farming system types that you use in commercial farming activities with smallholder commercial farmer groups in the zone?

Part II: On specific group-based smallholder commercial farming models and sustainability in the study area

1. Would you briefly explain on the mechanisms that you use in addressing land degradation when you practice commercial farming with groups of smallholder farmers in the zone?
2. Which mechanisms do you use in disseminating climatic and ecological information needs to groups of smallholder commercial farmers that you work in the zone?
3. How does the commercial farming model that you use with groups of smallholder farmers facilitate promotion of equity and fair practices between land needs in the zone?
4. How does the commercial farming model that you use with groups of smallholder farmers facilitate promotion of land users' social welfare and safety schemes in the zone?
5. How does the commercial farming model that you use with groups of smallholder farmers facilitate promotion of farm labour engagement at the local/regional level in the zone?
6. How does the commercial farming model that you use with groups of smallholder farmers facilitate meeting of land market demands by smallholder farmers in the zone?
7. How does the commercial farming model that you use with groups of smallholder farmers facilitate smallholder farmers' access to land needs?
8. Would you briefly explain on the capital and financing mechanisms that you use when working with smallholder commercial farmer groups in the zone?

9. What are the major challenges that you encounter in your endeavors to effect sustainable smallholder commercial farming in the zone?
10. What do you suggest to enhance smallholder commercial farming practices that are considerate to sustainability criteria in the zone?

THE THIRD COMPONENT:

Themes used to guide Focus Group Discussions (FGD) with smallholder commercial farmer group representatives from specific commercial farming models in the study area

Part I: General information on selected group-based smallholder commercial farming models in the study area

1. Name of the farmer group and its meaning
2. Name of the commercial farming company/agency/initiative that the group works with
3. Establishment of the group(when) and main reasons for its establishment
4. Location aspects of group members (e.g. same village, street etc.)
5. Beginning of the partnership with this company
6. Brief leadership and organization structure of the group
7. Current number of members, gender distribution and variations in numbers over time
8. Group members' land ownerships types
9. Average farm size that members own
10. Other crop types and main crop that farmer groups cultivate within this company
11. Type(s) of contractual mechanisms used in commercial farming activities with the current company. Contracted, Non-contracted
12. If contracted, the types of contractual agreements, implementation, monitoring and sanctioning mechanisms
13. Specific crop farming system(s) that the company uses with smallholder commercial farmers

Part II: Checking for drivers of smallholder farmers' choice of specific commercial farming models in the study area with respect to the IAD-SES Framework

1. **Ecological factors:** Control of land destruction patterns, coping with climate change risks, related climatic and ecological services
2. **Social factors:** Equity and fair practices on land access, ownership and use, land use safety, security and wellness schemes, farm-based employment creation.
3. **Governance system factors:** Form of land use governance, land ownership systems, land use governance rules, land use monitoring and sanctioning mechanisms
4. **Actor conditions:** Land users' population attributes, land users' socio-economic attributes, actors' influence on land access, actors' land access and use history, land resource dependence by actors

5. **Political factors:** Individual/group political orientation and land use, local political climate and land use, national political climate and land use.
6. **Economic conditions:** Managing land markets demand-supply conditions, mitigation of land markets price volatility, suitability of farm capital and financing structures
7. **Other factors:** The researcher has to probe for farmers to identify other possible drivers (factors) that are not within the list.

Part III: Smallholder commercial farmers’ consideration of TBL sustainability criteria in specific chosen commercial farming model in the study area

1. Land degradation

Availability of land degradation control, land pollution control, soil erosion control practices while undertaking farming activities.

2. Climatic and ecological services to land use

Availability of land use suitability assessments (fertility, water and diseases), flood susceptibility awareness provision, drought resilience awareness provision and overall climate change resilience information services provision.

3. Equity and fair practices on land needs and use

Enhanced equity to land access, equity to land tenure/ownership, provision/availability of equal opportunities to land use.

4. Social wellness and safety schemes on land use

Land users health care captivation, land users’ safety support, land users’ social security and welfare schemes and programs.

5. Land use and employment creation

Opportunities for farm employment creation, youths employment and absorption and casual farm employment creation.

6. Demand-supply status for land markets

Facilitation to land access, ownership and use, mitigation of land price volatility to enhance/support smallholder farming.

7. Capital and financing structures for smallholder commercial farming

Availability of reliable land access financing structures, financing access to farm inputs, available non-cash capital structure, access to other farm loans.

Part IV: Perceived performance of smallholder commercial farming models with respect to TBL sustainability criteria in the study area

1. After focus group discussions on drivers and consideration criteria for smallholder farmers’ choices of commercial farming models, a follow-up discussion will be done to examine smallholder farmers’ perceived performance of their chosen commercial farming models with respect to sustainability criteria in the study area
2. The same list of 3BL sustainability criteria(Part III) used for the discussions.

THE FOURTH COMPONENT:

A questionnaire for gathering quantitative data from a sample of smallholder commercial farmers selected from groups of specific commercial farming models in the study area

Part I. Basic individual, demographic, institutional, social and economic characteristics information of smallholder commercial farmers selected from groups of specific commercial farming models in the study area

1. General information
 - Questionnaire Number.....
 - Date of Interview.....
 - District.....
 - Ward.....
 - Village.....
2. Respondents individual information
 - 2.1 Name of the respondent :(Optional).....
 - 2.2 Sex of the respondent
 - Male [.....] Female [.....]
 - 2.3 Age of the respondent
 - 18 - 25 Yrs. [.....] 26 - 35 Yrs. [.....]
 - 36 - 45 Yrs. [.....] 46 - 55 Yrs. [.....]
 - Above 55Yrs [.....]
 - 2.4 Marital status of the respondent
 - Single [.....] Married [.....]
 - Divorced [.....] Widowed [.....]
 - 2.5 Respondent's level of education
 - No formal education [.....] Primary education [.....]
 - Secondary education [.....] Tertiary education [.....]
 - 2.6 Respondent's main activities for earning livelihood: (**Tick any appropriate**)
 - Formal employment [.....] Self-employment [.....]
 - Crop farming [.....] Livestock keeping [.....]
 - Non-farm business [.....] Others (Specify).....
3. Respondent's land ownership and use
 - 3.1 Under which form of ownership do you possess your land?
 - Inherited [.....] Bought [.....]
 - Leased [.....] Borrowed [.....]
 - Shared ownership [.....] Other forms (Specify).....
 - 3.2 What size of land do you own?
 - Less than 1 acre [.....] 1 - 5 acres [.....]
 - 6 - 10 acres [.....] 11 - 15 acres [.....]
 - More than 15 acres [.....]
 - 3.3 What size of land do you cultivate in one season?
 - Less than 1 acre [.....] 1 - 5 acres [.....]
 - 6 - 10 acres [.....] 11 -15 acres [.....]
 - More than 15 acres [.....]

- 3.4 Which among the following main crops do you cultivate during the season?
(Tick any appropriate)
- | | | | |
|----------------|---------|----------------|---------|
| Maize | [.....] | Sorghum | [.....] |
| Tea | [.....] | Irish potatoes | [.....] |
| Sweet potatoes | [.....] | Pyrethrum | [.....] |
| Beans | [.....] | Sesame | [.....] |
| Fruits | [.....] | Vegetables | [.....] |
- Other crop (Specify).....
- 3.5 Which among the following is the main crop that you cultivate for commercialization during the season? **(Tick one)**
- | | | | |
|----------------|---------|----------------|---------|
| Maize | [.....] | Sorghum | [.....] |
| Tea | [.....] | Irish potatoes | [.....] |
| Sweet potatoes | [.....] | Pyrethrum | [.....] |
| Beans | [.....] | Sesame | [.....] |
| Fruits | [.....] | Vegetables | [.....] |
- Other crop (Specify).....
4. Respondent's commercial farming under a specific commercial farming model
- 4.1 When did you join the smallholder commercial farming model that you belong?
- | | | | |
|-----------------------------|---------|-----------------------------|---------|
| Less than 5 years ago | [.....] | Between 6 and 10 years ago | [.....] |
| Between 11 and 15 years ago | [.....] | Between 16 and 20 years ago | [.....] |
| More than 20 years ago | [.....] | | |
- 4.2 Which mode of commercial farming did you shift/leave from to the current?
- | | | | |
|----------------------------|---------|-----------------------|---------|
| Individual mode of farming | [.....] | Group mode of farming | [.....] |
|----------------------------|---------|-----------------------|---------|
- Others (Specify).....
- 4.3 How do you explain the structure of managing groups in the farming model that you belong?
- | | | | |
|-----------------|---------|---------------------|---------|
| Well-structured | [.....] | Flexible | [.....] |
| Still informal | [.....] | Other(Specify)..... | |
- 4.4 Which areas have you contracted out in your currently chosen commercial farming model? **(Tick any appropriate)**
- | | | | |
|---------------------------|---------|------------------------------|---------|
| Access to farmland | [.....] | Access to farm inputs | [.....] |
| Access to farm technology | [.....] | Access to extension services | [.....] |
| Farm financial supports | [.....] | Sales support | [.....] |
| Access to markets | [.....] | Other (specify)..... | |
- 4.5 How do you explain the structure of monitoring the contractual agreements in the farming model that you belong?
- | | | | |
|-----------------|---------|---------------------|---------|
| Well-structured | [.....] | Flexible | [.....] |
| Still informal | [.....] | Other(specify)..... | |
- 4.6 How do you explain the structure of enforcing sanctions in breached contractual agreements in the farming model that you belong?
- | | | | |
|-----------------|---------|---------------------|---------|
| Well-structured | [.....] | Flexible | [.....] |
| Still informal | [.....] | Other(specify)..... | |
- 4.7 Which type of farming system(s) do you use in your currently chosen commercial farming model?
- | | | | |
|-----------------------------|---------|------------------------|---------|
| Conventional farming system | [.....] | Organic farming system | [.....] |
| Mixed farming systems | [.....] | Other (specify)..... | |

Part II: Drivers for smallholder farmers’ choices of specific commercial farming models in the Highlands Agro-Ecological Zone in Njombe District

1. The listed factors below are possible drivers for smallholder farmers’ choices of commercial farming models in the Highlands Agro Ecological Zone in Njombe District. Against each factor are response alternatives. Tick(√) **only one** response that you identify to be relevant to you against each factor.

No.	Stated Factor	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.1	The mode of land degradation, land pollution and soil erosion control drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	The adopted form of resilience to droughts and floods drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Provision of climatic and ecological information services to smallholder farmers drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Enhanced smallholder farmers’ equity to land access, tenure and use drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5	The captivation of smallholder farmers’ healthcare, safety and social security drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6	I choose this smallholder commercial farming model because of its potential contribution to farm employment creation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7	I choose this smallholder commercial farming model because of its facilitation in provision of social services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8	The adopted land use governance system drive me to choose this commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9	The established forms of land access and ownership drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10	Rules and norms set to govern land use drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11	I choose this smallholder commercial farming model because of its land use monitoring and sanctioning mechanisms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12	I choose this smallholder commercial farming model because many smallholder farmers in the zone choose it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13	The economic, social and cultural homo/heterogeneity with other farmers drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14	My leadership and entrepreneurship tendencies compel me to choose this commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15	My social norms, social capital and mental models drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

No.	Stated Factor	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.16	My dependence on land as source of livelihood impel me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17	My individual or my group political affiliation drive me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.18	My local level political climate drives me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.19	My country level political climate compel me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20	I choose this smallholder commercial farming model because of its ability to aid farmers in land markets demand-supply rivalry in the zone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21	Established mechanisms of financing smallholder farming activities push me to choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Do you have any other factors that you identify to be drivers for choice of your specific commercial farming model in the Highlands Agro Ecological Zone in Njombe District?
Yes [.....] No [.....]
3. If yes, list and rate the level to which each factor is a driver for choice of your specific commercial farming model in the Highlands Agro Ecological Zone in Njombe District (Use the guide table below).

No.	Stated Factor	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part III: Smallholder commercial farmers' consideration of TBL sustainability criteria in specific chosen smallholder commercial farming model in the study area

1. Listed below are sustainability criteria that smallholder farmers consider when they practice farming in different chosen commercial farming models in the Highlands Agro Ecological Zone in Njombe District. Against each criterion are response alternatives. Tick (✓) **only one** response that you identify to be relevant to you against each criterion.

No.	Considered Criteria	Not At All	Very Little	Some What	Very Much	Ex Tremely
1.1	Presence of land degradation control practices is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	I consider presence of control of land pollution practices when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Presence of soil erosion monitoring practices is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Presence of proper land use practices is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5	I consider provision of farm suitability assessments for smallholder farmers when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6	Provision of flood susceptibility awareness to smallholder farmers is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7	Provision of drought resilience awareness to smallholder farmers is my consideration when I choose a smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8	I consider provision of climate change resilience information services for smallholder farmers when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9	Enhancement of smallholder farmers' equity to land access is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10	I consider enhancement of smallholder farmers' equity to land tenure when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11	Provision of equal opportunities to land use to smallholder farmers is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12	Smallholder farmers' health care captivation is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13	Smallholder farmers' safety, security and welfare support is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

No.	Considered Criteria	Not At All	Very Little	Some What	Very Much	Ex Tremely
1.14	I choose this smallholder commercial farming model by considering its suitable conditions it provides to its labour force	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15	I choose this smallholder commercial farming model by considering its contribution to overall employment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16	I choose this smallholder commercial farming model by considering its contribution to casual employment creation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17	Facilitation of smallholder farmers' handling land demand rivalry is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.18	Existence of reliable mechanisms for mitigating land market price volatility is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.19	Facilitation of smallholder farmers' land access, ownership and use is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20	Existence of reliable mechanisms for financing smallholder farmers' access to farm inputs is my consideration when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21	I consider the existence of a non-cash capital structure that supports smallholder farmers when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.22	I consider existence of a reliable farm loan structure that supports smallholder farmers when I choose this smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. What are your opinions on enhancing smallholder farmers' consideration of sustainability criteria in their chosen smallholder commercial farming models in the Highlands Agro- Ecological Zone in Njombe District?

.....

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Part IV: Perceived performance of specific smallholder commercial farming models with respect to TBL sustainability criteria in the study area

1. Listed below are sustainability performance criteria for commercial farming models in the Highlands Agro Ecological Zone in Njombe District. Against each criterion are response alternatives. Tick(√) **only one** response that you identify to be relevant to you against each criterion.

No.	Stated Criteria	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.1	There is control of land degrading practices in our commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	There is control of land polluting practices in our commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Soil eroding practices under our commercial farming model are monitored	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Farm suitability assessments (fertility, water, diseases) for smallholder farmers are conducted in our commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5	There is provision of flood susceptibility awareness to smallholder farmers in our commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6	Drought resilience awareness to smallholder farmers under our commercial farming model is provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7	In our commercial farming model, the overall climate change resilience information services for smallholder farmers is provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8	Equity to land access in our commercial farming model is enhanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9	Smallholder farmers' equity to land tenure in our commercial farming model is enhanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10	Other opportunities to land are equally provided to smallholder farmers in our smallholder commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11	Health care concerns to smallholder farmers under our commercial farming model are captivated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12	Smallholder farmers' safety and welfare support under our smallholder commercial farming model is enhanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13	Smallholder farmers' labour conditions under our commercial farming model are generally suitable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14	Our commercial farming model is an attractive potential for the overall present labour force	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15	Our commercial farming model is a contributing potential to farm employment creation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16	Our commercial farming model is a contributing potential to casual employment creation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17	Volatility of land market prices are mitigated under our commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

No.	Stated Criteria	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.18	Smallholder farmers' land access, ownership and use are facilitated under our commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.19	In our commercial farming model, there are reliable mechanisms for financing smallholder farmers' access to land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20	There are reliable mechanisms for financing smallholder farmers' access to farm inputs in our commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21	There is a dependable non-cash capital structure to support smallholder farmers in our commercial farming model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.22	In our commercial farming model, there is a reliable structure to support smallholder farmers with other farm loans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. What other land use perceptions do you have on the following aspects in the commercial farming model that you have adopted?

Environmental performance.....
.....
Social performance.....
.....
Economic performance.....
.....

3. What other land use opinions do you suggest in order to foster sustainability on the following aspects in the commercial farming model that you have adopted?

Environmental performance.....
.....
Social performance.....
.....
Economic performance.....
.....

Thank you very much for your cooperation

Appendix 2: Clearance letters and research permits used in empirical data collection

2.1 Ethical clearance letter from the Ethics Commission of Carl von Ossietzky Universität Oldenburg used in empirical data collection



CARL VON OSSIETZKY UNIVERSITÄT OLDENBURG - 26111 OLDENBURG

Carl von Ossietzky Universität Oldenburg
Department für Wirtschafts- und Rechtswissenschaften
Prof. Bernd Siebenhüner
26111 Oldenburg

Prof. Dr.-Ing. Andreas Hein

**KOMMISSION FÜR FOR-
SCHUNGSFOLGENAB-
SCHÄTZUNG UND ETHIK**

— **Stellungnahme der Kommission für Forschungsfolgenabschätzung
und Ethik zum Antrag „Commercial Farming Models, Smallholder
Farmers' Choices and Sustainability in the Highlands Agro
Ecological Zone in Njombe District, Tanzania“ (Drs. 78/2018)**

TELEFONDURCHWAHL
+49 (0)441 798 4450

EMAIL
andreas.hein@uni-oldenburg.de

POSTANSCHRIFT
Geschäftsstelle Ethikkommission
Carl von Ossietzky Universität Oldenburg
Carl-von-Ossietzky-Str. 9-11
Gebäude W16A Raum 1-105a
D-26111 Oldenburg

— Sehr geehrter Herr Prof. Siebenhüner,

OLDENBURG, 13.02.2018

— die Ethikkommission hat in ihrer Sitzung vom 20.12.2017 das obige
Forschungsvorhaben eingehend geprüft und ist zu der Auffassung
gekommen, dass das Vorhaben ethisch unbedenklich ist. Am Antrag
beteiligte Personen waren nicht in diese Entscheidung eingebunden.

Die zustimmende Bewertung ergeht unter der Annahme gleichbleibender
Gegebenheiten. Die Verantwortlichkeit des jeweiligen Wissenschaftlers
bleibt im vollen Umfang erhalten.

— Für Ihr Vorhaben wünsche ich Ihnen viel Erfolg.

Mit freundlichen Grüßen

A handwritten signature in blue ink, appearing to read 'A. Hein', is written over a horizontal dashed line.

Prof. Dr. Andreas Hein

2.2 Research permit/clearance from the Vice Chancellor (VC) of the University of Dar es Salaam to the Regional Administrative Secretary (RAS) of Njombe Region

UNIVERSITY OF DAR-ES-SALAAM
OFFICE OF THE VICE CHANCELLOR
P. O. BOX 35091 ♦ DAR ES SALAAM ♦ TANZANIA

General: +255 22 2410500-8 ext. 2001
Direct: +255 22 2410700
Telefax: +255 22 2410078



Telegraphic Address: UNIVERSITY OF DAR ES SALAAM
E-mail: vc@admin.udsm.ac.tz
Website address: www.udsm.ac.tz

Ref. No: AB3/12(B)

Date: 9th March 2018

Regional Administrative Secretary
Njombe Region

RE: REQUEST FOR RESEARCH CLEARANCE

The purpose of this letter is to introduce to you **Mr. Musa Shelembi Nkuba** who is a bonafide staff member of the University of Dar es Salaam and a PhD Student at the University of Oldenburg in Germany. Mr. Nkuba is required to conduct research as part of his PhD studies in Germany.

In accordance with government circular letter Ref. No. MPEC/R/10/1 dated 4th July 1980, the Vice Chancellor of the University of Dar es Salaam is empowered to issue research clearances to staff members and students of the University of Dar es Salaam on behalf of the government and the Tanzania Commission for Science and Technology (COSTECH). I am pleased to inform you that I have granted a research clearance to **Mr. Nkuba**.

I therefore, kindly request you to grant him any help that may enable him achieve his research objectives. Specifically we request your permission for him to meet and talk to the leaders and other relevant stakeholders in your region in connection with his research.

The title of the research is '**Commercial Farming Models, Smallholder Farmers' Choices and Sustainability in the Highlands Agro-Ecological Zone in Njombe District, Tanzania**'.

The period of the research is from **March to October 2018** and the research will cover **Njombe Region**.

Should there be any restriction, you are kindly requested to advise us accordingly. In case you may require further information, please do not hesitate to contact us through the Directorate of Research and Publication, Tel. +255 22 2410500-8 Ext. 2084 or +255 22 2410727 and E-mail: research@udsm.ac.tz.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'William A.L. Anangisye'.

Prof. William A.L. Anangisye
VICE CHANCELLOR

VICE CHANCELLOR
UNIVERSITY OF DAR-ES-SALAAM
P.O. Box 35091
DAR-ES-SALAAM

QUOTATION OF REF. NO. IS ESSENTIAL

2.3 Research permit/clearance from the Vice Chancellor (VC) of the University of Dar es Salaam to the District Executive Director (DED) of Njombe District

UNIVERSITY OF DAR-ES-SALAAM
OFFICE OF THE VICE CHANCELLOR
P. O. BOX 35091 ♦ DAR ES SALAAM ♦ TANZANIA

General: +255 22 2410500-8 ext. 2001
Direct: +255 22 2410700
Telefax: +255 22 2410078



Telegraphic Address: UNIVERSITY OF DAR ES SALAAM
E-mail: vc@admin.udsm.ac.tz
Website address: www.udsm.ac.tz

Ref. No: AB3/12(B)

Date: 9th March 2018

District Executive Director
Njombe District Council
Njombe Region

RE: REQUEST FOR RESEARCH CLEARANCE

The purpose of this letter is to introduce to you **Mr. NMUsa Shelembi Nkuba** who is a bonafide staff member of the University of Dar es Salaam and a PhD Student at the University of Oldenburg in Germany. Mr. Nkuba is required to conduct research as part of his PhD studies in Germany.

In accordance with government circular letter Ref. No. MPEC/R/10/1 dated 4th July 1980, the Vice Chancellor of the University of Dar es Salaam is empowered to issue research clearances to staff members and students of the University of Dar es Salaam on behalf of the government and the Tanzania Commission for Science and Technology (COSTECH). I am pleased to inform you that I have granted a research clearance to **Mr. Nkuba**.

I therefore, kindly request you to grant him any help that may enable him achieve his research objectives. Specifically we request your permission for him to meet and talk to the leaders and other relevant stakeholders in your district in connection with his research.

The title of the research is '**Commercial Farming Models, Smallholder Farmers' Choices and Sustainability in the Highlands Agro-Ecological Zone in Njombe District, Tanzania**'.

The period of the research is from **March to October 2018** and the research will cover **Njombe District**.

Should there be any restriction, you are kindly requested to advise us accordingly. In case you may require further information, please do not hesitate to contact us through the Directorate of Research and Publication, Tel. +255 22 2410500-8 Ext. 2084 or +255 22 2410727 and E-mail: research@udsm.ac.tz.

Yours sincerely,

A blue ink signature of Prof. William A.L. Anangisy.
VICE CHANCELLOR
UNIVERSITY OF DAR-ES-SALAAM
P.O. Box 35091
DAR-ES-SALAAM

Prof. William A.L. Anangisy
VICE CHANCELLOR

QUOTATION OF REF. NO. IS ESSENTIAL

2.4 Researcher's acceptance and introductory letter from the Regional Administrative Secretary (RAS) of Njombe Region to the Njombe District Executive Director (DED)

**JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA**

MKOA WA NJOMBE

Simu Na: (026) 2782912
2782913
Nukushi: (026) 2782914
Barua Pepe: rc@njombe.go.tz
ras@njombe.go.tz
ras.njombe@tamisemi.go.tz
info@njombe.go.tz
Tovuti: www.njombe.go.tz



Ofisi ya Mkuu wa Mkoa
S.L.P. 668
NJOMBE.

Unapojibu tafadhali taja:-

Kumb. Na. AB.301/326/01C/111

22 Machi, 2018

Mkurugenzi Mtendaji,
Halmashauri ya Wilaya,
S. L. P 547,
NJOMBE.

Yah: **UTAMBULISHO**

Tafadhali husika na somo la hapo juu.

Kwa barua hii namtambulisha kwako ndugu Mr. Musa Shelembi Nkuba ambaye ni mwanafunzi kutoka Chuo Kikuu cha Dar es Salaam (UDBS) kufanya utafiti wa andiko lake lenye somo "**Commercial Farming Models, Smallholder Farmers' Choices and Sustainability in the Highlands Agro – Ecological Zone in Njombe District**".

Tafadhali mpokee na kumpa ushirikiano ili aweze kufanya utafiti kwenye eneo lako kuanzia Machi, 2018 hadi Oktoba, 2018.

Natanguliza shukrani kwa ushirikiano wako.


Nuru Mwakisyala

Kny: KATIBU TAWALA MKOA
NJOMBE.

Nakala: Prof. William A. L. Anangisye,
Vice Chancellor,
University of Dar es Salaam,
S. L. P. 35091,
DAR ES SALAAM.

Mr. Musa Shelembi Nkuba,
University of Dar es Salaam,
DAR ES SALAAM.

2.5 Researcher's acceptance and introductory letter from the Njombe District Executive Director (DED) to respective Heads of Departments

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS – TAWALA ZA MIKOA NA SERIKALI ZA MITAA
HALMASHAURI YA WILAYA YA NJOMBE
(Mawasiliano yote yafanywekupitiakwa Mkurugenzi Mtendaji wa Wilaya)

Simu Na.: 026 2782111 Mkurugenzi

Fax Na.: 026 2782857

E-mail: njombedc@yahoo.com

Unapojibu tafadhali taja.



S.L.P. 547,
NJOMBE.

Kumb. Na. NDC/P.20/2/VOL. III/200

22/03/2018


Wakuu wa Idara ya Kilimo,
Ardhi na Maliasili, Afya na Uthibiti wa taka ngumu
S.L.P 547
NJOMBE.

YAH: UTAMBULISHO WA NDUGU MUSA SHELEMBI NKUBA.

Tafadhali husika na mada tajwa hapo juu.

Kwa barua hii namtambulisha kwako mtajwa hapo juu ambaye ni mwanafunzi wa Cho kikuu Dar es Salaam (UDSM) Kufanya utafiti katika Idara, kwa andiko lenye somo: "**Comercial Farming Models, Smallholders farmer Choice and Sustainability in the Highlands Agro-Ecological Zone in Njombe District Tanzania.**"

Tadhali mpokee na kumpa ushirikiano ili aweze kufanya utafiti kwenye eneo lako kuanzia **mwezi Machi hadi Oktoba, 2018.**


Shida Kasebele
KNY: MKURUGENZI MTENDAJI
HALMASHAURI YA WILAYA
NJOMBE

MKURUGENZI MTENDAJI
WA WILAYA
NJOMBE

Nakala:

Musa S.Nkuba

2.6 Example of an introductory letter issued by the Department of Agriculture, Irrigation and Cooperatives in Njombe District for the researcher to access to smallholder farmer groups

HALMASHAURI YA WILAYA YA NJOMBE

Kitengo cha Ushirika,
S. L. P 547,
NJOMBE.
23/08/2018

Mwenyekiti wa Bodi
Chama cha Ushirika cha Kilimo na Masoko MATEMBWE,
S. L. P.....,
NJOMBE.

YAH: UTAMBULISHO WA NDUGU MUSA SHELEMBI NKUBA

Kichwa cha habari hapo juu chahusika

Kwa barua hii namtambulisha mtajwa hapo juu ambaye ni mwanafunzi wa Chuo kikuu cha Dar es Salaam (UDSM) anayefanya utafiti unaohusiana na Mifumo mbalimbali inayotumika katika kilimo Biashara kwenye wilaya ya Njombe.

Kwa kuwa Chama chako ni miongoni mwa vyama vinavyofanya biashara ya mazao tunamtambulisha kwenu mtafiti huyo ili mshirikiane tunaamini utafiti wake utaleta matokea chanya kwenye shughuli zenu, hivyo unaombwa kumpa ushirikiano wa dhati ili kufanikisha utafiti huo.

Pamoja na salamu za ushirika nakutakia utekelezaji mwema
Asante.



Fred D. Mwankusye
Afisa ushirika
Halmashauri ya wilaya ya Njombe

AFISA USHIRIKA WA WILAYA
S.L.P. 9
NJOMBE

Appendix 3: Ethical clearance information sheets and forms used in empirical data collection in Njombe District

3.1 A sample of participants information sheet

EK-Application Musa Nkuba Shelembi 26.01.2018
General information on the study to an FGD participant

1



Carl von Ossietzky Universität Oldenburg
Department of Business Administration, Economics and Law
Chair of Ecological Economics
Prof. Dr. Bernd Siebenhüner

Contact Person for any queries:
Musa Nkuba Shelembi

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Home address:

Alexanderstrasse 150

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General information on the study to a Focus Group Discussion participant

Carl von Ossietzky Universität Oldenburg

Title of the study: Commercial Farming Models, Smallholder Farmers' Choices and Sustainability in the Highlands Agro- Ecological Zone in Njombe District, Tanzania.

Welcome to our study named "Commercial Farming Models, Smallholder Farmers' Choices and Sustainability in the Highlands Agro- Ecological Zone in Njombe District, Tanzania". Thank you for your interest in our study.

In this study, the drivers that influence smallholder commercial farmers' choices of commercial farming models and sustainability consideration in the study area will be determined.

The Focus Group Discussion procedure

The Focus Group Discussion will take approximately two hours per group of a discussion. I would like to ask you to answer my questions to the best of your knowledge and belief. If you have any questions, please don't hesitate to ask me.

Voluntariness and anonymity

Your participation in this Focus Group Discussion is voluntary. You may terminate the participation in this discussion at any time without notice, without incurring any inconvenience. The data, sound records and personal information collected through this interview will be treated with high confidentiality. For example, access of the coding list will be done only by the investigator during data analysis and will be deleted once the study is completed. Confidentiality on these data and recordings must be adhered to and should not be shared to any third parties. Any personal identifications or information of people contacted during the discussion process will not be identified in any publications or reporting.

Privacy policy

Coding list:

The collection and processing of your personal data described above is pseudonymized in the Department of Business Administration, Economics and Law of the University of Oldenburg using a number and without stating your name. There is a code list on paper that associates your name with the number. The coding list is only accessible to the experimenter and the project manager; that is, only these people can associate the collected data with my name. The coding list is kept in a lockable cabinet and will be destroyed on 30th September 2019, the planned date of completion of the study. Your data is then anonymized. This will make it impossible for anyone to associate the collected data with your name. The anonymous data will be stored for at least 10 years. As long as the coding list exists, you can request the deletion of all data collected by you. Once the coding list has been deleted, we can no longer identify your record. Therefore, we can only meet your request for deletion of your data as long as the coding list exists.

3.2 A sample of participants form for the declaration of consent

EK-Application Musa Nkuba Shelembi 26.01.2018
Declaration of consent for in-depth interviewees

1



Carl von Ossietzky Universität Oldenburg

Department of Business Administration, Economics and Law
Chair of Ecological Economics
Prof. Dr. Bernd Siebenhüner

Contact Person for any queries:
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Declaration of consent for in-depth interviewees

Carl von Ossietzky Universität Oldenburg

Title of the Study: Commercial Farming Models, Smallholder Farmers' Choices and Sustainability in the Highlands Agro- Ecological Zone in Njombe District, Tanzania

I (Name of the participant) _____ have been informed about the study and the interview procedures. I agree to participate in this interview. If I had any questions about this envisaged study, they have been answered completely and to my full satisfaction by Musa Nkuba Shelembi.

With the described collection and processing of the data gathered through an interview, I am informed that sound recordings are made. The recording and evaluation of the data is done anonymously using a personal codeword that I created myself and that only I know. That is, nobody is able to associate my data with my name. The coding list is only accessible to the experimenter and will be deleted after completion of the study. There is a very low probability that a person involved in the data analysis will recognize me. For this reason, all persons involved in the evaluation are subject to absolute secrecy and under no circumstances may they disclose confidential information to third parties.

I know that I can revoke my consent to the storage or storage of this data without incurring any disadvantages. I have been informed that I can request a deletion of all my data at any time. However, if the code list is already erased, my record can no longer be identified and therefore cannot be deleted. My data is then anonymized. I agree that my anonymized data may continue to be used for research purposes and remain stored for at least 10 years.

The consent form for the sound recording is voluntary. I can revoke this statement at any time. In the event of refusal or resignation, there are no costs or other disadvantages for me. However, participation in the study is not possible.

I had enough time for a decision and I'm ready to work on the interview and participate in the study. I know that participation in the study is voluntary and I can terminate participation at any time without giving reasons.
I have received a copy of the participant information about the study and a copy of the declaration of consent. The participant information is part of this declaration of consent.

Place, date & signature of the participant:

Place, date & signature of researcher:

Participant's name in block letters:

Researcher's name in block letters:

3.3 A sample of participants form for the revocation of consent



This revocation of consent form will be kept by the researcher for his records

Name of the Faculty: Faculty of Computing Sciences, Business Administration, Economics and Law

Name of Project Leader: Prof. Dr. Bernd Siebenhuner

Contacts: bernd.siebenhuener@uni-oldenburg.de

Name of Researcher: Musa Nkuba Shelembi

Faculty of Computing Sciences, Business Administration, Economics and Law

Department of Business Administration, Economics and Law

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Title of the study: Commercial Farming Models, Smallholder Farmers' Choices and Sustainability in the Highlands Agro Ecological Zone in Njombe District, Tanzania

Revocation of Consent to Participate in filling a questionnaire

I(Names) hereby voluntarily withdraw my consent to participate in filling a questionnaire for the above titled research study that is being conducted by Musa Nkuba Shelembi, a PhD student of the University of Oldenburg, Germany.

Participant's signature / Thumb print

Date

Researcher's signature / Thumb print

Date