

# Agricultural investments for development in Tanzania: reconciling actors, strategies and logics?

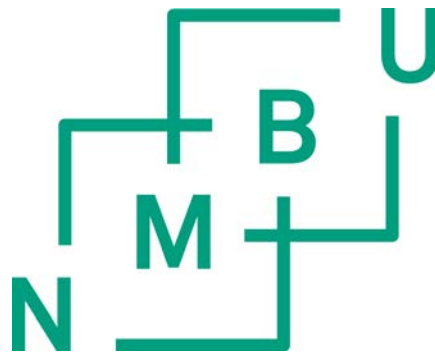
Landbruksinvesteringer for utvikling i Tanzania: aktører, strategier og logikker

Philosophiae Doctor (PhD) Thesis

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## Table of contents

Acknowledgements .....	iv
Summary .....	vi
Sammendrag .....	vii
1. INTRODUCTION .....	1
1.1 Approaching agricultural investment for development.....	2
1.2 Problem statement.....	3
1.3 Situating the study.....	3
1.4 Objectives and research questions .....	4
1.5 Structure of the thesis.....	6
2. THEORETICAL FRAMEWORK.....	7
2.1 The contested terrain of development.....	7
2.2 Development as modernization and economic growth .....	8
2.3 Development as ‘freedom’ and capabilities.....	9
2.4 Tanzania’s post-independence development trajectory .....	9
2.5 Environmental, land-use and sustainability concerns .....	12
2.6 OG schemes: theory and practice.....	14
2.7 OG schemes: reconciling actors, strategies and ‘logics’?.....	18
2.8 Aspects of development explored in the thesis .....	22
3. METHODOLOGY .....	30
3.1 Philosophical and methodological foundations of the thesis .....	30
3.2 Research strategy and design .....	33
3.3 Study sites description .....	34
3.4 Research timing and access.....	39
3.5 Methods and data collection .....	41
3.6 Data analysis and validity considerations .....	47
3.7 Positionality, reflexivity and ethical considerations .....	48
4. SUMMARY OF THE PAPERS .....	52
5. DISCUSSION .....	57
6. CONCLUSIONS.....	63
7. REFERENCES .....	66

## **PART II** Compilation of papers

Paper I. West, J. and R. Haug. Forthcoming. “Polarized narratives and complex realities in Tanzania’s Southern Agricultural Growth Corridor”. *Development in Practice* 27(4). DOI: 10.1080/09614524.2017.1307324.

Paper II. West, J. “Combining external and internal agro-investments for development in Tanzania”. Submitted to *Forum for Development Studies* on October 13, 2016.

Paper III. West, J. and R. Haug. “The vulnerability and resilience of ‘inclusive’ agro-investments in Tanzania”. Revised and re-submitted to *Journal of Eastern African Studies* on March 6, 2017.

Paper IV. West, J. 2015. “Can linking small- and large-scale farmers enhance adaptive capacity? Evidence from Tanzania’s Southern Agricultural Growth Corridor”. In: Inderberg, T.H., Eriksen, S., O’Brien, K. and L. Sygna (eds). *Climate Change Adaptation and Development: Transforming Paradigms and Practices*. New York: Cambridge University Press. ISBN: 978-1-138-02598-1. Chapter 8, pp 139-160.

Paper V. Aaheim, A., West, J. and A. Orlov. 2016. “National and local perspectives on adaptation strategies in Tanzania's agricultural sector”. In: Kulindwa, K. A., Silayo, D., Zahabu, E., Lokina, R., Hella, J., Hepelwa, A., Shirima, D., Macrice, S., and S. Kalonga (eds). *Lessons and Implications for REDD+: Implementation Experiences from Tanzania*. CCIAM-SUA, Morogoro, Tanzania: E&D Vision Publishing Ltd. ISBN: 978-9987-735-53-2. Chapter 3, pp 41 – 64.

## **List of figures**

Figure 1. Map outlining the location of the study sites

## **List of tables**

Table 1. Overview of similarities and differences between MSE and KPL

Table 2. Characteristics of interviewed households in Lungo and Mkangawalo villages

Table 3. Overview of the fieldwork activities

## **Appendices**

Appendix 1. Interview guides, Mkangawalo and Lungo Villages

Appendix 2. Approved Errata

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## Summary

Agricultural investments carry opportunities and risks for smallholders, rural communities, and the environment. This thesis investigates the potentials and limitations of smallholder-inclusive agricultural investments in Tanzania as a development strategy through an in-depth study of private sector-led efforts to develop commercial partnerships between smallholders and large agricultural estates in Tanzania's Southern Agricultural Growth Corridor (SAGCOT). Drawing on a multiple methods, nested case study approach, the thesis investigates how smallholders and nucleus estates in two 'outgrower' (OG) schemes, a form of contract farming that is promoted within SAGCOT, are navigating their relationships in practice and explores what implications this has for smallholder livelihood vulnerability and resilience, and agricultural investment, risk management, and climate adaptation strategies at different scales. The thesis comprises five separate, but interrelated, papers that draw on and combine insights from the literatures on contract farming and OG schemes, sustainable rural livelihoods, rural vulnerability, resilience and adaptive capacity, and responsible and inclusive agro-investment governance. The findings show that it is difficult to reconcile the different actors, strategies and development logics and paradigms that OG schemes combine in practice. There is inherent complexity, including potential trade-offs and conflicting values and interests in agro-investments that combine public- and private sector actors, small- and large-scale farmers, and normative development goals. Variations in the contracted crops and their markets, the agro-ecosystems in which they are grown, and in the ownership structure, level of smallholder voice, and types of risks and rewards that small- and large-scale producers in the two schemes face challenge generalized assumptions about their potentials and limitations as a development strategy. While national policies and strategies promote OG schemes as part of a linear agricultural 'modernization' strategy aimed at increasing agricultural productivity and profitability, the findings show that smallholders engage in OG production as part of their efforts to diversify and secure their livelihoods and reduce their vulnerability to risks and uncertainties. The findings moreover raise questions about the viability and sustainability of the nucleus estates connected to the schemes, about the 'theory of change' that underpins their promotion as a development strategy, and about the state's ability and willingness to enforce a level playing field for responsible and inclusive agricultural investment. Taken together, the findings show that OG schemes are part of a more dynamic and complex smallholder development pathway than what is envisaged in national strategies and plans.

## Sammendrag

Landbruksinvesteringer medfører både muligheter og utfordringer for småbrukere, bygdesamfunn og miljøet. Denne avhandlingen ser på mulighetene og begrensningene ved å inkludere småbønder i landbruksinvesteringer som en del av Tanzanias utviklingsstrategi. Avhandlingen undersøker dette gjennom en dybdestudie av tiltak ledet av privat sektor for å utvikle kommersielle samarbeid mellom småbrukere og store landbrukseiendommer i Southern Agricultural Growth Corridor (SAGCOT) i Tanzania. Ved hjelp av kombinerte metoder, altså en nestet kasusstudie-tilnærming, undersøker avhandlingen hvordan små og store bønder i to «outgrower»- (OG)-ordninger (en form for kontraktlandbruk som promoterer innenfor SAGCOT) styrer forholdene seg imellom i praksis. I tillegg utforskes hvilke implikasjoner dette har for småbrukere når det gjelder levebrødets sårbarhet og robusthet, samt risikostyring og investerings- og klimatilpasningsstrategier på ulike skalanivåer. Avhandlingen består av fem selvstendige, men relaterte artikler som bygger på og kombinerer momenter fra litteratur som omhandler kontraktlandbruk og OG-ordninger, bærekraftige rurale levebrød, rural sårbarhet, robusthet og tilpasningskapasitet, samt ansvarlig, inkluderende styring av landbruksinvesteringer. Funnene viser at det er vanskelig å forene de ulike aktørene, strategiene og utviklingslogikkene og -paradigmene som OG-ordningene i praksis kombinerer. Det er en iboende kompleksitet, som innebærer mulige kompromiss og motstridende verdier og interesser i landbruksinvesteringer som kombinerer offentlig-private samarbeid, små- og storbønder og normative utviklingsmål. Variasjoner i de kontraktfestede avlingene og markedene for disse, i landbruksøkosystemene som de dyrkes i, hvorvidt småbøndene får en stemme, og typene risikoer og belønning som små og store produsenter i de to ordningene møter, utfordrer generaliserte antakelser om muligheter og begrensninger i en slik utviklingsstrategi. Mens nasjonale retningslinjer og strategier fremmer OG-ordninger som en del av en lineær «moderniseringsstrategi» for å øke produktiviteten og lønnsomheten i landbruket, viser funnene at småbønder bruker OG-produksjon som en av flere måter for å diversifisere og sikre levebrødet sitt og redusere sårbarheten for risiko og usikkerhet. I tillegg reiser funnene spørsmål om levedyktigheten og bærekraftigheten til de store landbrukseiendommene tilknyttet ordningene, om «endringsteorien» som ligger til grunn for å fremme dem som utviklingsstrategi og om statens evne og vilje til å håndheve rettferdige vilkår for ansvarlig og inkluderende landbruksinvestering. Sammen viser funnene at OG-ordninger er en del av en mer dynamisk og



kompleks utviklingsvei for småbrukere enn det bildet som er dannet i nasjonale strategier og planer, tilsier.



## 1. INTRODUCTION

This thesis investigates the potentials and limitations of smallholder-inclusive agricultural investments in Tanzania as a development strategy. Agriculture constitutes a cornerstone of rural livelihoods and development policies and efforts in Tanzania (URT 2011, URT/MAFC/NAP 2013, URT 2016). If directed properly, investments in agriculture hold the potential to strengthen rural livelihoods, enhance rural incomes and food security, and contribute to national economic development efforts. Yet agricultural investments may also heighten social and economic inequalities, exacerbate vulnerability to climate change, and undermine the ecological basis upon which agricultural development and investment depend (URT/MAFC 2014). While much academic attention, in Tanzania and internationally, has been directed at agricultural investments that involve large-scale commercial land acquisitions in an era of ‘land grabbing’ (Zoomers 2010, Borras et al. 2011, Havnevik et al. 2011, Nelson et al. 2012), smallholder farmers are the main investors in agriculture worldwide (HLPE 2013). Understanding and overcoming the investment barriers that smallholders face and enhancing their capabilities to invest in their own agriculture is therefore considered to be an urgent development priority (Committee on World Food Security 2014). While the form, content, and poverty-reducing impacts of agricultural investments targeting smallholders for development are debated (Hazell et al. 2010, Oya 2010, Collier and Dercon 2014), smallholder-inclusive agricultural investments are promoted in Tanzania as part of private sector-led efforts to modernize and transform the country’s agricultural sector. In particular, outgrower (OG) schemes, a form of contract farming (CF) that combines agricultural production and processing by a large-scale ‘nucleus’ estate with production by smallholders on their own land, are widely promoted as part of efforts to increase agricultural productivity and enhance rural livelihoods and incomes in breadbasket regions of the country (AgDevCo and Prorustica 2011). OG schemes have been promoted as a smallholder-inclusive rural development strategy by different actors, for different crops, at different times, and in various contexts in Tanzania and elsewhere (Oya 2012). However, the diversity of actors and objectives that they combine, contexts in which they are practiced, and ways in which they have been studied leads Oya (2012: 4) to conclude that, contract farming is a site of “ideological and methodological struggles” and that the development implications of CF “constitute contested ground”.

## 1.1 Approaching agricultural investment for development

Agricultural investment in this thesis refers to the process of *capital formation and accumulation and capability enhancement* in and through smallholder agriculture (HLPE 2013). As a process, it refers first and foremost to the investments that smallholders themselves make in their own agriculture, recognizing that such investments are undertaken as part of dynamic livelihood decisions and contexts that are embedded in and shaped by wider socio-ecological, institutional, historical, political and economic processes (Ellis 1993, Thompson and Scoones 2009). Viewing smallholders as key agents of agricultural investment and acknowledging the dynamic socio-ecological and livelihood contexts within which agro-investments take place, contrasts with a perspective of smallholders as being passive recipients, or even victims, of external agricultural development and investment interventions that are imposed on them in a top-down manner from the outside (Havnevik 1993). By agricultural investment *for development*, the thesis takes the normative perspective that smallholder-inclusive agricultural investments should aim to strengthen rural livelihoods in sustainable and equitable ways (Chambers 1995, HLPE 2013, Committee on World Food Security 2014). This requires going beyond a narrow technocratic and instrumental focus on getting the marketing and technological conditions ‘right’ for smallholders to enhance their agricultural productivity as part of externally conceived agricultural modernization and growth efforts (Kay 2009, Haug 2016). It requires understanding the diverse priorities, values, capacities and needs that motivate smallholder behavior, and the social and political ‘logics’, as well as the economic rationale, for promoting OG schemes as a rural development strategy (Little and Watts 1994). Indeed, while the term ‘investment’ would seem to draw attention to the financial aspects of agricultural investments, and to smallholders as strategic individual or household ‘utility maximizers’, rural livelihood and institutional economic perspectives emphasize that smallholder agricultural production and investment decisions (and human behavior in general) are guided by diverse values, priorities and practical realities (Ellis 1993). These relate inter alia to ensuring household food security, reducing livelihood vulnerability and enhancing resilience to climatic and marketing uncertainties and risks and strengthening identity, cultural capital, capabilities, autonomy and well-being (Netting 1993, Scoones 1996, Chambers 2012, Coulthard 2012). Smallholders are moreover not only ‘outgrowers’; they are part of households, communities and societies that may have different goals and rationalities than maximizing agricultural productivity, profits or individual ‘utility’.

## 1.2 Problem statement

A range of agricultural development strategies have been implemented in Tanzania in the past. These have included ‘incremental’ and ‘transformational’ approaches that focused variously on improving smallholder farming practices, and moving smallholders into large-scale resettlement schemes and exposing them to ‘modern’ mechanized farming practices (IBRD 1961).

Agricultural development and investment efforts have also been characterized by different mixtures and levels of state, donor and market involvement (Haug 2016). However to date these efforts have not succeeded in enhancing agricultural productivity, reducing rural poverty or increasing the sustainability and resilience of rural livelihoods (Ellis 2006, Maghimbi et al. 2011, Pauw and Thurlow 2011, Coulson 2013). OG schemes, which combine small- and large-scale agricultural production, public- and private-sector investment, and economic, social and sustainable development objectives, constitute a potential ‘middle ground’ approach to meeting a range of normative development objectives. However, the actors, strategies and ‘logics’ that are combined in these schemes are arguably rooted in particular development paradigms. This thesis investigates the problem of to what extent agro-investment approaches that combine diverse actors, interests and normative development objectives can strengthen rural livelihoods and contribute to sustainable and equitable development.

## 1.3 Situating the study

An important policy backdrop motivating the study of agricultural investments for development in Tanzania is the current agricultural policy context, in which the private sector is considered to play an increasingly important role in the country’s agricultural development efforts (Coulson 2012, Haug 2016). In recent years, and in line with the Tanzanian government’s ‘Kilimo Kwanza’ (Agriculture First) declaration, major public-private partnership investment initiatives have been initiated in breadbasket regions of the country with the goals of bringing about a much hoped-for ‘green revolution’ and transforming agriculture into a modern and efficient sector (AGRA 2016, Feed the Future 2016). SAGCOT and Big Results Now (BRN) are prominent examples of these efforts (AgDevCo and Prorustica 2011, URT 2014, Haug 2016). SAGCOT is a large-scale public-private agricultural commercialization partnership that was initiated by former Tanzanian president Kikwete in 2010 and is promoted as a flagship programme of ‘Kilimo Kwanza’ (Cooksey 2013). The proposed SAGCOT region encompasses an area of approximately five million hectares of arable land in the central and southern breadbasket

regions of the country. According to the Prime Minister's Office, SAGCOT aims to bring 350,000 hectares of farmland into commercial production in this region over the coming two decades, raise annual agricultural revenues by US\$1.2 billion and lift 450,000 farm households out of poverty (URT 2013). Big Results Now is modelled after the so-called 'Malaysian development model' and targets multiple sectors, including agriculture. It emphasizes cross-sectoral planning, and employs a 'laboratory' approach to overcome key bottlenecks constraining production and marketing of prioritised crops (URT 2014). Common to the SAGCOT and BRN initiatives and of interest to the topic of the thesis is that they are both heavily promoting OG schemes between small- and large-scale farmers as having 'win-win' potential to reduce rural poverty and contribute to inclusive and sustainable national economic development (AgDevCo and Prorustica 2011, Kikwete 2014, URT 2014).

#### 1.4 Objectives and research questions

The thesis set out to investigate the potentials and limitations of smallholder-inclusive agricultural investments as a development strategy in Tanzania through in-depth research on efforts to develop commercial partnerships between smallholders and large agricultural estates in the region that SAGCOT and BRN are targeting. The objective of this investigation is to identify the role that smallholder-inclusive agro-investments may play in strengthening rural livelihoods, and to explore to what extent agro-investments that combine diverse actors, strategies and development 'logics' can contribute to sustainable and equitable development. Research focused on two large, agricultural estates: Mtibwa Sugar Estates Limited (MSE), which produces sugarcane, and Kilombero Plantations Limited (KPL), which produces rice, and on smallholders living in two villages located adjacent to the estates. Through nested case studies that apply insights from diverse literatures on rural development, the thesis investigates the material and discursive contexts that shape the promotion and performance of OG schemes in particular contexts and identifies processes and factors at different scales that affect their contribution to smallholder livelihoods, risk management strategies, and capacities to adapt to change. The findings draw on 15 months of fieldwork undertaken over a period of 4 years, and address five research questions, which correspond to the five papers that comprise the thesis.

***1. To what extent do the polarized narratives that surround the SAGCOT initiative align with the perceptions and experiences of agricultural investment stakeholders and intended beneficiaries on the ground?***

Debates around agricultural investment in Tanzania are highly contested. This paper investigates and unpacks the controversy surrounding the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) initiative by comparing and contrasting the polarized narratives that characterize SAGCOT debates with the views and perspectives of SAGCOT stakeholders and intended beneficiaries who are experiencing and navigating agricultural investment realities on the ground.

***2. How do external agricultural interventions intersect with smallholders' own agricultural investment strategies, capacities, and priorities and influence their livelihood trajectories?***

OG schemes are promoted as part of a smallholder-inclusive agricultural modernization pathway aimed at increasing agricultural productivity in breadbasket regions of Tanzania. The paper draws on mixed methods research in a village located next to an existing OG scheme and insights from the rural livelihoods literature to show how women and men smallholders engage in external interventions as part of efforts to diversify and secure their livelihoods, reduce their vulnerability to a range of uncertainties and secure meaningful livelihood trajectories.

***3. How do governance and political economy factors shape the vulnerability and resilience of the MSE and KPL OG schemes to risks and uncertainties and affect their viability as a development strategy?***

OG schemes are promoted as a way to overcome the transaction costs and risks that farmers and firms face, and to make large-scale investments in land more inclusive and 'responsible'. The paper combines insights from the literatures on rural vulnerability and resilience, and responsible agro-investment governance to identify how governance and political economy factors shape the division of ownership, voice, risks and rewards in the MSE and KPL OG schemes, the dynamics of vulnerability and resilience in these commercial partnerships, and their viability as a rural development strategy.

***4. To what extent do OG schemes support the adaptive capacities of smallholders and rural communities to climate variability and change?***

Agricultural investments that are undertaken as part of development efforts may enhance or constrain the capacities of smallholders and rural communities to adapt to climate variability and change. The paper draws on insights from the literatures on contract farming and climate

adaptation to analyse the interplay between OG schemes and adaptive capacity at household and community levels in two locations in relation to seven factors: economic resources; risk management; technology; information and skills; infrastructure; institutions; and equity.

### ***5. How do assumptions about smallholder behavior matter to recommendations for adaptation strategies in Tanzania's agricultural sector?***

This paper explores the differences between using macroeconomic indicators, tailored modeling of farmers' behavior and findings from empirical fieldwork to assess climate change vulnerability, impacts and adaptation in Tanzania's agricultural sector. Conclusions about rural households' abilities to adapt to climate change under assumptions that they behave as 'representative agents' are compared with findings from place-based research that examined differences in smallholder access to land and off-farm income in a wider livelihood context.

#### **1.5 Structure of the thesis**

The thesis is based on five scientific papers, including two published book chapters and three journal articles, of which one is accepted for publication and two are under review in peer-reviewed journals. The papers are presented fully in Part II. Part I presents the background, and the theoretical and methodological approaches that are taken in the thesis. The first section of Part I provides an introduction to the research project, states the research problem, objectives and questions, and provides an overview of the theoretical and policy context that motivates the choice of research topic. The second section delves into more depth into the theoretical foundations of debates about agricultural investment and development processes in Tanzania and the promotion of outgrower schemes as a development strategy under current private sector-led agricultural investment efforts. This section also further defines, expands upon and problematizes the core concepts that are operationalized in the individual papers of the thesis. The third section describes the methodological approach that is taken in the thesis, presents the research sites and cases, details the research methods that have been employed and discusses the considerations that have been taken during fieldwork and data collection. The fourth section synthesizes the results of the thesis and discusses the theoretical and policy implications of the findings. The fifth section concludes.



## 2. THEORETICAL FRAMEWORK

The papers presented in this thesis draw upon a range of theoretical perspectives that are situated within the broad fields of international environment and development studies. By addressing five distinct research questions from different analytical perspectives, the papers and the thesis as a whole investigate the potentials and limitations of smallholder-inclusive agro-investments as a development strategy in Tanzania. This opens up for major questions about how ‘investment’, ‘development’, and the relationships between them are conceptualised. In the following section, I will reflect on some of the key theoretical debates that are bound up in the promotion of outgrower schemes as a development strategy in Tanzania. Along the way, I will define, expand upon and problematize further the theoretical and analytical concepts that are employed in the individual papers of the thesis.

### 2.1 The contested terrain of development

A concern with the development implications of smallholder-inclusive agro-investments in Tanzania cuts across the thesis. However, ‘development’ is a malleable theoretical concept and ‘a moving target’ in practice (Hydén 2014). Theories, ideas and practices of ‘development’ have varied over time, in response to changing ideas about what constitutes ‘progress’, ‘well-being’ and ‘the good life’ (Kothari 2005). In his paper ‘On the meaning of development’, Shanmugaratnam (2001: 263) asks:

Why do we time and again, return to the question: ‘what is development?’...it is the failure of what is generally regarded as ‘the development process’ to change the conditions of large numbers of people for the better that compels us to ponder the meaning of development...hidden in the apparently straightforward question of ‘what is development?’ is the question of what development ought to be.

The analysis of development is therefore “inherently a normative and ethical field of study” (Aandahl 2010: 147). ‘Development studies’ arose as a practical field of study in the UK and other countries following the initiation of decolonization processes in many parts of the world at the end of the Second World War (Kothari 2005). However, some scholars locate the evolution of modern development doctrine as ‘intentional social improvement’ further back, seeing it as the product of the social and economic contradictions produced by the rise of 19<sup>th</sup> century industrial capitalist development in Europe (Cowen and Shenton 1996). Seen from the latter perspective, ‘development’ is both a process, and an intentional effort. On the one hand, it refers to the inner logic, or dynamic of the immanent forces of capitalism and the free market, which

has produced historically uneven social and economic impacts. On the other hand, it refers to the intentional efforts by states to secure the well-being of their citizens in response to industrial capitalism's negative impacts (ibid). Ideas of agricultural development – both its goals and the ways to achieve it – are embedded in these debates about what development is and should be. In approaching the topic of smallholder-inclusive agricultural investments in Tanzania, the thesis recognizes that there are differing normative views and theoretical perspectives about what form and direction agricultural investments for development can and should take and how they should proceed (World Bank 2007, Kay 2009, De Janvry 2010, Collier and Dercon 2014). A central tension that is explored in the thesis concerns the conceptualization of OG schemes in national agro-investment initiatives as part of a linear agricultural modernization pathway that aims to strengthen agriculture's role in processes of economic growth and the role that OG schemes play in practice as part of dynamic smallholder livelihoods, farming systems and processes of rural development. These contrasting perspectives reflect different ideas and discourses of development that have influenced Tanzania's post-Independence development trajectory.

## 2.2 Development as modernization and economic growth

'Modern' economic development theory is typically associated with the decades following the Second World War and up until about the 1970s. Under this paradigm, agriculture's role in development was narrowly conceived of as contributing to stable and linear processes of industrialization, modernization and economic growth (De Janvry 2010, Gibbon 2011). In Africa, large- scale plantation agriculture was promoted under colonialism in settler colonies, and is associated with the classical paradigm of development economics that predominated in the post-war period (Gibbon 2011). It was during this period that Walt Rostow published his famously stylized 'stages of economic growth'. Rostow's model conceptualizes economic growth as a linear process that occurs in five sequential stages, through which all countries pass as they evolve along a predictable path from 'traditional societies' that are largely engaged in and dependent on subsistence agriculture (stage one) to highly industrialized societies characterized by 'high mass consumption' (stage five) (Rostow 1990). According to the classical economic development thinking of Rostow's time, agricultural growth was considered to be an instrument for industrialization and structural transformation of countries' economies (De Janvry 2010). The primary role of agriculture in development was to generate an 'investible surplus' for industrial development in the form of labour, lower food prices, foreign exchange and taxes

(ibid: 19). This instrumental, or ‘industrialist’ view of agriculture for development drew on historical experiences in Western countries, and some Asian countries, where it had been observed that industrial revolutions were generally preceded and fueled by agricultural revolutions. The Green Revolution ‘successes’ in many Asian countries were credited as having prevented major famines and initiated processes of industrialization, and further reinforced this view (De Janvry 2010). According to this perspective, a declining share of agriculture in employment and GDP over time are considered signs of successful ‘development’.

### 2.3 Development as ‘freedom’ and capabilities

From the 1960s and 1970s, modernization theory, and Rostow’s model, began to come under heavy critique from dependency theorists such as Andre Gunder Frank and post-development theorists such as Arturo Escobar, who argued that the pursuit of modernization policies served to deepen problems of poverty, inequality and dependency between so-called ‘developed’ and ‘underdeveloped’ countries and regions of the world (Escobar 1995, Kay 2011). Disappointment with the failure of both ‘modernization theories’ and the ‘neoliberal agenda’ to deliver development ‘with a human face’ over the past several decades has led to growing calls for ‘growth with redistribution’ (Harriss, 2005). A focus on development as a bottom-up unfolding of ‘freedoms’, and as a ‘grassroots’ process of empowerment and enhancement of capabilities both through and against the state gained wider acceptance in the last decades of the 20<sup>th</sup> century through the influential writings of development scholars and academics such as Amartya Sen (Sen 1999, Shanmugaratnam 2001). Sen’s ‘capability approach’ underpins the conceptualization of *human development* that has been adopted by the United Nations Development Programme (UNDP) and popularized through its annual ‘Human Development Reports’ (Srinivasan 1994). The capability approach places greater emphasis on individual agency in the development process, while retaining the state’s importance in public service provisioning. It draws attention to the social and human dimensions of development, underscoring that an “expansion of the economy without an expansion of human capabilities is not development, and we may argue that there is negative development when policies contribute to capability failures for some sections of society” (Sen 1981; 1999; quoted in Shanmugaratnam, 2001: 270).

### 2.4 Tanzania’s post-independence development trajectory

Tanzania’s post-independence development trajectory can be described as ‘state-led development’ characterized by efforts to pursue and combine economic modernization and

intentional social improvement (Ibhawoh and Dibua 2003). This approach was heavily influenced by the ideological thinking of Tanzania's first prime minister and president, Julius Nyerere, who led the country from 1961-1985 (Havnevik 2010). Following independence, Tanzania and other African countries pursued policies of state-led modernization in pursuit of agricultural improvement, industrialization and economic growth. However, the 'African socialist' development model pursued in Tanzania under Nyerere, and socialist paths pursued in countries such as Mozambique and Zambia, differed significantly from the modernization pathway pursued by neighboring Kenya (Barkan 1994). There were thus different faces and approaches to development and modernization in Africa that were distinct from western conceptualizations of modernization.

While adopting many of the basic tenets of state-led modernization theory, Nyerere consciously attempted to alter the development path that Tanzania inherited from its former colonial rulers by promoting what he considered to be African socialist ideals of freedom, self-reliance, 'family-hood' and equality (Ibhawoh and Dibua 2003, Saul 2012). These ideals are embodied in the concept of *Ujamaa*, as well as in 'human development' paradigms that gained ground in the 1990s as a normative alternative to a narrow 'economic' framing of development. Nyerere laid out his view of African socialist ideals in the Arusha Declaration, which was adopted by TANU<sup>1</sup> in 1967. In it, he argued that the basis for Tanzania's future development lay in agriculture and in the people of Tanzania. Havnevik (2010:37) notes: 'the focus on food production and agriculture [in the Arusha Declaration] stands out'. He goes on to cite the following passage from the Declaration:

And because the main aim of development is to get more food, and more money for our other needs, our purpose must be to increase production of these agricultural crops. This is in fact the only road through which we can develop our country – in other words, only by increasing our production of these things can we get more food and more money for every Tanzanian.

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<sup>1</sup> Tanganyika African National Union, the political party that was the forerunner to Chama Cha Mapinduzi (CCM). CCM is the major political party in Tanzania that was formed in 1977 through the joining of TANU and the Afro-Shirazi Party of Zanzibar.

(Nyerere, J. 1968: 24, quoted in Havnevik, 2010: 37). To achieve these increases in agricultural production, Nyerere advocated for rural development policies that would combine egalitarian principles that he equated with traditional and pre-colonial village life in Tanzania with the utilization of modern farming methods (Havnevik, 2010: 39). While social advances were made in areas such as rural education and health, and in Tanzania's political unity (Ibhawoh and Dibua 2003), the 'high modernist' and 'utopian' policies associated with Nyerere's post-independence government, in particular the 'villigisation' of more than 70 per cent of Tanzania's population under *Ujamaa*, are widely regarded to have failed in material terms (Scott 1998). Various authors have noted the contradictions that were inherent in the expressed ambitions of Nyerere's philosophy of *Ujamaa*, which promoted "freedom, equality and unity" (Ibhawoh and Dibua 2003: 62) and the ways in which it was implemented in practice (Shivji 1976, Saul 2012, Coulson 2013). Despite these contradictions and the discrepancies between Nyerere's utopian vision for *Ujamaa*, and its implementation and outcomes in practice, there are arguably lessons to be learned from the socialist philosophy and aspirations that underpinned the promotion of *Ujamaa* as an alternative to a neo-liberal development paradigm (Ibhawoh and Dibua 2003, Saul 2012).

The fiscal crisis and debt incurred in the wake of the 1973/74 oil crisis, growing food insecurity, and the mounting costs of public sector-led agricultural and industrial development policies led Tanzania to adopt structural adjustment policies in the 1980s and 90s in order to secure concessional loans from the World Bank and bilateral donors (Bryceson 1999). While successful at achieving greater macro-economic stability, the adoption of structural adjustment policies led to withdrawal of state support for and reduced public spending on agriculture in key areas such as agricultural extension, research, infrastructure, guaranteed inputs and price support (Maghimbi et al. 2011). The adoption of structural adjustment policies exposed rural households to greater agricultural market and price volatility (Cooksey 2011). Output of cash crops stagnated and declined, and processes of 'de-agrarianisation' and 'de-peasantisation' were set in motion as rural households sought to secure and stabilize their livelihoods in a context of growing institutional and market uncertainties (Bryceson 1999, Ellis 2006).

More recently, Tanzania has experienced relatively high economic growth rates averaging about 7% (World Bank 2015). However, growth in GDP has not translated into reduced poverty or

greater food or nutrition security for rural residents (Pauw and Thurlow 2011). Poverty continues to be concentrated in rural areas, smallholders lack access to basic agricultural inputs, infrastructure and credit, agricultural productivity remains low, and land-holdings are small and fragmented (Coulson and Diyamett 2012, World Bank 2015). Public levels of investment in agriculture in Tanzania remain disappointing (Ellis 2006). Under the Comprehensive Africa Agriculture Development Programme (CAADP), Tanzania committed to increase investment in agriculture to 10% of the national budget; however, so far it has yet to achieve and sustain this target. Between 2003/04 and 2012/13, annual investment in agriculture as a percentage of total GDP varied from under three per cent to just above eight per cent, only reaching 10 per cent in 2008 (Hella et al. 2013: 31-32). Lack of public funding and capacities to implement existing agricultural development policies, and changing aid modalities have led the government to see the private sector as a source of needed agricultural investment funds (Cooksey 2013). This is evident in political slogans such as ‘Kilimo Kwanza’ (‘Agriculture First’), and in the development of the Southern Agricultural Growth Corridor (SAGCOT) and Big Results Now (BRN) initiatives, both of which constitute large-scale public-private partnership efforts aimed at attracting greater private-sector investment to the agricultural sector (Haug 2016). It is within this context that private sector-led OG schemes linking small- and large-scale farmers are being promoted as a rural development strategy.

### 2.5 Environmental, land-use and sustainability concerns

Environmental sustainability concerns have become increasingly central to agricultural investment and development debates internationally (IPES-Food 2016) and in Tanzania (Mtengeti et al. 2015, Haug 2016). It is increasingly recognized that agricultural production that relies on high-external inputs can have adverse ecological and climatic impacts (Woodhouse 2010). Climate variability and change are already posing substantial challenges to the livelihoods of smallholders and to the country’s aggregate agricultural production, as recognized in Tanzania’s National Adaptation Programme of Action NAPA and the National Climate Change Strategy (URT 2007, URT 2012). The majority of Tanzanian smallholders produce under rain-fed conditions and are exposed and vulnerable to both fluctuating market prices and to the impacts of variable rainfall on agricultural production (Hella et al. 2011, URT 2011). Future climate change is expected to augment natural climate variability, and have deleterious impacts on crop and livestock production (Thornton et al. 2011, Mtongori et al. 2016). As such, it will act

as a ‘threat multiplier’ (Paavola 2008, URT 2012), exacerbating current patterns of social and economic vulnerability in rural areas, and reducing livelihood options for rural producers (Thornton et al. 2011). The ways in which new agricultural investments interact with and influence existing patterns of land and water use are likely to shape the climate adaptation pathways open to different stakeholders who depend on natural resources (West and Haug Forthcoming). Agricultural investments may also contribute to climate change if they encourage land-use changes that increase emissions of greenhouse gases (Phelps et al. 2013).

Concerns about the potential negative impacts of large-scale commercial farming investments on food security, livelihoods and the environment in African countries have featured high on the international agenda, and attracted a growing body of academic critique (Oxfam 2014). A number of critical studies have highlighted the risks that foreign direct investments in African farmland - often branded as ‘land grabs’ or as ‘green/blue grabs’ pose to smallholder farmer livelihoods, rural communities and the environment (Zoomers 2010, Havnevik et al. 2011, Fairhead et al. 2012, Nelson et al. 2012). These critiques contend that smallholder farmers and rural communities are vulnerable to agricultural investments due to high rates of poverty in rural areas, and to financial and other power inequalities between investors and farmers that may skew the benefits towards investors and the risks towards farmers, rural communities and the environment (Cotula et al. 2009, Paul and Steinbrecher 2013). There exist differing views about how much arable land is available for investment in Tanzania that is not already in use by any right-holders (TNBC 2009, Kaarhus et al. 2010). While it is estimated that public institutions such as military camps and prisons control more than two million hectares of land that is suitable for agriculture (TNBC 2009), this land is not necessarily attractive land, due to its remoteness. Neither is this land necessarily ‘un-used’; in cases where land has lain idle for many years, farmers and livestock keepers may have moved into and settled on the land (Peters 2004). The SAGCOT region is already a site of competing land-uses, including for rain-fed and irrigated agriculture, livestock keeping, wildlife and biodiversity conservation, wetlands, forestry, mining, and other activities (Environmental Resources Management Limited 2012). Smallholder farmers and livestock keepers have been moving into the SAGCOT region from other parts of Tanzania due to its relatively favorable climate and abundant land and water resources. This has led to increasing conflicts over land and other natural resources (Benjaminsen et al. 2009, HAKIARDHI 2009). Agricultural investments therefore have implications for climate adaptation, as well as mitigation, efforts (Lal et al. 2015). Recognition of

these challenges has led to the promotion of ‘climate-smart’ forms of agriculture (FAO 2010), sustainable intensification (Pretty et al. 2011, Conway et al. 2012) and ‘Agriculture Green Growth’ (AGG) within the SAGCOT initiative that are linked to the so-called Green Economy (UNEP 2011, EcoAgriculture Partners 2012). Sustainability concerns have broadened expectations, in Tanzania, as elsewhere, about what kinds of ‘development’ agricultural investments should achieve (De Janvry 2010).

## 2.6 OG schemes: theory and practice

This thesis examines a form of CF known as ‘outgrower’ (OG) schemes. OG schemes have been defined in a variety of ways. In the thesis, they refer to “a system where a central processing unit that is located on a nucleus agricultural estate, purchases the harvests of independent farmers and the terms of the purchase are arranged in advance through contracts” (Baumann 2000: 7).

Experiences with contract farming arrangements in Africa and elsewhere are highly mixed. This mixed picture reflects the diversity of approaches employed to study CF and the different forms that it has taken in different times and places (Oya 2012). CF and OG schemes have been studied from different perspectives and schools of thought. The thesis variously draws upon, critiques and extends salient aspects relating to four distinct perspectives on CF and OG schemes that can be discerned within the literature (Glover and Kusterer 1990, Little and Watts 1994, Oya 2012).

The *technical or commodity-specific approach* emphasizes that the technical characteristics of different crops give rise to different forms of contractual arrangements, production organization and labour regimes (Binswanger and Rosenzweig 1986). According to this perspective, agricultural production relations vary according to whether the contracted commodity is a ‘traditional’ export crop such as tea and sugar, a horticultural product, such as fresh fruit and vegetables, or a staple food crop, such as rice and maize (ibid). In giving primacy to commodity characteristics, this perspective downplays the role that political, social and economic contexts play in shaping contractual relations (Litte and Watts 1994). A second strand of *evaluation studies* of CF undertaken by development practitioners has examined and compiled lessons from cases where donor money was invested (See for example: Tyler and Dixie 2013). These studies take a pragmatic, rather than a theoretical, approach to studying CF relations and seek to derive lessons and recommendations for how to improve their social and economic performance (Glover and Kusterer 1990). A third perspective is associated with mainstream economic, including *new institutional economics* (NIE) approaches, which are concerned with



understanding how to lower transaction costs and address market failures and deal extensively with contract theory (See: Kirsten and Sartorius 2002). NIE perspectives approach contractual relations between farmers and firms as a form of governance or ‘institutional innovation’ aimed at overcoming transaction costs and risks and enhancing economic efficiency and coordination in imperfect markets (Williamson 1985). A fourth perspective, known as the *neo-populist approach* (Oya 2012), or what Glover and Kusterer (1990) refer to as a ‘Food First’ group, encompasses academics and practitioners who are highly critical of agribusiness, advocate food self-sufficiency and employ a pro-smallholder discourse. (See: Little and Watts 1994, Porter and Phillips-Howard 1997). The latter views contract farming as evidence of capitalism’s increasing penetration into the countryside and of ongoing globalization of agro-food systems and agro-industrialization, and places emphasis on understanding the historical, social, economic, and political contexts within which CF takes place and its implications for grower welfare, power relations and autonomy (Little and Watts 1994, Porter and Phillips-Howard 1997).

The mixed picture of CF and OG scheme arrangements in Africa and elsewhere reflects the diversity of analytical approaches employed to study them, described above, and the different forms that CF and OG scheme relations have taken in different times and places (Oya 2012). While diverging in focus and methodological approach, the diverse CF literature suggests that there are at least three rationales, or ‘logics’, for why OG schemes are promoted as a development strategy. First, an *economic logic*, which suggests that CF/OG schemes may help to overcome the transaction costs that smallholder farmers face in accessing agricultural markets, inputs, services and information, and reduce the production and marketing risks that farmers and firms face (Kirsten and Sartorius 2002, Poulton et al. 2008, Mmari 2012). This perspective is associated with mainstream economic and NIE theories described above, and underpinned by a rational choice individualist perspective that sees human action as strategic, and aimed at maximizing individual ‘utility’. Seen from this perspective, contract farming involves a sharing of risk between the buyer and the producers of the contracted crops. Normally, though depending on the pricing policy, the buyer assumes the marketing risks, while the producer bears the risks associated with crop production (including climatic risks). According to this perspective, the rationale, or logic, for contracting, is to increase economic efficiency (Williamson 1985). A

number of studies find that price-setting mechanisms are key determinants of the economic and social viability of a scheme (Glover 1990, Huh et al. 2012). The existence of alternatives to OG production strengthens smallholder farmers' bargaining positions vis-à-vis estates and enables them to cope with uncertain production and marketing environments (Little and Watts 1994). However, the existence of such alternatives may weaken commitment to the contract, undermining the economic viability of a scheme over time.

Second, a *political logic*, which suggests that CF/OG schemes are promoted by states and investors for political reasons. This view aligns to an extent with the 'Food First' arguments outlined above, and with historical and sociological institutionalist perspectives. The latter emphasize the normative and cognitive role of institutions and the power relations and path dependencies that they embody (Vatn 2015: 100). Sociological institutionalism has been influenced by insights from organizational theory, which has addressed the question of why modern organizations may take forms or engage in practices that are not the most economically 'efficient' ones (ibid: 102). Here, sociological institutionalists argue that organizational forms and procedures do not necessarily embody a "transcendent 'rationality'" based on a means-end calculation, but instead reflect "culturally-specific practices" (Hall and Taylor 1996: 946). A number of OG schemes in Africa have been created as 'political projects' connected to state-led efforts to create jobs in remote rural areas or as part of resettlement efforts (Little and Watts 1994). The combination of large- and small-scale farming associated with OG schemes offers a politically attractive alternative to large-scale foreign direct investments in or expropriations of land, such as those historically associated with the plantation system under colonial rule, and with the contemporary phenomena of 'land grabbing' in Tanzania and other countries (Glover 1990, Oya 2012, Tyler and Dixie 2013). Seen from this perspective, OG schemes may offer a way to *legitimize* large-scale investments in agricultural land, and to ensure that such investments are not simple 'land grabs', but also provide social and economic benefits to local communities (Oxfam 2014). From a political economy perspective, OG schemes can also be seen as an economic strategy and opportunity for 'primitive' accumulation by members of the state bureaucracy and well-connected elites (Maghimbi et al. 2011, Coulson 2013). The considerable powers vested in the Tanzanian president to allocate land for national 'development purposes', and the promotion of large-scale commercial farming operations under initiatives such as SAGCOT and BRN create opportunities for formal and informal rent capture and patronage in

connection with the privatization and sale of state-run farms and enactment of large scale land 'deals' (HAKIARDHI 2009).

Third, a *developmental logic* which suggests that incorporating smallholder producers into agricultural value-chains via contractual arrangements can enhance their access to agricultural inputs, technology, training and services (World Bank 2007, Poulton et al. 2008). The logic, or rationale, for assigning a developmental role to OG schemes here varies according to whether contractual relations are seen as a way to lower transaction costs, enhance coordination, increase economic efficiency and profits, and reduce risks (as in NIE perspectives), as a way to reduce political tensions and enhance the social acceptability and legitimacy of large-scale investments in land, or for reasons that have to do with improving grower welfare. Various studies of CF and OG schemes suggest that they may augment smallholder incomes, provide employment, and increase smallholders' voice and empowerment by fostering collective organisations, and attract additional public, private and donor financing in rural infrastructure projects and services (Bellemare 2012, Abebe et al. 2013, Tyler and Dixie 2013). By linking smallholder farmers, through production contracts, to a central buyer or processor, farmers who produce on contract may receive various kinds of assistance (inputs, machinery, credit, harvesting and other services) in exchange for being able to sell their produce at a guaranteed price. Input costs may be deducted from farmers' earnings according to the specifications of the contract (FAO 2013). Comparative scholarship on the welfare effects of CF and OG schemes using panel data series and controlling for locational and self-selection biases indicates that contract farming generally increases the incomes of participants (Warning and Key 2002, Miyata et al. 2009, Barrett et al. 2012, Bellemare 2012, Herrmann 2017). Barrett et al. (2012) however document a high degree of 'non-compliance' on both the farmer, and the firm, side of the contract relationship, as well as frequent entry and exit of farmers and firms. This suggests the fluidity and potential transience of the OG model, and underscores its historical, geographic and social, political and economic contingency. OG schemes have moreover been criticized for their potential to create dependency and to widen economic inequalities within communities and households (Little & Watts, 1994; Porter & Phillips-Howard <sup>¶</sup>, 1997).

The diversity of approaches that have been employed to study CF and OG schemes makes it difficult to draw generalisations about their developmental and social performance, as well as

their political and economic significance (Oya 2012). Whether OG schemes can deliver broad development benefits seems to depend on the specifics of particular schemes. These include the ownership structures, the technical demands of producing and marketing the contracted crops, state of farmer collectivization and bargaining, contractual obligations and rights of participants, pricing policy, macro-economic policies, and levels of trust and transparency in the producer-buyer relationship, which are location and -scheme-specific (Glover and Kusterer 1990, Little and Watts 1994, Porter and Phillips-Howard 1997, Warning and Key 2002). Given the wide reported variation in outcomes of CF and OG schemes, attention has focused on “investigating the economic and institutional conditions for making contract farming an inclusive, fair and transparent process for smallholders” (HLPE, 2013: 6). This includes attention to the conditions under which smallholder-inclusive business models share value with smallholders in terms of ownership, voice, risk and rewards (Vermeulen and Cotula, 2010: 35).

### *2.7 OG schemes: reconciling actors, strategies and ‘logics’?*

OG schemes are interesting from both a theoretical and a practical perspective because they illustrate the multiple actors, interests and logics that are bound up in the promotion of smallholder-inclusive agricultural investments within initiatives such as SAGCOT and BRN and embody some of the key debates about how agricultural investments for development in Tanzania should proceed (West and Haug Forthcoming).

#### *Which strategies?*

One of the most important and debated issues that is bound up in the promotion of OG schemes in Tanzania is whether smallholders, or large-scale, commercial estates, should be the focus of countries’ agricultural investment and development efforts (Hazell et al. 2010, Deininger and Byerlee 2012, Collier and Dercon 2014). This question is addressed in scholarship on the classic ‘agrarian question’, which seeks to understand and explain the historical and current role of peasant agriculture in agrarian and societal transformations in Tanzania and elsewhere (Bernstein 1996, Akram-Lodhi and Kay 2010, Maghimbi et al. 2011, Mueller 2011, Patnaik and Moyo 2011). In theory, OG schemes support the development of both smallholder farmers, and large commercial estates, rather than emphasizing the development of one over the other. Tanzania inherited both small- and large-scale agriculture at Independence (Coulson and Diyamett 2012). Following the Arusha declaration and implementation of *Ujamaa*, “rural development policies revolved around two poles - large-scale agriculture and ranching under parastatals and small-

scale agriculture under villagisation” (Shivji 1998: 9). Post-independence agricultural development strategies centered on both ‘incremental’ and ‘transformation’ approaches (Thomas 1974). The former aimed to improve subsistence smallholder agriculture, while the latter promoted large-scale industrial farming (Coulson 2013). However, as Coulson and Diyamett (2012) note, Tanzania has witnessed some of “the largest failures in large-scale agriculture anywhere in the world” (p.7). The ill-fated Groundnuts Scheme of 1947-51 and the Basotu Wheat Scheme that was implemented with Canadian money in the 1970s and 1980s constitute textbook examples of ‘development gone wrong’ (Allen and Thomas 2000, Coulson 2013). Internationally, smallholder paths of development are increasingly promoted on grounds of both efficiency and equity, and due the importance of the smallholder sector for food security, employment and income in countries that depend on agriculture (Hazell et al. 2010). This view is reflected in Tanzania’s many agricultural and development policies, plans and strategies, which highlight that agricultural investment should include and benefit smallholders<sup>2</sup> (TNBC 2009, URT 2011, URT/MAFC/NAP 2013, URT 2014). However, the promotion of large-scale commercial agriculture and OG schemes that combine small- and large-scale agriculture within SAGCOT and BRN arguably reflects the government’s continued ambivalence as to whether smallholders, or large-scale, agricultural production, should be the focus and engine for Tanzania’s agricultural investment and development efforts.

#### *Which actors?*

The actors, production and investment strategies, development objectives and ‘logics’ that OG schemes combine are arguably rooted in particular development paradigms. In addition to combining small- and large-scale farming, OG schemes combine elements of public- and private-sector investment, and investments by third parties such as donors and NGOs. They thus embody tensions and questions about the desired role and influence of the state, the private sector, civil society, and other development partners, in agricultural investment and development processes. To date, neither the agricultural modernization efforts undertaken by the post-independence developmental state, nor following structural adjustment of the Tanzanian

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<sup>2</sup> The National Bureau of Statistics in Tanzania defines ‘smallholder’ households as those having less than 20 hectares of land under production and/or own between 1 and 50 head of cattle, and or between 5 and 100 head of goats/sheep/pigs. According to the National Sample Census of Agriculture in 2007/08, there were 1006 large-scale farms in Tanzania according to this definition in comparison to six millions small-scale agricultural households in the same census.

economy, have succeeded in reducing rural poverty or inequality (Maghimbi et al. 2011, World Bank 2015). Although OG schemes are currently promoted as part of private sector-led agricultural development efforts in Tanzania, historically, most contract farming schemes in Africa have seen considerable involvement of the state, either in an ownership role, or in a regulatory capacity (Glover 1987, Little and Watts 1994, Oya 2012). This is true of the two large estates examined in the thesis, which were both developed and managed by the public sector before they were privatized and have since attracted additional financing from various third parties to develop their ‘smallholder schemes’. Neither are OG schemes a ‘new’ phenomenon in Tanzania. Sugarcane has been produced by smallholder farmers located near large, previously government-owned, sugarcane estates in Mvomero and Kilombero Districts since Independence, and OG schemes for tea have existed in Rukwa since the early 1960s (Ruthenberg 1968, Maganya et al. 1989). Outside of Tanzania, OG schemes have been established and supported in a number of African, Asian and Latin American countries, often through alliances between post-independence governments, donors and international funding agencies such as the World Bank and the Commonwealth Development Corporation (CDC) (Little and Watts 1994). OG schemes have been promoted as part of resettlement projects and state-run farms under *Ujamaa* and ‘transformation’ agricultural development approaches, and under current privat-sector-led agro-investment initiatives such as SAGCOT. The varied history and the ideological legacies and institutional logics associated with the different development paradigms within which OG schemes have been promoted, challenge NIE and ‘Food First’ perspectives that view contract farming as an instrument or institution of capitalism designed to increase economic efficiency, overcome transaction costs and risks, and integrate smallholders into agro-industrial value chains.

#### *Which logics?*

It is important to acknowledge the tensions between the different ‘logics’ or rationales that are bound up in the promotion of OG schemes as a rural development strategy. These logics relate to the different configurations of state, market and civil society that are embodied in the different development paradigms within which OG schemes have been promoted and theories about what OG schemes are and the rationale for promoting them, which are discussed in Section 2.6. They also encompass assumptions about the nature of institutions and the motivations for human behavior. The thesis adopts a constructivist view of individuals, institutions and society that sees

human action and behavior as ‘multi-rational’, and OG schemes as organizations and *actors* that are embedded in wider institutional and historical structures and processes. This view corresponds to classical institutional economic and historical and sociological institutionalist perspectives on human and organizational behaviour (Vatn 2015). The latter contrasts with rational choice institutionalism, which views human behaviour as strategically aimed at maximizing individual ‘utility’ (Hall and Taylor 1996). From a constructivist institutional perspective, OG schemes are not only or necessarily ‘economically rational’ forms of organization but are also historically embedded social, cultural and political phenomena that reflect diverse interests and power dynamics.

On the production side, OG schemes combine industrial-scale monocrop production on nucleus estates that employ large machinery, hired labour and rely on external agro-chemical inputs, with farming by smallholders. The latter generally engage in diversified agricultural production on small plots of land for both food and income, using few purchased inputs, and relying on household labour (Porter and Phillips-Howard 1997, West 2015). The ‘logics’ and motivations underpinning smallholder and industrial-scale agricultural production are arguably very different (IPES-Food 2016). On the one hand, the desire to maximize production, efficiency and profits, according to the logic of the “market episteme” (McMichael 2009), and on the other, the desire to reduce exposure to risks and secure a stable supply of income and food that matches households’ needs and resources at different times (Netting 1993). Large-scale plantation and settler agriculture was promoted by colonial governments in Tanzania and is associated with the classical paradigm of development economics that predominated in the post-war period and which emphasized agricultural modernization and industrialization aimed at maximizing agricultural production and profitability (Gibbon 2011). Mainstream and new institutional economics perspectives on contracting, which are based on rational choice individualist view that assumes that farmers aim to maximize their individual utility, support this view. This perspective assumes that people act strategically, that their preferences are stable, and that equilibrium outcomes can be attained through market mechanisms of production and exchange (Vatn 2015: 93-94). Viewing large-scale farms, rather than smallholders, as the engine for agricultural modernization efforts rests on an assumption that there exists a conservative, homogeneous and ‘backward’ sector of smallholders producing under ‘equilibrium’ conditions that can and should be transformed through the application of external scientific knowledge,

technology and expertise (Maghimbi et al. 2011, Coulson 2013). This view has prevailed throughout Tanzania's pre-and post-independence history (Iliffe 1979), but fails to acknowledge the considerable knowledge, and local expertise and skills that farmers possess in crafting livelihoods in highly dynamic and uncertain socio-ecological circumstances (Monson 1991, Crane et al. 2011).

While they are currently promoted as part of private sector-led agricultural development efforts, in the past, OG schemes have been promoted as part of state-led rural development and modernization strategies (Glover 1984, Glover and Kusterer 1990, Little and Watts 1994, Oya 2012, Tyler and Dixie 2013). OG schemes therefore arguably embody tensions arising from the different institutional logics (cf. Friedland and Alford 1991, Thornton et al. 2012, Beck et al. 2015) connected to state-led, market-led and more recent, participatory development approaches and paradigms. The current 'development paradigm' in Tanzania can be seen to reflect unresolved tensions between state- and market-led development approaches (Cooksey 2011). The rationale that informs the promotion of OG schemes as part of a modernization strategy that privileges large-scale farms and scientific farming methods aimed at maximizing smallholder agricultural productivity is arguably different than a strategy that aims to harness OG schemes to strengthen smallholder livelihoods and capabilities as part of a 'bottom-up' process of sustainable and equitable development. With these caveats and this background in mind, the thesis extends the literature on the *development* implications of CF and OG schemes by investigating the understudied linkages between engagement in OG schemes and rural livelihood vulnerability, adaptation and resilience in the context of climate and other changes. This focus reflects the increasing centrality of social and environmental sustainability concerns to discourses and debates about agricultural investments for development and what they are expected to achieve, in Tanzania and internationally (De Janvry 2010, AgDevCo and Prorustica 2011).

## 2.8 Aspects of development explored in the thesis

The thesis examines the development implications of selected OG schemes on a number of fronts, including for participating men and women smallholders' livelihood strategies and trajectories (Paper 1, 4 and 5), smallholders' and communities' adaptive capacities to climate change (Paper 4), large estate and smallholder risk management strategies (Papers 3 and 4), and in relation to the debates that surround the SAGCOT initiative (paper 1) and national



assessments of climate change vulnerability, impacts, and adaptation (Paper 5). In the following sections, I will define the various concepts that are employed in the individual papers and describe how they are operationalized in the thesis.

### *2.8.1 Sustainable rural livelihoods*

In line with evolving thinking about the importance of agricultural investment for poverty reduction, the distributional aspects of economic development, and the need for agricultural investments to address sustainability concerns, the thesis takes the normative perspective that agricultural investments for development should strengthen smallholder livelihood capabilities and contribute to sustainable and equitable processes of development (HLPE 2013, Haug 2016). Conceptually, the individual papers in the thesis draw more or less explicitly on a *sustainable rural livelihoods* (SRL) approach that acknowledges the dynamic, heterogeneous, risk-prone contexts and environments within which agriculture and food systems are embedded (Thompson and Scoones 2009). Whether large or small, agricultural producers in Tanzania face numerous risks (Coulson and Diyamett 2012). Climate and market variability, dependence on rain-fed agriculture and high pest and disease pressure on crops and livestock combine with a lack of access in many regions to basic infrastructure and services to increase production and marketing uncertainties for smallholder households (Paavola 2008, Poulton et al. 2010). Unreliable policy signals at the national level compound these uncertainties (Cooksey 2011, Cooksey and Kelsall 2011). Since independence, the agricultural sector has had to deal with frequent institutional and policy changes, most recently the withdrawal of state support to agricultural producers under structural adjustment that has resulted in reduced availability and access to quality agricultural input and extension services in rural areas (Maganya et al. 1989, Maghimbi et al. 2011). These policy changes shape farmers' agricultural production decisions and their decision to diversify into non-farm activities (Bryceson 1999, Ellis 2006).

To deal with these risks, smallholders living in the geographical areas investigated in the thesis combine food production with cash crop production, farm different plots of land, engage seasonally in non-farm activities such as petty trading and short-term migration, combine intensive and extensive forms of crop and livestock production, and grow a diversity of crop types and varieties, rather than specializing in one or two. Doing so enables them to make the best of available resources and to reduce the vulnerability and enhance the resilience of their livelihoods, and to take advantage of livelihood opportunities, one of which is OG schemes.

Agricultural production and investment strategies – including production of OG crops – are adjusted over time and in space. Different varieties of rice are planted in different parts of the same fields and in different plots of land, at different times, in different seasons, and in different ways. Maize is intercropped with legumes, vegetables, fruit trees and medicinal plants in home gardens and outfields, in mountains and hills, along riverways, and on residual moisture in seasonal floodplains. Crop and livestock keeping are combined with petty trading and non-farm activities, including charcoal production, brick making, sale of local brew, fishing, and selling snacks, vegetables and meals from local food stalls at different times of the year. Engaging in diversified production – which may combine elements of agricultural intensification and extensification - and income activities provides households with flexibility to cope with unforeseen events and may reduce food insecurity in the event of crop failure, lack of pastures or food price spikes, and helps households spread labour and smooth consumption throughout the year (Ellis 1998, Eriksen et al. 2005). Agricultural investment approaches that focus only on increasing aggregate yields and augmenting smallholder productivity may underestimate the importance of agricultural and income diversification – in time and place - to farmers’ risk management strategies (Smucker et al. 2015).

The SRL literature emphasizes the importance of both capitals, also referred to as assets or resources, and human capabilities, as means and ends of smallholder agricultural investments and development processes (Bebbington 1999, Scoones 2015). Capabilities are “the alternative combinations of functionings a person is feasibly able to achieve” (Brown and Westaway 2011: 323), and the term is closely related to the concept of *adaptive capacity*, described below. Following Sen (1997, paraphrased in Bebbington, 1999: 2034) enhancing human capabilities is vital not only for material improvement but because it empowers people to “question, challenge, propose and ultimately...to change the rules of the development game”. The ability to engage with other actors “through relationships governed by the logics of the state, market and civil society” is an important means for smallholders to expand their capabilities, their asset base and their power (Bebbington, 1999: 2021). While influential, SRL approaches have been criticized for being overly focused on individual agency and material livelihood aims, for seeing livelihood decisions as being static rather than dynamic, and for privileging households as a unit of analysis (De Haan and Zoomers 2005). ‘Sustainability’ is moreover a normative and contested concept (Leach et al. 2010), and local definitions and measures of “sustainable” livelihoods may differ

greatly from those of so-called experts (Jodha, 1988, cited in Chambers, 1995). What is sustainable from an individuals' perspective, may furthermore be unsustainable at the scale of a community or landscape (Scoones 2009). Cross-scale analyses of SRL, and an understanding of how political economy processes and historical and structural factors shape societal vulnerability and social exclusion are therefore increasingly recognized as being central to SRL approaches (Scoones 2015). The later factors are also considered to be essential aspects of contextual vulnerability approaches (O'Brien et al. 2007, Pielke et al. 2013), which are applied in the thesis and described below. The thesis adopts a capability perspective that combines insights from rural livelihood and contextual vulnerability approaches to investigate whether and how OG schemes, which embody and reflect institutional relationships, power dynamics and social relationships at a range of scales, can empower women and men smallholders to create livelihoods that are sustainable, resilient and capable of adapting to opportunities, risks and uncertainties.

#### *2.8.2 Vulnerability, resilience and adaptive capacity*

The thesis employs insights from the literatures on rural vulnerability, resilience and adaptive capacity, which help to explain how and why smallholders and rural communities confront risks and uncertainties and avail opportunities as part of dynamic and diversified livelihoods. Market fluctuations and climate variability are two important sources of uncertainty affecting rural agricultural households (Eakin 2006, Tucker et al. 2010). Climate change, changes in the organization of global agro-food systems and fluctuations in international agricultural markets and in international policies further accentuate the uncertainties that farmers face (Leichenko and O'Brien 2008). In the climate change adaptation and coupled socio-ecological systems literature, 'vulnerability' is considered to be a function of exposure and sensitivity to shocks and risks, and the capacity to cope with and adapt to them, also known as "adaptive capacity" (Smit and Pilifosova 2001, Turner et al. 2003). Adaptive capacity refers to the resources and assets that enable adaptation and learning, and the ability to mobilize them (Nelson et al. 2007). As such, it is closely tied to concepts of human capabilities and to human agency, including behavioral motivations and responses to change (Brown and Westaway 2011). Vulnerability is variously understood as an "end point" and as a 'starting point' of analyses (O'Brien et al. 2007). The former is widely associated with climate 'impact' studies, and economic modelling, such as that informing Paper 5, which take environmental and climate change processes as the starting point of analyses. The latter is associated with 'contextual' and 'capability' approaches to vulnerability

that are employed throughout the thesis, which take a bottom-up and socially situated perspective and emphasize the socioenvironmental drivers that shape how vulnerability is manifested in different times and places, and the social nature of adaptation processes (Vermeulen et al. 2013, Eriksen et al. 2015). Conceiving of vulnerability as an end point, or residual, of climate impacts privileges top-down, technological and large-scale solutions for dealing with climate change, whereas viewing vulnerability as a starting point draws attention to underlying social, economic, institutional and environmental inequalities that drive vulnerability (O'Brien et al. 2007, Pielke et al. 2013). Adaptation solutions proposed when vulnerability is viewed as the starting point of investigation are more apt to prescribe solutions that address the root causes, rather than the symptoms, of vulnerability, such as enhancing poor peoples' entitlement to assets and safety nets (Ribot 2014). There is increasing recognition that adaptation is not only a social but a thoroughly political process (Eriksen et al. 2015, Taylor 2015).

There are close connections between the concepts of vulnerability, adaptive capacity and resilience (Gallopín 2006). The latter is applied widely in research, policy and practitioner communities and has diverse scientific roots and applications (Brown 2014). In general, it refers to the capacity of social and ecological systems to resist or 'bounce back' from disturbances, shocks and adversity and is concerned with adaptations and feedbacks in complex, non-linear and non-equilibrium socio-ecological systems (Brown and Westaway 2011). In an agricultural investment context, the resilience of farming and livelihood systems can be enhanced by engaging in forms of production that maintain and enhance diversity, flexibility and response options in the face of climate and other changes, such as engaging in mixed crop-livestock production, and planting a diversity of crop varieties (HLPE 2013). Access to diversified income opportunities, including income earned off the farm, is increasingly important for sustaining rural livelihoods in Tanzania (Ellis 2006, URT/MFEA 2009). The usefulness of resilience as an organizing concept is contested, particularly by social scientists, who criticize it for failing to adequately consider politics and power relations, for its pre-occupation with ecological 'systems' and equilibrium thinking, and for evoking normative, conservative, and at times contradictory, views about the processes and goals of social change (Brown 2014, Olsson et al. 2015). Questions about 'whose' resilience we are talking about, and normative questions about whether 'resilience' is a positive or a negative system attribute and can be considered an enabler or barrier to progressive social change, are among the critiques that critical geographers have raised

about the concept of resilience (Cretney 2014). In the thesis, the concept of resilience is applied in both a positive and a negative sense, and at different scales. It is used in a positive sense in Paper 2 to describe the ways in which individual smallholders and their households craft resilient livelihoods that enable them to manage risks and uncertainties. And it is used in a negative sense in Paper 3 to refer to the ‘institutional inertia’ and ‘path dependency’ (Munck af Rosenschöld et al. 2014) that helps to explain the persistence of a poorly performing OG scheme.

Mainstream development discourses continue to portray climate change as a threat to development, with attendant calls for support to climate adaptation and ‘climate proofing’ of current development trajectories (Boyd and Juhola 2009). However, there is increasing recognition that ‘development as usual’ approaches pursued within economic growth-led modernization paradigms are both responsible for the current climate crisis, and create and perpetuate social and economic inequalities that make people vulnerable to climate change (Eriksen et al. 2015). A growing body of literature suggests that transformational approaches to development are needed that challenge existing societal structures, institutions and power relations that perpetuate vulnerability and inequality (Pelling 2011, O’Brien 2012). Paper 4 investigates how OG schemes, which are promoted as part of general development efforts in Tanzania, shape smallholder and rural communities’ and adaptive capacity in relation to economic, technological; informational, infrastructural and institutional factors that are known as ‘determinants’ of adaptive capacity in the climate change literature (Eakin and Lemos 2006, Smit and Wandel 2006, Keskitalo et al. 2011). Whether, in supporting or strengthening adaptive capacity, OG schemes hold potential for transforming rural livelihoods, farming systems and wider societal structures in ways that address and reduce rural poverty and inequality, or whether they represent incremental adjustment aimed at maintaining the status quo and entrench existing vulnerability dynamics is an important question in this regard.

In line with a ‘contextual’ vulnerability approach, the thesis views vulnerability as varying dynamically within and between households and communities, and as being shaped by societal structures, processes, institutions and interactions at different scales (Eriksen and O’Brien 2007, O’Brien et al. 2009). Accordingly, it is important to understand the contextual factors that differentially shape peoples’ access and entitlements to resources for coping with and adapting to adversity and change (Turner et al. 2003, Adger 2006, Gallopín 2006, Vogel et al. 2007). The

thesis extends the concepts of vulnerability and resilience, as they have typically applied to smallholders and to socio-ecological systems, to agricultural investments involving large-scale commercial agricultural producers. In doing so, it emphasizes that investments in OG schemes that are undertaken as part of development efforts may alter the vulnerability context and enhance or constrain the capacities of women and men smallholders, households and rural communities to adapt to climate variability and change (West 2015, West Submitted). While partnerships between small- and large-scale farmers constitute a potential source of livelihood vulnerability and positive resilience for smallholders, these partnerships are also themselves potentially vulnerable to political economy, governance and power relations and embody and reflect dynamics and dependencies that may make them negatively resilient and resistant to progressive or transformational processes of change (West and Haug Under review).

### *2.8.3 Governing agricultural investments*

The thesis also draws upon responsible agro-investment governance and political economy perspectives to understand and explain the role of governance in shaping the potentials and limitations of OG schemes as a development strategy. The importance of the smallholder sector for food security, income and employment in Tanzania, the vulnerability of rain-fed agriculture to climate change, and the potential for land-grabs and unequal relations between smallholders and large estates, create a strong argument for active government involvement to steer and guide agricultural investments in ways that strengthen and support smallholder livelihoods.

Recognition that agricultural investments carry both opportunities and risks for smallholder farmers, rural communities, investors, governments, and the environment has resulted in efforts to develop international guidelines and principles for directing agricultural investment in more inclusive and responsible ways (FAO et al. 2010, Committee on World Food Security 2014). Responsible agricultural investment (RAI) principles have been proposed by the international community and a range of different actors as a means to ensure that investments in agriculture contribute to food security, livelihoods, and environmental integrity, consider the priorities, knowledge and voices of local communities, and result in a fair distribution of risks and rewards between investors, host governments and communities. However, recent literature questions the extent to and ways in which transformations in agro-food systems can and should be governed (van Bers et al. 2016). This literature draws attention to the importance of governance of transformation as well as *transformation of governance*, defined as “fundamental shifts in social

relations and institutions” that can support sustainable and equitable outcomes of food systems (ibid: 3). Preconditions for transformation in food systems and arrangements for governing them have to do inter alia with the “effectiveness of formal institutions and lock in to a reigning paradigm”, which may facilitate or hinder effective transformation (ibid: 17).

From a political economy perspective, the potential for smallholder-inclusive agricultural investments to reduce rural poverty and contribute to sustainable economic development hinges crucially on whether or not the Tanzanian state has the capacity and is politically motivated to implement pro-poor agricultural investment and development policies (Cooksey 2012). National agricultural development policies and strategies in Tanzania emphasize the importance of smallholder farmers and rural communities to agricultural commercialization and modernization efforts (URT 2011, URT/MAFC/NAP 2013, URT/MAFC 2014). However, promoting inclusive, fair and transparent commercial partnerships between small- and large-scale farmers in official policies is not the same as implementing them. The Tanzanian government’s performance in implementing past and current national agricultural policies in transparent, inclusive and accountable ways and in the interests of broad-based poverty reduction, are disappointing (Hella et al. 2013). Cooksey (2012) notes that the governance context within which agricultural investments in Tanzania take place is fragmented and lacks clarity, transparency and consistency. He cautions that agricultural “[p]olicy ‘ownership’ is...a highly contextual and contingent matter. One cannot identify unambiguous interest groups since elite members ‘straddle’ different and sometimes contradictory interests” (p.19). It has been noted that smallholders regularly lack a ‘voice’ in national agricultural policy and decision-making processes (Haug 2016). Tanzania is moreover highly dependent on donors to finance its agricultural development agenda, and there exists a persistent tension in and disconnect between official agricultural policy discourse, and practice regarding the desired role of the state- and the private sector in agricultural investment and development efforts (Cooksey 2012). Existing governance and political economy contexts shape potentials and limitations for OG schemes to be an effective, sustainable and equitable rural development strategy (West and Haug Under review)

### 3. METHODOLOGY

#### 3.1 Philosophical and methodological foundations of the thesis

The research design underpinning this thesis draws upon philosophical and methodological insights from critical realism and pragmatism, applies a nested case study approach and employs multiple, primarily qualitative, data collection methods to answer the central research questions. Critical realism and pragmatism constitute ‘middle ground’ philosophical paradigms that transcend the distinctions between positivism and constructivism that have typically separated the natural and social sciences, and quantitative and qualitative social science research methodologies (Collier 1994, Cupchik 2001, Morgan 2007, Denscombe 2008). Critical realism is associated with the British philosopher, Roy Bhaskar, and gained prominence during the 1970s and 80s through his writings. It combines a realist ontology, which asserts that reality exists independently of human thought, with a constructivist epistemology, which maintains that knowledge about reality is socially situated (Collier 1994). Key hallmarks of critical realist philosophy are its emphasis on the irreducibility of ontology to epistemology; its affirmation of the stratification of nature and the reality of powers, mechanisms and structures in open social systems; and its concern with the emancipatory potential of social scientific inquiry (ibid). Pragmatism arose as a philosophical tradition in the late nineteenth and early twentieth centuries in the United States through the thinking and writing of the early philosophers Charles Sanders Peirce, John Dewey, William James and George Herbert Mead (Morgan 2007). It is a solutions-oriented philosophical perspective that is concerned with the practical applications of scientific knowledge to solve real-world problems and places emphasis on what people can do with the knowledge that they produce (Creswell 2009). In combination, critical realism and pragmatism provide an appropriate philosophical foundation for the multiple methods case study research design pursued in the thesis, which aims to provide policy-relevant insights about the potentials and limitations of smallholder-inclusive agricultural investments as a development strategy in Tanzania.

##### *3.1.1 Critical realism, stratification of nature and explanation in open systems*

The original ontological strand of critical realist philosophy is known as transcendental, or ‘depth’, realism, and derives its central ideas from a philosophical exploration of how scientific experiments are possible (Collier 1994, Bhaskar et al. 2010). Bhaskar argues that scientific experiment is possible only through an artificial ‘closing’ of naturally ‘open’ systems. He



critiques the positivist assumption that knowledge generated through experiments (based on isolation of mechanisms, closure of open systems, attempts at Humean causality and faith in sense data) constitutes an objective representation of reality. In particular, while artificial ‘closure’ may be possible in scientific experiments, it is far more difficult to accomplish when studying social phenomenon and processes. Instead, critical realism argues that reality is stratified in three domains: the empirical, the actual and the real (Sayer 2000). The empirical refers to the domain of reality that humans can experience; the actual domain refers to events that can be said to have taken place but cannot be experienced by humans; and the real domain refers to the generative mechanisms or structures that produce events or phenomena (Proctor 1998). The implications of nature consisting of real, stratified mechanisms are that “things can exist and events can occur unperceived by us” (Collier 1994: 36). An entity may possess powers that are not actualized, and/or these powers may be actualized but go unrecognized due to the codetermination of events in open systems (Bhaskar et al. 2010). Stratification implies that systems of parts will be characterized by emergent properties that depend on the tendencies of the parts involved and the way these potentials interact (ibid).

Critical realist philosophy sees structures and mechanisms in nature and society as being composed of higher and lower strata, whereby higher strata are rooted in, but not reducible to, lower strata (Sayer 2000). While higher strata can be partially explained with reference to the lower strata, the higher strata contain emergent features or characteristics that cannot be wholly explained by referring to the lower strata. This means that societal structures and mechanisms cannot be reduced to or predicted by those that exist at the biological level, or at the level of the individual person, household, community, and so on (Collier 1994: 107). In Bhaskar’s later work, he develops what has come to be known as ‘dialectical critical realism’ and his model of transformational social activity in which he critiques the strict ontological dichotomies between structure and agency, mind and body, and society and the individual, and makes the case for inter-, intra-, and transdisciplinary research (c.f. Bhaskar et al. 2010). Critical realism’s emphasis on emergence and stratification in open socio-ecological systems is particularly well suited to the study of OG schemes, which are embedded in and emerge from wider historical, social and economic processes and structures and embody a range of social, technological, ecological and biological components and interactions at different scales.

### 3.1.2 A pragmatic approach to multiple methods research

In addition to supporting problem-driven and policy-relevant research, pragmatism offers useful insights and guidance on how to connect epistemology, methodology and research methods in ways that avoid the typical dualisms between the positivist paradigm, which is typically associated with quantitative research, and the constructivist paradigm, which is typically associated with qualitative research (Creswell 2009). Such guidance is often missing in epistemological and ontological debates within philosophy of science. As Morgan (2007: 73) notes, “[t]he great strength of this pragmatic approach to social science research methodology is its emphasis on the connection between epistemological concerns about the nature of the knowledge that we produce and technical concerns about the methods that we use to generate that knowledge”.

Pragmatism enables the researcher who is conducting multiple methods social science research to address methodological issues by encouraging the use of *abductive* reasoning (moving back and forth between induction and deduction), *intersubjectivity* (recognizing the positionality of the researcher; moving back and forth between objective and subjective frames of reference) and *transferability*, in order to identify what is context-specific, as well as generalizable, about a study’s findings, and why (Morgan 2007:70-72). These research strategies are consistent with the multiple methods, case study research design employed in the thesis. In addition, pragmatism highlights the central place of worldviews in influencing the researcher; advocates communication, creation of shared meaning and identifying useful points of connection across disciplines and perspectives in order to create knowledge that is relevant to “joint actions or projects that different people or groups can accomplish together” (Morgan, 2007: 71-72).

In line with both critical realist and pragmatist philosophy, the epistemological approach taken in the thesis subscribes to a weak form of social constructivism that views human knowledge as inherently partial and incomplete and scientific inquiry as being socially situated and embedded. This means that while the search for ‘objective’ and ‘universal’ truths and predictive theories is not possible in a fundamental sense, it is possible to discern ‘better’ explanations of reality from ‘worse’ ones by endeavoring to gain concrete, context-dependent knowledge and engaging in reflexive research practices (Flyvbjerg 2006, Bhaskar et al. 2010).

### 3.2 Research strategy and design

The research strategy employed in the thesis is based on a nested case study approach. Case studies are well suited to developing thick descriptions and generating in-depth knowledge and understanding of complex phenomena (Bryman 2008). Insights gained from case studies can moreover be useful in theory development (Flyvbjerg 2006). The overall ‘case’ investigated in the thesis is the potentials and limitations of agricultural investments linking small- and large-scale farmers as a development strategy in the SAGCOT region of Tanzania. An in-depth focus on MSE and KPL estates, and their relationships with smallholders in two adjacent villages, constitutes a comparative case study within this overarching case. The topics of the individual papers, which explore the development implications of OG schemes from different conceptual and theoretical angles and at different scales, comprise nested cases within the comparative case study (Ragin and Becker 1992). The boundaries of my case study are therefore more malleable and fluid than for conventional societal units such as families, firms or organizations (Ragin and Becker 1992). In line with critical realist philosophy, the thesis approaches the two OG schemes as being ontologically ‘nested’ within and emergent from a wide range of historical and contemporary social, political, economic, agro-ecological and discursive contexts that affect their performance and function in practice. These include the crop genetic resources in question and the dynamic agro-ecosystems, livelihoods, and socio-economic contexts within which OG schemes ‘emerge’. Hence, following Creswell (1998), Bryman (2008) and Flyvbjerg (2006), the nested cases that form part of my case study design are to various extents exploratory, intrinsic, critical, exemplifying, revelatory, and instrumental, depending on the particular focus of the analysis.

As Flyvberg points out, the context-dependent knowledge generated through case studies constitutes an essential foundation for human learning and basis for developing expert knowledge (Ibid: 5). MSE and KPL estates were chosen as case sites due to their potential to generate a rich and nuanced understanding of the potentials and limitations of smallholder-inclusive investments as a development strategy in Tanzania. Both constitute examples of the types of smallholder-inclusive agro-investments that are being promoted in SAGCOT and produce crops that are prioritized in national initiatives due to growing domestic demand that currently outstrips supply and leads to periodic imports (AgDevCo and Prorustica 2011). In addition, they embody a number of dynamics and tensions that characterize debates around

agricultural investments for development. However, they differ on a number of dimensions, not least, in the crops that they produce, the markets for those crops, the length of time they have been operating, and their current ownership and management structures. Moreover, at the outset of research, they appeared to represent contrasting cases of responsible and inclusive agricultural investment in the region (West and Haug, under review). Hence, rather than being ‘typical’ examples of smallholder-inclusive investment, the MSE and KPL cases were chosen because they offered the possibility to generate relevant insights about the potentials and limitations as a development strategy. My approach to case selection thus differs from a desire for ‘replication’ of findings, as is sometimes advocated in positivist understandings of multiple case studies as forming part of a quasi-experimental research design (Yin 2009). Instead, the comparative case study design employed in the thesis attempts to ‘capture the rich ambiguity’ associated with the contemporary promotion and performance of OG schemes as a development strategy in Tanzania.

### 3.3 Study sites description

The primary study sites comprise the MSE and KPL nucleus estates, and smallholders located in Lungo village, located in Mvomero District, and Mkangawalo village, in Kilombero District. Figure 1 shows the location of the two estates and adjacent villages and Tables 1 and 2 provide an overview of the characteristics of the study sites. MSE and KPL estates are located in Morogoro region, an area of high agricultural potential, characterized by relatively good backbone infrastructure (outside the rainy seasons), and generally adequate rainfall. While Morogoro Region is by and large food self-sufficient, parts of Mvomero District, where MSE is located, are vulnerable to food insecurity (URT 2012). Both estates are located at the foot of mountain ranges between 250-350 meters above sea level in valleys that border wetlands that are prone to seasonal flooding. The Nguru mountain range, which lies above MSE, in Mvomero, and the Udzungwa range, which lies above KPL, in Kilombero, belong to the Eastern Arc Mountain chain, which is a recognized global hotspot for biodiversity (Burgess et al. 2007). The Kilombero Valley moreover falls under the provisions of the Ramsar Convention, to which Tanzania is party, due to the importance of its wetlands. KPL is located within a region of unimodal rainfall, while MSE falls within a region of bimodal rainfall. The largest total amounts of rainfall in both locations normally fall between March and May, however, the trend in both regions is towards

increasing rainfall (more frequent short duration, high intensity rainfall events) during the Short Rains, or *Vuli* (OND), season (URT 2005).

Table 1. Overview of similarities and differences between MSE and KPL

	<b>MTIBWA SUGAR ESTATES LTD</b>	<b>KILOMBERO PLANTATIONS LTD</b>
<b>Similarities</b>		
Size (ha)	6400 (main estate)	5818
Geography and ecology	Located at the base of the eastern foothills of the Nguru Mountain range at an elevation of 270 masl <sup>3</sup>	Located at the base of the Udzungwa Escarpment at an elevation of 350 masl
Remoteness	Located 102 km North of Morogoro Town, 300 km from Dar es Salaam; accessed by secondary road	Located 80 km SouthWest of Ifakara Town; 450 km from Dar es Salaam. accessible by secondary road and railway
Past ownership structure	Government parastatal	Joint Venture (50%/50%) between the Government of Tanzania and the Government of North Korea
Market destination and sub-sector characteristics	Mainly domestic (small EU quota) Highly politicized Demand exceeds supply by > 20% Sugar prices vary throughout the year due to local production variations and are influenced by hoarding/price speculation, informal cross-border trade and cheap sugar imports	Mainly domestic (cross-border trade) Highly politicized Demand exceeds supply Normally protected by a 75% import tariff (EAC-wide) Rice prices vary throughout the year due to variations in local production and are influenced by hoarding/price speculation and cheap rice imports
<b>Differences</b>		
Crop sown	Sugarcane	Rice
Type of crop	Cash crop only	Food and cash crop
Type of market	Monopsony	Open market
OG scheme established	1996/97	2011/12
Current ownership structure	Tanzania Sugar Industries Ltd., a private domestic investor	International joint venture between Agrica Tanzania Limited, RUBADA <sup>4</sup> , Norfund <sup>5</sup> , Capricorn <sup>6</sup> , and AgDevCo <sup>7</sup>
Crop characteristics	Perishable Perennial Mechanised harvesting only Less labour demanding	Durable Annual/seasonal Mechanised and manual harvesting More labour demanding
Annual rainfall	Average	Above average

<sup>3</sup> Meters above sea level

<sup>4</sup> The Rufiji Basin Development Authority (RUBADA) is a public entity.

<sup>5</sup> The Norwegian Investment Fund for Developing Countries

<sup>6</sup> Capricorn is a US-based impact investment fund.

<sup>7</sup> AgDevCo is a UK-based social impact investor and agribusiness developer working in Africa.

According to long-term daily rainfall records collected at MSE from four different locations on the estate for the period 1979 -2011, average annual rainfall is about 1200 mm/year. However, this falls below 700 mm in dry years, and exceeds 1800 mm in heavy rainfall years, at individual stations (MSE, unpublished rainfall records). Rainfall records at the Catholic Mission at Mchombe (near KPL) for the period 1961-1982 give a mean annual rainfall of 1902 mm, with high inter-annual variability evident in annual rainfall exceeding 3000 mm, and falling below 1500 mm in some years (Halcrow Consulting 1995). Travel time from the two schemes to tarmac highways using public transportation is between two (MSE) and three (KPL) hour's drive on rough roads. During the rainy seasons the roads become periodically impassable due to flooding and (in Kilombero) a high water table and the prevalence of black cotton soils.

At the village level, fieldwork concentrated on smallholders living in Lungo village, located adjacent to MSE, and Mkangawalo village, located adjacent to KPL. Table 2 provides a summary of household characteristics, livelihoods and farming systems in the two villages. Smallholders in Lungo produce sugarcane on contract for MSE, as well as engaging seasonally in production of rainfed lowland rice, which is an important food and cash crop in years with sufficient rainfall, as well as maize, sunflower, and irrigated vegetables for food and sale. Many households keep livestock and combinations of small, and large stock, including improved, or traditional cattle or both, are common in Lungo Village. Mkangawalo village's seven sub-villages stretch from the foothills of the Udzungwa scarp, where farmers grow maize, vegetables, sesame, cocoa, cassava, bananas and upland rice, to the floodplain of the valley. Research in Mkangawalo focused on smallholders living in four sub-villages: Kidete, Idulike and Ilole, located closer to the mountains and the main road, and Mgudeni, located to the southwest of KPL estate in the floodplain. Due to the differences in topography and soils in the valley, rice is the principle cash and food crop sown in the floodplain during the rainy season. Maize and vegetables are grown on residual moisture following the rice harvest in the floodplain, and year-round closer to the mountains, as well as near perennial rivers in the dry season. Households in Mkangawalo that do not traditionally keep livestock also engage in fishing in tributaries of the Kihansi and Kilombero Rivers. Petty trade of vegetables, fish, home brew, and selling local snacks and meals from food stalls, are common activities undertaken by women alongside engagement in agriculture. Men normally undertake local production and sale of bricks, fishing traps, equipment, and charcoal. In Mgudeni sub-village, livestock keeping is the predominant

means of livelihood for Maasai households, and most Sukuma households keep oxen, which they use to plough their rice fields as well as hiring them out to others.

Table 2. Characteristics of interviewed households in Lungo and Mkangawalo Villages

	<b>LUNGO VILLAGE</b>	<b>MKANGAWALO VILLAGE</b>
District	Mvomero	Kilombero
Main rainy season	March-May	October - May
Population	184 households	2150 households
Ethnicities	Majority of tribes (80%) from Northern Tanzania (Mpare, Mchaga, Maasai, Msambaa); Minority (20%) of tribes from Central and Southern Tanzania	Majority of tribes (71%) from Southern Tanzania (Ndamba, Muhehe, Mpogoro, Mnyakyusa, Mkinga, Mbena); Minority of tribes (29%) from Northern Tanzania (Msukuma, Maasai)
Number of households interviewed	50	92
OG crop sown	Sugarcane	Rice
Interviews with OG households	29	48 (25 repeat)
Interviews with non-OG households	21	34
Average household size	5,1	6,1
Average level of education	Primary	Primary
Average age of respondent	50	44
Gender of respondents	Female: 40% Male: 38% Both (interviewed together): 22%	Female 31% Male: 56% Both (interviewed together): 13%
Average land size per household (ha)	3,3 ( <i>Range: 0-21</i> )	3,5 ( <i>Range: 0-14</i> )
Main crops sown	Sugarcane, maize, rice, pigeon pea, pumpkin, fruit and fodder trees, fodder grasses, vegetables	Rice, maize, cassava, sweet potato, banana, watermelon, cocoa, oil palm, vegetables, fruit and fodder trees
Livelihoods	Combine agriculture, livestock keeping, petty trade and migration	Combine agriculture, livestock keeping, fishing, petty trade and itinerant trade
Rainfall pattern, and climate trends and key climate stressors identified by smallholders	Bimodal rainfall pattern. Two main rain seasons: March –May ( <i>Masika</i> ) and October –December ( <i>Vuli</i> ) Decreasing rainfall in the Vuli season; periodic rainfall shortages in the Masika; flooding in the Vuli and increasingly unreliable rainfall patterns	Unimodal rainfall pattern. Reliable rainfall during the main rain season (December to May). Periodic flooding; Unreliable onset of the main rains, increasing temperatures during the <i>Kiangazi</i> (dry season) and increase in crop, livestock and human pests and diseases

### 3.3.1 Political economy of the rice and sugarcane sub-sectors

In both cases, there are large differences in the ways in which estates and smallholder farmers produce the contracted crops: rice (KPL) and sugarcane (MSE). The nucleus estates engage in large-scale monocrop production and rely on heavy agricultural machinery for planting and harvesting, use agricultural inputs and rely to various extents on irrigation to control and manage

the seasonal production of rice and sugarcane. By contrast, farmers produce the contracted crops on small plots of land, under rain-fed conditions, using few agricultural inputs. There are moreover important marketing differences between the two contracted crops, as indicated in Table 1. The market for sugarcane is a ‘designed monopsony’, with MSE as the sole buyer of smallholder cane (Mmari 2012: 184). In contrast to sugarcane, rice is both a food and a cash crop and has an informal and highly dynamic domestic market characterized by multiple actors and numerous transactions along the value chain between rice producers and consumers (Wilson and Lewis 2015). This makes it an important focus not only for production, but also for income and employment generation (URT 2009, European Cooperative for Rural Development 2012). Sugarcane is produced on about 13 000 smallholdings, and on four large estates having industrial processing facilities in different parts of the country (Sutton and Olomi 2012). While OG cane accounts for about 40% of total cane supply to the factories in the different areas (ibid.), more than 90 per cent of Tanzanian rice is produced by smallholders farming less than 2 hectares of land (Mtengeti et al. 2015). Economic reforms following structural adjustment led to the privatization of large, state-owned and controlled rice and sugarcane estates and increased liberalization of food crop production and marketing. However, rice and sugarcane continue to be highly politicized crops (Therkildsen 2011, Haug and Hella 2013, Sulle et al. 2014). The main market for both crops is domestic, due to high and growing domestic demand, which currently exceeds supply. However, Tanzania exports a small amount of sugarcane to the EU under preferential terms, and periodic imports, as well as illegal cross-border trade, occur for both crops (KI 2011, Sutton and Olomi 2012). Tanzania is a high-cost producer of sugarcane, and industrial sugarcane factories are protected from price competition by a 40 kilometer radius within which it is prohibited to establish competitor processors/factories (Mmari 2012). As a member of the East African Community (EAC), Tanzania’s rice market is protected by a 75% tariff, and domestic rice prices are consistently higher than world market prices, (Wilson and Lewis 2015). However, the Government of Tanzania has lifted the import tariff for rice on several occasions, most recently in 2013, ostensibly due to production shortfalls and to lower rice prices for consumers, with detrimental impacts on rice producers (West and Haug, Under Review). Import permits are also regularly issued for sugarcane to cover domestic shortfalls, but have become increasingly politicized<sup>8</sup>. In addition to detrimental impacts on rice and sugarcane

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<sup>8</sup> See “Magufuli’s Sugar Headache”: <http://allafrica.com/stories/201602260914.html>



producers and processors when prices are lowered (Haug and Hella 2013), there is potential for corruption and rent capture by local trading cartels when lucrative import permits are awarded (Cooksey 2012). Rice and sugar tariffs are moreover subject to ‘price wars’ between EAC members aiming to protect their domestic agro-industries and producers and maintain bilateral trade agreements with non-EAC members<sup>9</sup>.

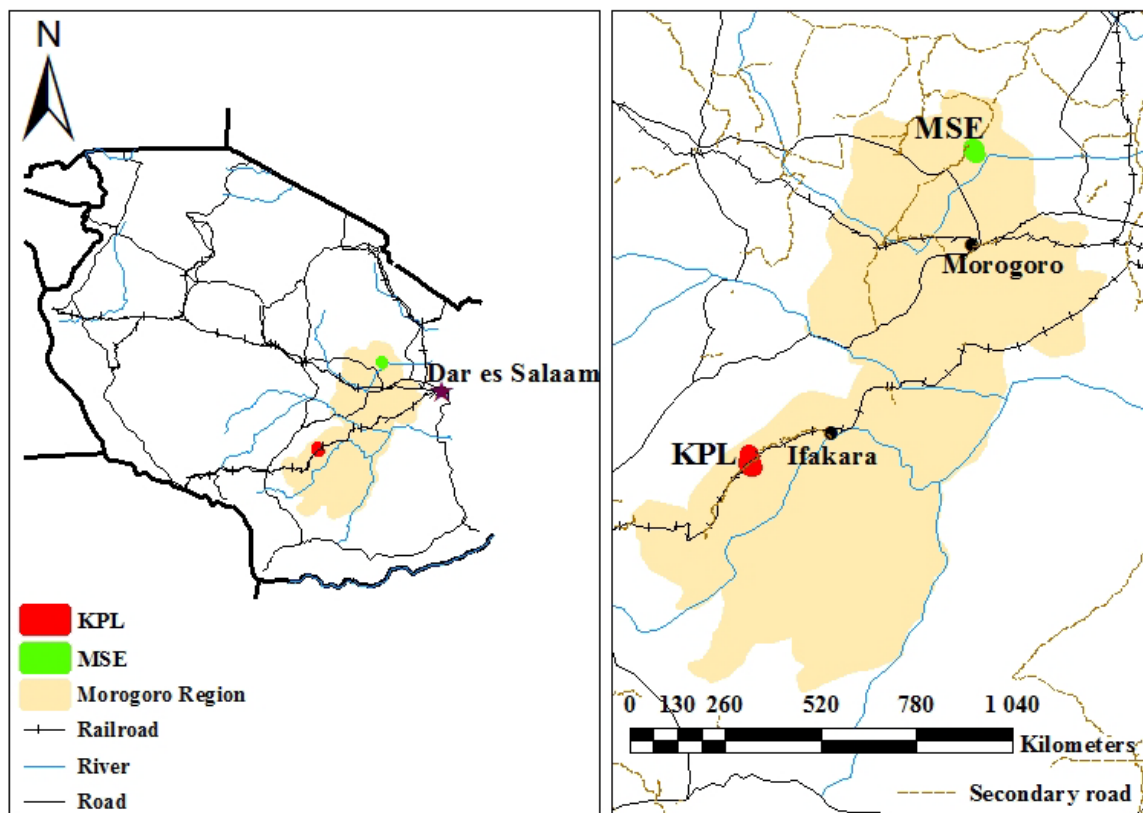


Figure 1. Map outlining the location of the study sites

### 3.4 Research timing and access

I visited Tanzania six times between October 2010 and June 2014, staying for a total of 15 months. The main period of fieldwork lasted from June 2011 to July 2012. However, several shorter visits to Tanzania lasting from 5 days to 3 weeks helped to prepare for this fieldwork and enabled me to follow up on initial findings. In October 2010, I travelled from Arusha to Njombe together with colleagues from the Norwegian University of Life Sciences (NMBU), Sokoine University of Agriculture (SUA), and the Norwegian fertilizer company, YARA during a 10-day

<sup>9</sup> See: <http://www.theeastafrican.co.ke/news/Exit-Kenya-sugar-enter-Tanzania-rice-Kampala-new-trade-war/2558-2851112-ob5qv1z/index.html>

joint scoping visit to potential field sites, including Lungo Village. The visit was made in connection with the Norwegian-funded CCIAM (Climate Change Impacts, Adaptation and Mitigation) research programme that provided funding for my PhD<sup>10</sup>. In March 2011, I returned to Lungo and several other villages with SUA colleagues to conduct a baseline for the sub-project to which my PhD was attached<sup>11</sup>. In the end, Lungo village was not chosen as a focal site for the wider research project activities, but I decided to do research there due to the proximity to Mtibwa Sugar Estates and in order to maintain my independence from the wider sub-project activities. I had also made good local contacts during previous visits and was able to arrange to live with a local family in Lungo via a SUA professor who had previously conducted research in the village. This family became my ‘gatekeeper’ and ‘sponsors’ (Bryman 2008) for the fieldwork and living with them constituted my initial ‘window into’ the community and to relations between smallholders and MSE.

In Kilombero, the initial process of gaining entry was quite different from in Lungo. I was invited to join a scoping fieldtrip to Kilombero and Kilolo Districts with SUA colleagues under a separate CCIAM research project to which my co-supervisor was attached. While taking part in a group discussion with farmers, I learned about KPL estate and their efforts to train local farmers in some nearby villages. I hired a local forest officer and we set out on his piki-piki (dirt bike) the next day to visit KPL unannounced, not quite knowing where it was located, and having greatly underestimated the distance. We arrived covered in dust after having travelled 40 kilometers on rough roads with a faulty foot peddle, and were met with bemused greetings by the management at KPL, who invited us to stay for lunch. Later, the General and Farm Managers, who seemed to appreciate my ‘researcher curiosity’, welcomed me to follow the upscaling of their SRI training to farmers in surrounding villages. I was invited to stay at the KPL guesthouse, in nearby Mngeta Village, while doing so, which I accepted, as power provided by the KPL hydroelectric dam was available in the guesthouse. Living with a family in Lungo village on the one hand, and at the KPL guest house, on the other provided very different windows ‘in’ to the case study sites (Bourke 2014). On the one hand, these different entry points enabled me to ‘get

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<sup>10</sup> Financed through the Royal Norwegian Embassy in Dar es Salaam

<sup>11</sup> Entitled: “Small-holder Production Systems in Tanzania: Striking a balance between intensification, sustainability, food security and climate”.

up close to' and see, different 'sides' of the smallholder-estate relationship, and strengthened the research. Nevertheless, they also presented practical and ethical challenges (see section 3.7).

### 3.5 Methods and data collection

In line with the nested case study design that underpins the thesis, I employed a variety of methods to secure an in-depth understanding of the potentials and limitations of OG schemes as a development strategy. The methods employed in the study are summarised in Table 3. While quantitative information was collected during semi-structured interviews with households in Lungo and Mkangawalo villages, and informs papers 1 and 5, statistical analysis have not been performed on this data. Primary insights were gained from deep immersion in the case study sites, involving significant components of participant observation and informal qualitative interviews; hence, 'multiple methods' is a more accurate description of the predominantly qualitative approach that was adopted in data collection. The process of collecting and analyzing data followed an inductive and iterative approach, with data collection and analysis proceeding hand and hand and informing one another throughout the fieldwork. Initial observations, conversations and interviews helped to guide data collection decisions, which evolved over the course of the fieldwork and were informed by emerging insights and findings from the fieldwork. Data collection strategies were at first very open, and narrowed over time as my Swahili improved, and as I became more familiar with the social settings and contexts of the research. This process was enriched by moving back and forth between localities during the fieldwork, which enabled reflections and learning to take place and to inform subsequent data collection efforts in both locations. At times data collection was targeted (as when conducting semi-structured household interviews), and at others times it was opportunistic, such as when living at the KPL guesthouse and participating in the SRI trainings as they unfolded.

Table 3. Overview of the fieldwork activities

LOCATION	MAIN FIELD PERIOD JUNE 2011-JULY 2012			ADDITIONAL FIELDWORK
	PARTICIPANT OBSERVATION	INTERVIEWS	GROUP DISCUSSIONS	SCOPING/ FOLLOW-UP
<b>MSE/ LUNGO VILLAGE</b>	<p><b>Village level</b> Rice and maize harvesting activities and visits to farmers cane fields; Household activities (threshing grain, cooking, fetching water, caring for livestock, gathering firewood) while living with a local family; Informal interactions, socializing and attendance at local celebrations; Establishment of local SRI farmer experimentation plot; Village Assembly Meeting</p> <p><b>Scheme level</b> Guided student tour of MSE and OG association offices with staff presentations</p>	<p><b>Village level</b> 50 semi-structured household interviews; 20 repeat key informant interviews/farm tours</p> <p><b>Scheme level</b> 14 key informant (5 repeat) interviews with MSE estate staff, OG association staff, extension officers, and others</p> <p><b>District level</b> 7 interviews</p>	<p><b>Village level</b> Sub-village wealth ranking discussions (5); ‘Mshikamano’ dairying group (1); Sugarcane farmer field school (1); Irrigation Group (1); Long-terms residents (1)</p> <p><b>Scheme level</b> Kiomo Group (cane harvesting services) (1)</p>	<p><b>Scoping visits, village level</b> (Oct. ’10 and March ’11) Group discussions and PRA exercises; Farm tours; Structured interviews with 5 local residents</p> <p><b>Follow-up fieldwork</b> (April 2013/May 2014) Short field visit, informal discussions and observations (2013); Life history interviews with 2 female OGs in Lungo village (2014)</p>
<b>KPL/ MKANGAWALO VILLAGE</b>	<p><b>Village level</b> Sub-village-level SRI sensitization meetings</p> <p><b>Scheme level</b> Expansion of the SRI training to 1200 farmers in 9 villages surrounding KPL; Observation of former President Kikwete’s visit to KPL; Training of KPL extension officers; Micro-credit trainings for SRI farmers; Regular observations, informal discussions and interactions with KPL staff while living near the estate and writing-up field notes at KPL office headquarters</p>	<p><b>Village level</b> 92 semi-structured household interviews 15 key informant interviews (5 repeat)</p> <p><b>Scheme level</b> 26 key informant interviews with KPL staff, visitors and extension officers (15 repeat)</p> <p><b>Ward and District levels</b> 11 interviews (4 repeat)</p>	<p><b>Village level</b> Wealth ranking and PRA exercises with men and women in Kidete and Mgudeni sub-villages (12); Informal discussions with SRI-trained farmers at demo plots (6); Long-term residents (2); Pastoralists (1)</p> <p><b>Scheme level</b> Regular informal discussions with KPL extension officers</p>	<p><b>Village level</b> 50 structured interviews with 25 SRI-trained farmers in 2013 and 2014 to follow up on experiences and levels of adoption of the SRI training and the nascent OG scheme.</p>
<b>ADDITIONAL NATIONAL AND SUB-NATIONAL</b>	<p><b>Short visits and farm tours</b> (March – May, 2012) Kilombero Sugar Company (KSC), and Kilimo cha Yesu (KCY) farms in Kilombero District; Mbarali Highland Estates and Madibira smallholder schemes in Mbarali District, Mbeya Region</p>	<p><b>Scheme and district levels</b> (March – May, 2012) 12 interviews at KSC, KCY, Mbarali Highlands, Madibira smallholders, and Mbarali District</p>	<p><b>Scheme level</b> (April-May, 2012) Discussions with farmers at KCY, Madibira, Mbarali Highlands (3)</p>	<p><b>National and regional levels</b> (June 2011-July 2012) 22 interviews at national and regional levels (9 repeat); Regular discussions with staff at Sokoine University of Agriculture (SUA)</p>

### *3.5.1 Participant Observations*

Understanding the implications of OG schemes for smallholder livelihoods and sustainable and equitable development processes requires investigating how the tensions and dynamics embodied in these schemes play out in concrete circumstances. Participant observation, which involves prolonged immersion in the culture and everyday lives of the people and organizations being studied, is well suited to this purpose (Bryman 2008). In Lungo village, the fieldwork started with an initial one-month visit that coincided with the annual rice harvest. During this time, I lived with my host family, learned basic Swahili, harvested rice, and walked and biked around the village to different farmers' fields, moving around with different families to harvest rice. By taking part in these and other daily and farming activities, I endeavored to learn as much as I could about local farming systems and the social, economic and political realities that were a part of daily life in my host family and in the wider community. At KPL, the fieldwork began with prolonged participant observation of daily estate activities and dynamics, and observing and participating in the upscaling of the KPL estate's outgrower farming scheme and System of Rice Intensification (SRI) training to 1200 farmers over a period of three months as it unfolded in real time. Doing so required being open and flexible to participate in activities that unfolded on the ground, including consultations and meetings between the estate and farmers, farmer and extension officer trainings, and the establishment of SRI demonstration plots. Living at the KPL guest house and making daily visits to the main estate offices provided opportunities for formal and informal interactions with estate management, personnel and staff and government officials, donors, guests and potential investors that visited the farm. During this period, former President Kikwete made an official visit to KPL as part of the official launch of SAGCOT and the 'Kilombero Cluster'. His visit provided an interesting opportunity to interact with and observe a number of government and SAGCOT officials in attendance, and to listen to speeches given by KPL owners and managers, and the former president himself. Participating in and observing everyday practices – both the “mundane and the extraordinary”, enabled me to gain in-depth, tacit and multi-layered understanding of OG scheme dynamics in the two locations in practice (Hammett et al. 2015). These experiences moreover helped to build trust and rapport with the research participants within the communities and organizations over time and enabled me to gain insights into local farming systems and livelihood dynamics that helped to lay the groundwork for subsequent research activities.

### *3.5.2 Household Interviews*

Following these initial periods of residence, I conducted household interviews with a selection of smallholders in Lungo and Mkangawalo villages, with the aid of two local research assistants whom I located and trained for this purpose. These interviews followed a semi-structured format, and were undertaken with the help of an interview guide that was tested and tailored to the two locations (see Appendices). In addition to gathering basic information about respondents, such as their age, ethnicity, marital status, and length of residence in the village, these interviews sought information about households' livelihood assets and resources, agricultural production practices and engagement in the MSE OG scheme and KPL SRI trainings. They also elicited respondents' qualitative perceptions and experiences of climate, environmental and livelihood changes, and views concerning their relationships with the two estates. The strategy for sampling households in the two villages varied. Enumeration and participatory wealth ranking of all households in Lungo, and in Mgudeni and Kiteto sub-villages in Mkangawalo, was first undertaken by knowledgeable local residents according to criteria that were vetted and agreed upon during focus group discussions. In Lungo village, the household interview sample reflected the proportion of households belonging to different wealth categories in the different sub-villages, and aimed to include all livelihood groups (such as livestock keepers and female-headed households) and ethnicities. The number and type of OG households interviewed thus reflected their general distribution in the village. In Mkangawalo, non-SRI households drawn from Mgudeni and Kidete sub-villages reflected the distribution of wealth categories in those sub-villages. However, SRI participants constituted a minority of households in the village as a whole and were selected purposively from Kidete, Mgudeni and two additional sub-villages, Idulike and Iole, for which wealth ranking was not undertaken. The total number of SRI participants numbered 102 across these four sub-villages, and hence they are overrepresented in the total sample relative to their share of the population. This gives a bias towards households that received SRI training, relative to the general sub-village and village populations in Mkangawalo. As in Lungo, I made a specific effort to seek out and interview livestock keeping households (who were generally not included in SRI-training) and households of different ethnicities (in both SRI- and non-SRI households) during interviews in Mgudeni and Kidete. In total, I conducted 142 semi-structured household interviews: 50 in Lungo village with 29 OG

and 21 non-OG households, and 92 in Mkangawalo village with 58 SRI-trained and 34 non-SRI households.

### *3.5.3 Key informant and other interviews*

I conducted a range of additional interviews at different scales, and in different contexts to gain further understanding about smallholder livelihoods, the MSE and KPL schemes, and the wider SAGCOT initiative and policy context for the fieldwork. At the village and sub-village levels, I conducted focus group discussions with elderly residents to gain further insights into relevant processes of social and environmental change, with livestock keepers to understand past and current opportunities and challenges connected to livestock keeping, and as part of participatory wealth ranking of households in Lungo and Mkangawalo villages. In Mkangawalo, participatory rural appraisal (PRA) exercises (Hammett et al. 2015) were undertaken with men and women smallholders of different wealth categories in Mgudeni and Kidete sub-villages. Two male field assistants and a female facilitator working for a local NGO in Ifakara assisted me in these activities. PRA activities included resource mapping, agricultural calendars, and identification of salient agricultural and livelihood opportunities and constraints, as well as observed impacts, vulnerability and adaptation to climate variability and change. A group discussion with smallholder cane OGs in Lungo village, with a private cane service-providing group in Madizini, and discussions with SRI-trained farmers at the SRI 'shamba darasas' (demonstration plots) in the different sub-villages of Mkangawalo, afforded additional insights that inform the findings.

The findings are also informed by a wide range of formal interviews and informal encounters with smallholders and livestock keepers, MSE and KPL management and staff, and with researchers, private-sector actors, donors, government officials, and NGOs at the local, district and national levels that I sought out or met during the course of the fieldwork. Key informants were knowledgeable residents and employees/staff of relevant organizations that I visited more than once and with whom I undertook formal interviews on specific topics that I later followed up informally in different settings as the fieldwork progressed. These informants provided an invaluable means for me to 'ground truth' and triangulate emerging findings, as well as helping to explain and clarify issues or questions that arose during the fieldwork. In addition, I conducted regular interviews with MSE and KPL staff, village and Ward extension officers, District officials and other actors having knowledge of specific environmental, land-use, climate change, social development, crop production, seed system, OG support, agricultural extension,

marketing, and irrigation issues. These interviewees were generally identified through snowball sampling, whereby someone I met would tip me about another relevant person or persons that I should speak with. In all cases, the topic of interviews and degree of formality of conversations depended on the setting and the identity and position or role of the respondent.

#### *3.5.4 Additional data sources*

In order to follow up on insights gained from the main period of fieldwork and triangulate my data, I engaged my research assistant in Mkangawalo to do follow-up structured interviews with 25 SRI farmers in Mkangawalo Village in 2012/13 and 2013/14 to gauge their implementation of the training in practice over time. I also made short visits to Lungo Village in 2013 and 2014, during which time I spoke to key informants, visited farmers' fields, and conducted life history interviews (Goodson 2001) with two local women with whom I had developed a close rapport during the fieldwork. Towards the end of the main field period in 2012, I undertook brief visits to several other rice and sugarcane estates and smallholder schemes in Kilombero and in Mbarali District, in Mbeya. These visits helped me to understand the wide variation in processes and outcomes in different OG and smallholder schemes for the same crops, and to reflect upon the factors that were salient for understanding my own findings. During the course of the fieldwork in Lungo, I helped to develop a small rice experimentation plot at Lungo village together with local residents in which we applied adapted SRI planting techniques, and experimented with different spacings, local and publically bred rice varieties, and manure treatments. The excitement, learning and frustration that accompanied this work, and its outcomes, provided tangible insights that enriched my understanding of the contextual factors that shape technology adoption, diffusion and adaptation in dynamic, uncertain and 'multi-rational' farming and livelihood contexts. In addition to these visits and follow-up interviews, I collected and reviewed a range of grey literature and documents related to the investments in MSE and KPL estates and their OG schemes, including company memos and consultancy reports, contractual agreements, lists of SRI farmers and OG cane deliveries, external evaluations, training materials, and a range of other background literature. I reviewed relevant news items, and collected pamphlets and policy briefs, publications and studies from different NGOs, investors, research stations, and informants that I visited. These provided additional background that informed and contextualized the findings.



### 3.6 Data analysis and validity considerations

Data collection, transcription and analysis proceeded hand and hand while I was in the field and followed an inductive and iterative approach. I tape recorded and handwrote fieldwork observations, insights and reflections in a field journal, transcribed interviews while in Mkangawalo, and diligently kept track of the names, contact details, positions, dates and interview locations and topics of those I spoke to in an Excel file. I lacked access to electricity while living in Lungo and made short visits to Morogoro and to SUA to transcribe formal interview notes and questionnaires, write summary ‘memos’, reflect on my emerging findings, and adjust my data collection strategy, and print off questionnaires and interview guides. I also used this time to ‘decompress’ and discuss emerging research findings with SUA colleagues, and with my main supervisor, who visited me twice during the main fieldwork. I continued to transcribe formal interviews, and scanned my remaining hand-written notes upon coming home. Data from semi-structured household interviews was entered into Excel and qualitative data on different topics were summarized in Word documents. Summary statistics were performed on relevant household interview material and inform, in particular, papers 4 and 5. I printed off and read through my material multiple times, making notes in the margins, and highlighting and summarizing important key words and excerpts in notes and memos. I catalogued my material in different ways under different topical themes, revisiting this material frequently and writing a series of summaries under thematic headings such as ‘outgrower-estate relations at MSE’; ‘Climate change issues in Lungo’, and various other headings as the analysis proceeded. Along the way, I employed several analytical strategies, including pattern matching where I considered rival explanations for the findings in cases; explanation building to identify and describe causal links that helped to explain my data; writing memos and conducting thought experiments, and performing cross-case synthesis of various aspects of the data in the two cases (Yin 2009, Maxwell 2013). Insights gained from an in-depth review of different literatures upon coming home from the field enabled me to consider how my data related to wider theoretical perspectives, and to ‘test’ my data against alternative theoretical propositions, a process that enriched and helped to sharpen the findings. I combined this inductive process of analyzing my data with insights gained from further reading, as well as my knowledge and reflections gained through primary and follow-up fieldwork, to draft ideas and outlines for the individual papers, which prompted further analysis and review of my data.

Employing multiple methods enabled me to triangulate the research findings and strengthened the validity of my analysis (Creswell 2009). I was conscious of the different ‘entry points’ to my two cases and made efforts to seek out alternative knowledge and views to the ones with which I was initially presented (Hammett et al. 2015). Visits to other estates and smallholder schemes provided an additional means of triangulation and prompted further reflection on the salient contextual (local, and national, historical and contemporary) factors shaping the performance, processes and outcomes of contractual relations in my two cases. Informal data collection strategies provided valuable contextual information that enriched the analysis. Exploring the same phenomena (participation in OG schemes) at different scales (as in Lungo), using different methods enabled me to document the heterogeneity of agricultural investment strategies, opportunities and interests within and across households, and over time. As Flyvbjerg, (2006), notes, the in-depth approach taken in case studies is ideal for generalizing on the basis of ‘falsification’, which is an important part of critical reflexivity in social science, and “one of the most rigorous tests to which a scientific proposition can be subjected” (Flyvbjerg 2006: 11). In particular, what Flyvbjerg (citing Popper) refers to as the possibility of identifying ‘black swans’, where “what appears to be ‘white’ often turns out on closer examination to be ‘black’” (ibid) proved to be particularly true of my two cases. Upon closer inspection, they proved to be quite different than the “best” and “worse” cases of responsible and inclusive agricultural investment that I had thought they were when first heading into the field.

### 3.7 Positionality, reflexivity and ethical considerations

Conducting fieldwork raises practical challenges and ethical issues and dilemmas that require the researcher to reflect upon their role and positionality while in the field (Sultana 2007, Hammett et al. 2015). During household interviews in Lungo and Mkangawalo villages, I was accompanied by two local research assistants and residents who translated for me when needed, and whom I selected and trained for this purpose. In Lungo, my assistant was a 21-year old female, Maasai resident who had completed Form 4 and was preparing to attend Teacher College. In Mkangawalo, my assistant was a 22-year old male resident who was studying for a certificate in Rural Development Planning. Employing research assistants who lived in the villages in which I conducted my research had its strengths as well as drawbacks. On the one hand, it was logistically uncomplicated and made moving around the villages and making arrangements to interview households expedient. Being accompanied by a local resident when

biking around and doing household interviews also seemed to put respondents at ease, and my assistants contributed important contextual and background information, knowledge and insights about the villages, local farming systems, politics, customs, events, practices and history that enriched my understanding of the research sites. On the other hand, it meant more thorough and diligent follow-up to ensure that we were always on the same page, since neither assistant had previously been involved in a qualitative field study. At times, I had to be flexible to work around their family and study commitments, which could be frustrating. In addition, in one case, a conflict between my assistant's family, and a neighbor, meant that I chose to go alone to an interview. In most cases, I was able to administer household interviews myself in Kiswahili, and the assistants helped to clarify when needed, and to translate what respondents said.

My positionality in relation to KPL and to the university and private sector partners with whom I first visited Lungo village, also proved problematic in some cases. In one case, I became uncomfortably aware that expectations had been raised among a family in Lungo village that I might be able to provide farmers with free seeds and fertilizer. In Mkangawalo, observing the unfolding of SRI training meant taking part in meetings between KPL and farmers in surrounding villages, and the establishment of SRI 'demonstration plots'. Although I was careful to introduce myself as a researcher during these meetings, and to distance myself from KPL during follow up research with farmers, questions about my connections to KPL were alluded to several times indirectly by farmers whom we interviewed, who tended to ask my assistant, rather than me, about this. I always made efforts to clarify my independence as a researcher to respondents and others I met, and endeavored to demonstrate my independence (as well as frugality) by biking around the villages to and from interviews and shopping and taking my meals locally. I declined offers of travelling to the estate offices with KPL staff by car/truck each day, opting instead to bike the 4 kilometers there and back. I also made a point of using local public transportation when travelling further afield and between my field sites and Morogoro City and SUA campus. These travels were learning and socialization experiences in themselves and often resulted in fortuitous conversations with knowledgeable fellow passengers who provided relevant information and in some cases contacts for interviews that enriched my research. While in Lungo, I spent time visiting and farming with different families, and walked and biked around the community and to interview farmer OG associations, and MSE estate staff, to avoid becoming overly reliant on the perspectives of my host family and my initial focus on

rice farming. Undertaking PRA exercises with men and women smallholders of different wealth groups in contrasting sub-villages of Mkangawalo, visiting different farmers' fields, conducting follow-up interviews with SRI-trained farmers, and seeking out views from a range of respondents, enabled me to gain insights about the wider farming systems and range of livelihoods in the village.

Engaging up close in fieldwork meant continuously confronting the rich nuances, messiness and complexity of the lives of the individuals, farming systems, households, communities and organizations that I studied. These encounters forced me to shed some assumptions and beliefs that I brought to the field that were partly the product of my own academic training and background. The debates around agricultural investment in Tanzania, including the ones I had studied and identified with before coming to the field, are highly polarized. They are replete with dichotomies that encourage the researcher to 'take sides' one way or another. Yet these dichotomies proved more elusive on the ground. My training in development studies had prepared me to side with smallholders and to be skeptical of large-scale investments such as OG schemes, which I assumed aimed to exploit them in the name of 'development'. Having been exposed to the insides and outside of both smallholder farming communities and the working of large estates during the fieldwork however meant that I could understand and sympathize with both 'sides'. The inability to achieve 'closure' was also unsettling, as I was still trying to 'follow' SAGCOT's implementation, and the scaling up of SRI training and inauguration of KPL's OG scheme after leaving the field, and was reluctant to pass judgement on them prematurely. With nuance, rich ambiguity, and the absence of 'closure', came the challenge of writing up the findings in separate papers as part of an article-based thesis that would do justice to the rich and layered details of the individual cases, and give voice to the multiple –and at times conflicting– perspectives on various topics and issues related to the thesis. This was an invigorating and challenging process.

On a practical level, the fieldwork involved long periods of residence, repeat visits, and 'hanging around' in local settings (Bryman 2008). While these visits and stays constituted an important means of establishing and building trust and rapport with research participants, In Lungo, I was acutely aware of the paradoxical 'blessing' and 'curse' that my stay with my host family, entailed. On the one hand, my ability to contribute economically to the household, and my being

a foreign 'guest' in their home was viewed positively. On the other hand, I was completely dependent on them for translation and material and social 'survival' during the early weeks of fieldwork. My clumsiness in relation to social cues, and cultural codes that dictated that I could not cook for myself or walk alone initially, and that I should eat in a privileged location and position in the home, were frustrating for me, and must have been inconvenient and grown old at times. I did my best to minimize the demands that I made on my host family and to reduce the power dynamics (which ran in both directions) by contributing to household chores and miscellaneous expenses, helping with the farming, and sharing my bike, in addition to compensating the family for my accommodation and food costs. I struggled to balance my feeling of indebtedness and gratitude and the reciprocity that this entailed, here and elsewhere, with wanting to belong and not be seen or treated as an 'outsider', which of course, I was. This did change subtly over the course of the fieldwork, however, as I moved along the 'insider-outsider' continuum (Hammett et al. 2015). Flexibility and 'luck', as well as 'sponsors' and 'gate keepers' of various kinds, have played important roles in shaping the knowledge I have been able to gain, and the stories I can tell, about my time in the field. At different times during the fieldwork I faced challenges in 'chasing the data' and trying to both 'assess' and 'follow processes that were unfolding in different places and to 'be in the right place at the right time'. By chance, I was at KPL when the former President came for a visit, and again, by chance, I happened to be in Lungo during torrential flooding that forced an early closure to the cane-harvesting season in late 2011 and provided a fascinating window into the reasons behind coordination breakdowns and failures. I reflected on these incidences of providence, and the dilemmas and paradoxes I encountered during fieldwork through journaling, in discussions with my family, and when connecting with other researchers and colleagues both in and outside 'the field'.

## 4. SUMMARY OF THE PAPERS

### Paper I

This paper analyses the controversy surrounding the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) initiative in the light of findings from consultations with SAGCOT stakeholders and intended beneficiaries who are experiencing and navigating agricultural investments on the ground. While SAGCOT narratives frame agricultural investments as either an ‘opportunity’, or a ‘risk’ for smallholder farmers, rural communities and the environment, the paper argues that agricultural investment realities on the ground are rarely as ‘glamorous’ or ‘gloomy’ as what these narratives suggest. Our findings show that policy makers, farmers, NGOs, government authorities and private investors are struggling to understand, define and coordinate their roles in relation to SAGCOT, to articulate the value-added of the initiative, and to balance a range of interests, objectives and potential trade-offs through agricultural investments on the ground. Rather than being ‘victims’ of large-scale agricultural investments, we find that smallholders and rural communities in the SAGCOT region may welcome such investments if they contribute to improving and diversifying rural households’ incomes and access to agricultural markets, training and services without exposing farmers to additional risks or undermining their land rights. The findings further suggest that local land-use conflicts, which are fueled by inadequate local and district-level land-use planning and high rates of smallholder immigration into the SAGCOT region, constitute an important, but neglected dimension of ‘land grab’ question in Tanzania. The findings illustrate that there is inherent complexity, including potential trade-offs and conflicting values and interests in agricultural investments that seek to combine public- and private sector finance, address the needs of small- and large-scale farmers, and balance social, economic and environmental goals. The paper concludes that there is a need for more coordinated, inclusive and transparent institutional and governance frameworks to guide SAGCOT investments. Rather than trying to get the overarching agricultural investment ‘models’ right, we argue that policy efforts within and beyond SAGCOT should promote and incentivize agricultural investment pathways that take diverse local investment priorities, contexts and needs seriously.

## **Paper II**

This paper investigates how external agricultural interventions targeting smallholders interact with, shape and support smallholders' own agricultural investment strategies, values and priorities in Lungo village, near Mtibwa Sugarcane Estates, and have contributed to local livelihood trajectories over time. Drawing on insights from the sustainable rural livelihoods literature, the paper describes how and why smallholder agro-investment practices and strategies in the village differ, assesses the role of contract farming and livestock-based interventions in these strategies, and identifies the factors that have enabled selected female outgrowers to translate their participation in external agricultural investments into improved well-being for themselves and their families. The analysis is based on quantitative and qualitative data from semi-structured interviews undertaken with men and women smallholders of different wealth categories in the village, on life history interviews, and on insights gained from qualitative observations and informal interactions with villagers during the fieldwork. The paper shows that smallholder agro-investment capacities, practices, values and priorities differ within and across households and over time due to a wide range of internal and external social, political, economic and environmental factors that shape access and entitlement to livelihood resources. Life history interviews with female outgrowers indicate that livestock keeping plays an important role in their households' livelihood trajectories and that they value flexible and autonomous sources of income that can be directed towards improving their families' health and education. The paper shows that OG production forms only one component of participating households' agricultural diversification efforts and that outgrowers in the village are actively drawing upon and combining external and internal resources, knowledge and capabilities and engaging in both intensive and extensive forms of crop- and livestock production in order to secure their livelihoods. However, external crop- and livestock-based interventions have bypassed poorer households and newcomers to the village. The findings suggest that contract farming is part of a more dynamic agricultural development pathway than what is envisaged in national policies and strategies that promote OG schemes as part of an agricultural modernization pathway.

### **Paper III**

This paper compares and contrasts two cases of smallholder-inclusive agricultural investment in Tanzania and investigates the factors that shape their vulnerability and resilience to risks and uncertainties that affect their performance and viability as a development strategy. Drawing on observations and interviews with smallholders, key informants and management and staff of Mtibwa Sugarcane Estates (MSE), and Kilombero Plantations Limited (KPL), we discuss how issues of ownership, voice, risks and rewards shape how smallholders and estates negotiate their relationships in these investments in practice. While OG schemes are promoted as a way to overcome the transaction costs and risks that farmers and firms face, and to make large-scale investments in land more responsible, our findings suggest that it is difficult to forge responsible and inclusive investment partnerships between smallholders and large estates that lower both types of actors' vulnerability to a range of risks and enhance their resilience in positive ways. Despite having a responsible investment profile on paper, KPL faces a number of challenges and risks that appear to threaten to undermine its commercial viability. Conversely, despite facing numerous challenges, the MSE smallholder scheme exhibits high levels of economic and political 'resilience'. The findings suggest that the dynamics of vulnerability and resilience in commercial partnerships between small- and large-scale farmers at MSE and KPL are largely shaped by the 'rules of the game' and in particular, how much or little the state 'protects' large-scale investors from political and economic risks. In particular, a lack of transparent and reliable agricultural investment policies and mechanisms for governing access to land, resolving contractual disputes, and marketing the crops in question reinforces power asymmetries between the participants, enhancing the risks, and undermining the potential development impacts of these partnerships. We conclude that inclusive agro-investments are unlikely to achieve their commercial and development objectives in the absence of coherent, transparent and enforceable governance and frame conditions and a 'level' playing field for private sector investments in agriculture that incentivizes and rewards responsible agricultural investment behavior.



## **Paper IV**

This paper asks whether and how agricultural investments that are undertaken as part of general development efforts in Tanzania can enhance the adaptive capacity of smallholder farmers and rural communities to climate change. This question is addressed by investigating the efforts made by two recently privatized large-scale agricultural estates, Kilombero Plantations Limited (KPL) and Mtibwa Sugar Estates (MSE), to establish and sustain ‘outgrower’ (OG) arrangements with smallholders for production of sugarcane and rice. The analysis draws on participant observations and interviews with smallholder households and a range of key informants. Insights from the contract farming and climate adaptation literatures are employed to analyse how the two OG schemes shape households’ and communities’ adaptive capacity in relation to seven factors: economic resources; risk management, technology; information and skills; infrastructure; institutions; and equity. The findings indicate that the MSE and KPL schemes, and the public, private and donor financing that they have attracted are enhancing local adaptive capacities by contributing to household income diversification, stability, and flexibility; by enhancing access to technologies, inputs, training, and skills that widen farmers’ production choices; by investing in physical infrastructure that enhances community and household access to healthcare services, education and markets; and by helping to build social capital and strengthening farmers’ abilities to lobby collectively for their interests and rights. However, the evidence does not suggest that smallholders’ participation in the schemes directly lowers their production or marketing risks or reduces social, economic or environmental inequalities in participating communities. The paper moreover identifies several ways in which KPL and MSE have missed opportunities to support smallholders’ adaptive capacity or are undermining it. The findings suggest that more emphasis on two-way learning processes and stronger cooperation between the public and private sectors and civil society are needed to expand the benefits, while mitigating the potential risks, to smallholders and rural communities who participate, or wish to participate, in OG schemes. Greater equity, transparency and sustainability in access to and use of land and water in and near the schemes are, moreover needed as land and water represent important local adaptation resources.

## **Paper V**

This paper explores the differences between using macroeconomic indicators, tailored modeling of farmers' behavior and findings from empirical fieldwork to assess climate change vulnerability, impacts and adaptation in Tanzania's agricultural sector. We compare conclusions arrived at by assuming that smallholders behave as 'representative agents' in a macroeconomic model, with a microeconomic sector model that accounts for differences in smallholder farm size, and findings from mixed methods research with smallholders in a village in Morogoro Region. The latter examined differences in households' access to land and off-farm income sources and their engagement in agricultural production activities in a wider livelihood context. The macroeconomic model suggests that agricultural productivity will be affected by a temperature increase of more than 5 °C by the end of this century, but with moderate impacts on prices. Findings from the micro-model indicate that if the projected climatic changes in 2100 occurred today, the impacts on agricultural productivity would result in food consumption of nearly 1.5 million more Tanzanians falling below the minimum supply of food, and more than two million additional people depending entirely on food that they produce themselves. Households that manage to stay above the nutrition constraint will have to reduce their food consumption. Lower productivity of land due to projected climate changes moreover encourages greater dependence on income earned from work outside the farm among poorer households who have access to smaller farms. The village-level data show that both the macroeconomic and micro-economic models overestimate the ability of poor smallholders to undertake autonomous adaptation in order to reduce their vulnerability to these changes. Only a small proportion of smallholders who were interviewed are engaged in reliable and remunerative employment. These tend to be wealthier households, with larger farms and more education. Poorer households cultivate smaller farms and rely to a greater extent on unpredictable income from casual work and petty trading. These findings suggest that climate change constitutes a barrier to mitigation of poverty that is more complex and challenging than indicated by analyses of the statistical data. It moreover suggests that climate adaptation measures undertaken in the agricultural sector need to consider smallholders' non-farm livelihood strategies and options, and linkages to other sectors. The findings suggest that major investments are needed to generate secure and remunerative off-farm employment options for poor, rural households to enable them to adapt to the direct and indirect impacts of climate change on agricultural production and productivity

## 5. DISCUSSION

This thesis has critically investigated the potentials and limitations of smallholder-inclusive agricultural investments as a development strategy in Tanzania through an empirical focus on two private sector-led OG schemes in Tanzania's Southern Agricultural Growth Corridor. By pursuing a nested, case study approach, and drawing upon and connecting theoretical perspectives and insights from the literatures on contract farming and outgrower schemes, sustainable rural livelihoods, contextual perspectives on vulnerability, resilience and adaptation, and responsible agro-investment governance, the analysis has shed light on the perceptions and motivations of the different actors that participate in two OG schemes, and problematized the 'logics' that underpin their promotion and that influence their viability as a development strategy.

The findings have shown that OG schemes carry both opportunities and risks, and may have both positive and negative development impacts, depending on the level and focus of analysis. At the household level, the findings from the research at MSE and KPL show that OG schemes may strengthen smallholder livelihoods by enhancing agricultural yields, contributing to agricultural diversification, providing access to agricultural training, inputs, markets and services, motivating smallholders to organize collectively, and in some cases, reducing participants' vulnerability to food crop failures. At the community level, the operation of large estates leads to employment opportunities and investment in physical and social infrastructure, training, and services from the estates and third parties that may be beneficial to communities. However, while strengthening smallholders' and communities' adaptive capacities in numerous ways, the analysis does not suggest that the MSE and KPL schemes contribute to more equitable local processes of development. While early entrants to the OG scheme in Lungo village have enhanced their livelihood trajectories, high entry and participation costs, risks and barriers may prevent poorer households and more recent migrants to the communities from participating in and benefiting from the schemes. Neither do the findings show that the income generated by OG production is shared equally within households. Hence, women in OG households may prefer to invest their time and labour in complementary activities that generate food and income that they can control and direct in ways that improve the long-term well-being of their families.

In both cases, the findings show that smallholder participation in OG schemes forms part of a more dynamic and complex agricultural development pathway than what is envisaged in national agricultural investment initiatives and plans (West and Haug, *under review*). Production of the contracted crops forms one component of participants' diversified agricultural production and livelihood strategies, and engagement with and commitment to the schemes is vulnerable to several factors. Smallholders in Lungo and Mkwangawalo villages sow a wide range of crops for food and sale, and engage in various on- and off-farm income-earning activities, in addition to growing the contracted crops. Rather than being passive recipients of external technology and training smallholders combine knowledge, skills and networks gained through their participation in OG schemes and other external interventions with their own local knowledge, practices, and experiences. Farmers engage in diversified agricultural production and livelihood activities in order to respond dynamically to external conditions, including fluctuating agricultural prices and climatic conditions, and to internal conditions such as the availability of labour, the health status of household members, and their need for food and income at different points in time. This dynamic, flexible and 'performative' behavior, which is motivated by both economic and non-economic concerns, enables smallholders to secure their livelihoods in uncertain and risky contexts (Richards 1985, Richards 1989, Crane et al. 2011). It reduces households' exposure to climate and marketing risks, helps to economize on labour and agricultural inputs, and ensures that households have a reliable and adequate supply of income and culturally appropriate and nutritious food (Netting 1993, Scoones 1996). Engaging in diversified livelihoods and forms of agricultural production also helps farmers to avoid becoming dependent on the contracted crops, and to enhance their bargaining position vis-à-vis estates in relation to prices and other contractual details. It also minimizes the potential risks that participating in OG schemes may entail, as shown in other studies (Glover and Kusterer 1990, Porter and Phillips-Howard 1997).

One of the reasons that agricultural development efforts in Tanzania continue to fall short of targets is arguably that they are pursued within a 'modernization' paradigm that fails to acknowledge and address the reality and motivations for livelihood diversification in rural areas (Ellis and Mdoe 2003, Ellis 2006). The stability of circumstances assumed by conceptions of development as part of an economic modernization strategy – whether pursued as part of state- or market-led development paradigms, contrast with the dynamism and instability that rural people live with in practice (Leach et al. 1999, Eriksen et al. 2005, Paavola 2008). The

dynamism, flexibility, and diversity of smallholder agricultural production systems and livelihoods contrasts with the emphasis on equilibrium, specialization, uniformity and control of agricultural production and processing connected to nucleus estates. The latter requires close coordination and integration of agricultural production and processing in order to achieve economies of scale and returns on investments in fixed assets and equipment. For these and other reasons, the findings show that large-scale investments in land are vulnerable to production, marketing and institutional uncertainties and risks, as well as coordination failures (West and Haug Under review).

The analysis has also identified ways in which the MSE and KPL schemes have missed opportunities for enhancing local adaptive capacity and may contribute to maladaptation. Examples include the promotion of top-down agricultural training approaches, input packages and production methods that are at odds with farmers' knowledge, preferences and dynamic production conditions; extending agricultural credit to finance rain-fed agricultural production; engaging in large-scale farming operations in regions where there is high competition over land and water resources, and undertaking infrastructure investments that are vulnerable to climate variability and change. These findings belie a lack of understanding and appreciation of local expertise and knowledge and the dynamic and risk-prone contexts within which smallholder production takes place (Thompson and Scoones 2009). They also suggest that undue faith continues to be vested in the ability of external interventions and modern agronomic science to solve the challenges that smallholders face (Coulson 2013). The findings in Paper 5 show that assumptions about smallholder behavior in macro- and micro-economic assessments of climate change impacts, vulnerability and adaptation in Tanzania's agricultural sector do not resonate with the dynamism and diversity of smallholder livelihoods in practice. Focusing only on the agricultural component of smallholder livelihoods is inadequate to address the adaptation constraints that poor rural households are likely to face under climate change. The findings show that linkages to the non-agricultural sector, and the creation of remunerative and secure income-earning opportunities for poor, rural households, constitute important dimensions of adaptation. Understanding the employment effects of OG schemes, which other studies in Tanzania have shown to be positive, is therefore crucial (Herrmann 2017).

The findings further show that OG schemes carry risks for smallholders, investors, rural communities and the environment. These relate to the unequal bargaining power and economic and political status of smallholders vis-à-vis large estates, the financial, operational and reputational risks facing large estates, the risks of smallholder farmers and livestock keepers losing access to land, and the environmental risks posed by large-scale industrial farming practices to communities living adjacent to and downstream from the estates. OG households to various extents engage in livestock keeping and other forms of agricultural production to secure food and income and in order to reduce the risks and uncertainties that they face, including those associated with engaging in OG production. These risks notwithstanding, smallholders who are able and have the resources to do so actively harness, engage with and combine the knowledge, skills, inputs and opportunities that OG schemes offer them in order to secure and improve their livelihoods and improve the well-being of their families.

However, the potential for OG schemes to yield positive local development impacts hinges on the stability of the relationships between smallholders and estates and on the sustainability and viability of investments in large agricultural estates. A range of contextual factors, interactions and feedbacks affect these dynamics. They include the production and marketing characteristics of the contracted crops, including the role that rice and sugarcane play in smallholder agricultural production systems and livelihoods, and the perceived fairness and transparency of contractual relations and processes by which the estates were privatized. Political economy and governance factors, including an unpredictable macro-investment environment and unequal 'playing field' for private sector agricultural investment, and the macro- and micro-institutional contexts governing access to land, render large estates more or less vulnerable to financial and operational risks that shape the vulnerability and resilience of their commercial partnerships with smallholders.

While illustrating that insights from these different literatures are relevant in different ways to understanding and interpreting the empirical material, the findings also challenge some of the assertions and assumptions that inform different strands of the CF/OG scheme literature. In line with the 'neo-populist' or 'Food First' school of CF studies, and critical realist thinking, the findings support the view of CF arrangements as being part of open systems and embedded within dynamic historical, social, economic, and political contexts (Little and Watts 1994, Sayer

2000). However, while recognizing the power asymmetries that exist and that shape the relationships between smallholder growers, and large, commercial estates, the findings nuance undifferentiated views of smallholders as ‘victims’ of large-scale agricultural investment and as being uniformly ‘vulnerable’ and in need of external adaptation assistance (Eriksen et al. 2015). The analysis shows that smallholders in Lungo and Mkangawalo villages are generally positive towards OG scheme investments and efforts connected to KPL and MSE, provided that they contribute to improving and diversifying rural households’ incomes and access to agricultural markets, training and services without exposing smallholders to additional risks or undermining their land rights.

In line with the commodity approach, the findings also show that the technological characteristics of the contracted crops affect the viability of OG schemes, and their potential to contribute to local development. Sugarcane is a highly perishable perennial cash crop that is harvested mechanically and requires timely delivery and processing to a central processing facility to be profitable. The market is a monopsony by design. Rice is a food and a cash crop that is harvested manually, and can be saved and stored by farmers in order to meet households’ needs for food, cash, contingencies, and social and cultural obligations. Farmers can sell either to KPL, or to the numerous small traders that travel into rice growing areas at harvest time. The existence of alternative sources of raw materials (from smallholders or the estate) for processing and markets affect smallholder OGs and estates’ commitments to the contract, and the viability and sustainability of the OG schemes.

The findings that smallholders are capable of producing as high or higher yields, and better quality rice, than KPL, and that both estates face risks that appear to threaten their commercial viability raises questions about the “theory of change” that informs the promotion of OG schemes as a development strategy. Whether they constitute an “institutional innovation”, and what the rationale is for promoting them, are salient questions. While NIE and mainstream economic approaches view smallholders as individual utility maximizers and emphasize the *economic* logic for why farmers and firms engage in contracting, the findings from the thesis question the extent to which OG schemes persist for economic or political reasons. The view that contractual arrangements serve to overcome the transaction costs and risks facing farmers and enhance economic efficiency is belied by the reality of dynamic smallholder production systems

and livelihoods in the investigated cases and the vulnerability and resilience of MSE and KPL schemes to various risks. Both estates were established and conceived as part of state-led development and modernization initiatives and were originally promoted as part of a socialist, rather than a market-based, ideology. Lungo village was established as part of large-scale resettlement and villagisation policies enacted under Nyerere's *Ujamaa* that centered around collective sugarcane farming, and plans to develop the Kilombero Valley for large-scale irrigated rice farming date back to German colonial rule (Monson 1991). Whether OG schemes are promoted due to an ideological and political commitment to a particular (historically rooted) vision of modernization and smallholder development (combining small- and large-scale farming), a desire to legitimize large-scale investments in land, or for other reasons, it seems clear that they are *political*, as much as they are economic, or social, creations. This political and ideological context, the top-down modernization development paradigms within which OG schemes have been promoted, and the logics that perpetuate it mitigate against the potential for OG schemes to form part of a deliberate and transformational bottom-up process of agricultural investment and development that supports and strengthens rural livelihoods.



## 6. CONCLUSIONS

The findings presented in the thesis underscore the challenges involved in reconciling diverse actors, values, strategies and normative development objectives in and through private sector-led smallholder-inclusive agro-investments in Tanzania. The findings show that there is inherent complexity, including potential trade-offs and conflicting values and interests in agricultural investments that seek to combine public- and private sector finance, address the needs of small- and large-scale farmers, and balance social, economic and environmental goals. While SAGCOT and BRN are promoting OG schemes as part of efforts to get agriculture on a linear economic 'growth pathway', using large-scale agricultural production and processing on nucleus estates as a vehicle for modernizing smallholder agriculture, the thesis shows that a number of the assumptions underlying this approach are problematic.

Goals of maximizing agricultural productivity, and assumptions that smallholders are individual 'utility maximizers' do not resonate with the reality of smallholder livelihoods in practice. Smallholders are members of heterogeneous households, communities and ethnic, religious and kin networks, and they pursue diversified livelihoods in order to maximize the economic and social well-being of their households, meet social and cultural obligations and secure their livelihoods against multiple risks and uncertainties. Moreover, contractual production forms only one component of OG households' strategies to secure their livelihoods and improve their well-being over time. This suggests that OG schemes are part of a more complex and dynamic smallholder pathway than what is envisaged in national initiatives and plans.

While the MSE and KPL OG schemes constitute a development opportunity for participating smallholders, they also carry risks. The diverse motivations, options and resources open to small- and large-scale participants in the schemes, and adverse and unreliable political economy and governance contexts, conspire to make agricultural investments risky for both small- and large-scale agricultural producers. The findings suggest that the financial viability of both MSE and KPL estates is questionable. Their differential vulnerability and resilience to political and economic risks raises questions about the potential for 'rules-based' versus 'deals-based' agro-investments to survive and make positive and sustainable contributions to local development. In both cases, understanding the wider livelihood contexts within which OG production takes place is necessary in order to understand whether and how OG schemes can support smallholder

livelihoods. These and other findings make it clear that OG schemes need to be approached holistically, rather than on purely economic, technical, or transaction cost terms. The OG schemes investigated in the thesis are products of and embedded within dynamic historical, social, ecological, and political contexts. They hence need to be understood as *political*, as well as social and economic phenomena.

There is a clear tension between the explicit function that nucleus estates are expected to perform as private-sector investors in OG schemes, and the implicit expectation that they assume the role of ‘development actors’. The thesis questions whether it is feasible, given current institutional arrangements, for OG schemes to perform both of these roles. It is frequently argued that the state has a key role to play in ensuring that agro-investments in contract farming and outgrower schemes operate in a socially and environmentally responsible manner (Committee on World Food Security 2014). However, in line with other authors, the findings from the thesis question the extent to which the state has the capacity and is politically motivated to promote and enforce a ‘level playing field’ for large-scale agricultural investments and to incentivize and enforce responsible and inclusive agro-investment practices (Cooksey 2012, West and Haug Under review).

Taken together, the findings suggest that OG schemes do not form part of a transformational adaptation process that directly challenges entrenched power relations and inequalities that produce and reproduce vulnerability in the investigated communities and households. Rather, it can be seen as a form of ‘incremental’ adaptation or ‘development as usual’ approach that perpetuates established views and discourses of agricultural investment and development as part of a ‘modernization’ process. The rationale that informs the promotion of OG schemes as part of a modernization strategy that privileges large-scale farms and scientific farming methods aimed at maximizing smallholder agricultural productivity is arguably different than a strategy that aims to harness OG schemes to strengthen smallholder livelihoods and capabilities as part of a ‘bottom-up’ process of sustainable and equitable development. This raises questions about whether OG schemes should be scaled-up as a ‘mainstream’ rural development strategy in Tanzania. While OG schemes targeting certain crops may constitute a ‘development opportunity’ for certain smallholders and rural communities, the findings in the thesis show they are not a panacea, and should not be pursued for all crops in and all contexts. An important question in

relation to scaling and equitable development is to what degree OG schemes are an option for the majority of women and men smallholder farmers in Tanzania, or only a privileged few. Given the social, political and ecological risks that expanding large-scale commercial agricultural production in Tanzania is likely to entail, and the uncertain viability of the schemes investigated in the thesis, alternatives to land-extensive OG schemes that can increase smallholder incomes and well-being and contribute to broad-based and sustainable development efforts should be explored, where indicated and feasible. Approaches that focus on processing and adding value to crops produced by smallholders and that do not involve large-scale land acquisitions or estate production, offer examples. Regardless of whether the government chooses to invest in small-scale or large-scale agricultural production, or promote investment approaches that combine them, it is important to avoid a ‘blueprint’ approach. Rather than trying to get the overarching agricultural investment ‘models’ right, current and future agro-investment initiatives and policy efforts in Tanzania should promote diverse agricultural investment pathways that acknowledge heterogeneous local investment and development contexts, capacities, needs and priorities. They should empower smallholders as key agricultural investors and engage and build upon their knowledge, resources, and skills. And they should recognize the dynamic nature of smallholder livelihoods and work to overcome the barriers that prevent the poorest smallholders from participating in and benefitting from, agricultural investments.

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## **PART II**





**Polarized narratives and complex realities in Tanzania's Southern Agricultural Growth Corridor**

Journal:	<i>Development in Practice</i>
Manuscript ID	CDIP-2015-0200.R1
Manuscript Type:	Article
Keywords:	Agriculture < Environment (built and natural), Governance and public policy, Region: Sub-Saharan Africa, Labour and livelihoods, Globalisation (inc trade, private sector), Partnership < Civil society, Developmental policies < Aid
Abstract:	This paper assesses the controversy surrounding a high-profile agricultural investment initiative: the Southern Agricultural Growth Corridor of Tanzania (SAGCOT). Drawing on a review of SAGCOT literature and findings from consultations with SAGCOT stakeholders and intended beneficiaries, we outline the polarized narratives of 'opportunity' and 'risk' informing SAGCOT debates, and present and discuss research findings that challenge these narratives. Our findings suggest that agricultural investments are rarely as glamorous or as gloomy in practice as what the polarized narratives around SAGCOT suggest, and illustrate the challenges involved in directing agricultural investments in ways that balance multiple interests and objectives in practice.

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## Polarized Narratives and Complex Realities in Tanzania's Southern Agricultural Growth Corridor

### Abstract

This paper assesses the controversy surrounding a high-profile agricultural investment initiative: the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), which aims to modernize, commercialize and transform Tanzania's agricultural sector. Drawing on a review of SAGCOT literature and findings from consultations with SAGCOT stakeholders and intended beneficiaries, we outline the polarized narratives of 'opportunity' and 'risk' informing SAGCOT debates, and present and discuss research findings that challenge these narratives. Our findings suggest that agricultural investments are rarely as glamorous or as gloomy in practice as what the polarized narratives around SAGCOT suggest, and illustrate the challenges involved in directing agricultural investments in ways that balance multiple interests and objectives in practice.

**Keywords:** SAGCOT, narratives, smallholders, agricultural investment, public-private partnerships, Tanzania

### Introduction

The Southern Agricultural Growth Corridor of Tanzania (SAGCOT) agricultural investment initiative has attracted wide attention and interest among policy makers, international organisations, donors, the private sector, civil society and academics (Sulle and Hall 2013, Paul and Steinbrecher 2013, Kaarhus et al. 2010). Unveiled by former Tanzanian president Kikwete at the World Economic Forum in Africa in May 2010, and described as a flagship public-private partnership in support of the government's 'Kilimo Kwanza' (Agriculture First) initiative for fostering greater private sector participation in the country's agriculture sector, SAGCOT aims to "deliver rapid and sustainable agricultural growth, with major benefits for food security, poverty reduction and reduced vulnerability to climate change" (AgDevCo and Prorustica 2011, Forward). Achieving broad based economic growth and poverty alleviation are central goals of Tanzania's development policies, as articulated in The Tanzania Vision 2025<sup>1</sup>, the National Strategy for Growth and Reduction of Poverty II (NSGRP-II)<sup>2</sup> and its corresponding Five Year Development Plan (FYDP) for 2011 – 2016 (URT 2016, URT/ MFEA 2011). Growth in

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3 agricultural production and productivity are considered key to achieving these aims, as affirmed  
4 in the National Agricultural Policy of 2013 (NAP 2013). Unlike past agricultural development  
5 visions and policies, including the Arusha Declaration policies (1967- 1997) and the Agricultural  
6 Sector Development Program (ASDP) of 2006-2013, current agricultural policies in Tanzania,  
7 including the 2013 NAP, as well as the SAGCOT, Kilimo Kwanza and more recent 'Big Results  
8 Now'<sup>3</sup> initiatives, emphasize the private sector, contra the public sector, as the engine of  
9 agricultural growth and development in the country (Cooksey 2012, URT/MAFC/NAP 2013).  
10 With this in mind, the Tanzanian government considers SAGCOT to be an important means of  
11 attaining its aim "to bring about a green revolution that entails transformation of agriculture from  
12 subsistence farming towards commercialization and modernization" (URT/MAFC/NAP 2013, 8).  
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16 Geographically, the region targeted by SAGCOT encompasses an area of approximately five  
17 million hectares of arable land in the Central and Southern Highlands regions, extending from the  
18 port of Dar Es Salaam to the country's borders with Malawi, Zambia and the Democratic  
19 Republic of Congo (ibid). This region boasts some of the country's most agriculturally  
20 productive land<sup>4</sup> as well as seasonal and perennial rivers, and backbone infrastructure such as  
21 roads and railways. The Prime Minister's Office states that "over the next 20 years, SAGCOT  
22 aims to bring 350,000 hectares of farmland into commercial production for national, regional and  
23 international markets to increase annual farming revenues by US\$1.2 billion, and lift more than 2  
24 million people (roughly 450,000 farm households) out of poverty" (URT 2013). It is expected  
25 that SAGCOT will attract investments worth more than US \$3 billion by the year 2030, through a  
26 combination of matching grants, direct investments, and 'patient capital' (AgDevCo and  
27 Prorustica 2011). These investments are expected to be channelled to initiatives within identified  
28 agricultural investment 'clusters' that target smallholder farmers and link them to agribusiness  
29 value chains, and that show promise of augmenting food production and farming incomes in the  
30 region in sustainable ways, with the goal of establishing Tanzania as a net food exporter  
31 (EcoAgriculture Partners 2012).  
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51 Proponents of SAGCOT, including the Tanzanian government, bilateral donors, multilateral  
52 organizations such as the World Bank, and global agri-business companies, see it as a way to  
53 modernize, commercialize and transform the region's agricultural sector, benefit the country's  
54 farmers and economy and reduce rural poverty. Yet SAGCOT has attracted heavy critique from a  
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3 number of non-governmental organisations (NGOs) civil society groups and academics, who  
4 view it as a vehicle to marginalize smallholder livelihoods, impoverish rural communities and  
5 exploit the environment (Oxfam 2014). This paper draws on interviews and consultations with  
6 key SAGCOT stakeholders including central and district-level government officials, smallholder  
7 farmers, and large-scale farmers and investors to assess whether the types of agricultural  
8 investments that SAGCOT is promoting are as ‘good’ or as ‘bad’ for smallholder farmers, rural  
9 communities and the environment as what the polarized narratives around the initiative suggest.  
10 Although is still too early, given the slow pace of implementation on the ground, to determine  
11 whether SAGCOT has been a ‘success’ or a ‘failure’, if implemented, it is likely to have  
12 widespread implications – for better or worse - for the millions of smallholder households in  
13 Tanzania that depend on agriculture for their livelihoods (Kaarhus 2011, World Bank 2015). It is  
14 thus important to have a solid understanding of the potential social, economic and environmental  
15 opportunities and constraints associated with the types of investment that SAGCOT is promoting.  
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18 We start by outlining two contrasting narratives that are shaping SAGCOT debates: one that  
19 portrays SAGCOT investments as a ‘triple win’ opportunity, and the other that highlights the  
20 potential ‘risks’ that these investments pose to smallholder farmers, rural communities and the  
21 environment. We then outline the research methods and the key features of the agricultural  
22 investment approaches that SAGCOT is advocating. Thereafter we present findings from  
23 consultations with SAGCOT stakeholders and intended beneficiaries, which suggest that  
24 SAGCOT investments are neither as glamorous nor as gloomy in practice as what the polarized  
25 narratives around the initiative suggest. We find that although the simplified ‘risk’ narrative  
26 portrays smallholder farmers and rural communities as being the ‘victims’ of large-scale, private-  
27 sector-led agricultural investment, smallholders in the SAGCOT region may welcome large-scale  
28 investments in land if they contribute to improving and diversifying rural households’ incomes  
29 and their access to agricultural markets, training and services without exposing farmers to  
30 additional risks or undermining their land rights. Further, we find that not all large-scale  
31 agricultural investments constitute contemporary examples of ‘land grabbing’ and that local land-  
32 use conflicts fuelled by increasing rates of smallholder immigration into the SAGCOT region  
33 constitute an important, yet neglected, aspect of the land question. At the same time, the research  
34 reveals that there is inherent complexity, including potential trade-offs and conflicting values and  
35 interests, in investments that seek to combine public- and private sector finance, address the  
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3 needs of small- and large-scale farmers, and balance social, economic and environmental goals.  
4 This complexity underscores the need for more coordinated, inclusive, accountable and  
5 transparent institutional and governance frameworks to guide SAGCOT investments. We argue  
6 that policy efforts to guide agricultural investments within and beyond SAGCOT should focus  
7 less on trying to get the overarching agricultural investment ‘models’ right and more on  
8 understanding how to promote and incentivise diverse agricultural investment pathways that  
9 respond to heterogeneous local needs and contexts.  
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## 15 16 **Background and approach**

### 17 18 *SAGCOT as opportunity or risk?*

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20 A reading of the SAGCOT literature suggests that there are two prevailing narratives about the  
21 kinds of agricultural investment that it is promoting: the first is an ‘opportunity’ narrative, which  
22 presents SAGCOT as a ‘triple-win’ opportunity to enhance sustainable agricultural growth,  
23 augment food security, and reduce rural poverty (AgDevCo and Prorustica 2011, EcoAgriculture  
24 Partners 2012). A contrasting narrative highlights that SAGCOT poses a number of ‘risks’ for  
25 smallholder farmers, rural communities and the environment (Sulle and Hall 2013). These  
26 narratives of ‘opportunity’ and ‘risk’ are not exclusive to SAGCOT debates but mirror ongoing  
27 debates at the global level about the form and direction that renewed investments in agriculture in  
28 developing countries should take, where questions about the relevance, roles and balance  
29 between ‘traditional’ and ‘modern’<sup>5</sup>, farming approaches, public and private-sector actors,  
30 smallholders and large-scale food producers, food security and export production goals, and  
31 environment and development concerns in agricultural investments are the subjects of  
32 considerable and ongoing debate (Foresight 2011, Mtengeti et al. 2014). These debates are in turn  
33 connected to historical questions and contemporary theories about the role of agriculture in wider  
34 societal development and transformation processes, the roles and legitimacy of the state, the  
35 private sector, and civil society in these processes, and more recent concerns about how  
36 agricultural investments may interact with issues of land rights, power relations, and social,  
37 environmental and economic entitlements and inequalities (Zoomers 2010, Benjaminsen and  
38 Bryceson 2012, De Janvry 2010).  
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### *SAGCOT as 'opportunity'*

Early SAGCOT investment plans, including the SAGCOT Investment Blueprint ('Blueprint'), and Green Growth Investment Framework ('Greenprint'), emphasise that SAGCOT investments offers multiple opportunities for smallholder farmers, rural communities, investors, and the country (AgDevCo and Prorustica 2011, EcoAgriculture Partners 2012). The 'opportunity' narrative frames agricultural investment constraints in the SAGCOT region as arising from smallholder farmers' lack of access to financial and technical resources, inputs and information, high transaction costs associated with reaching smallholders who are farming on small and dispersed plots of land, and inadequate production, transport and marketing infrastructure. The solutions outlined in the SAGCOT Blueprint focus on concentrating agricultural investment in geographic 'clusters' in order to enhance agricultural competitiveness, productivity and profitability around strategic value-chains in areas of comparative economic advantage, and pursuing investment approaches that combine diverse actors, interests and objectives. For example, SAGCOT is promoting public-private partnerships (PPPs), outgrower (OG) schemes (a variant of contract farming) that combine the agricultural production of smallholders and large, nucleus estates; and so-called Agricultural Green Growth (AGG)<sup>6</sup> investment approaches in a bid to increase agricultural productivity while protecting the environment. By highlighting that SAGCOT investments should be "environmentally sustainable, socially equitable, and economically feasible" (EcoAgriculture Partners 2012: Executive Summary), SAGCOT seeks to position itself as a sustainable initiative that can achieve 'win-win', or 'triple win' outcomes for smallholder farmers, rural communities and the environment.

### *SAGCOT as 'risk'*

The view that SAGCOT presents multiple 'risks' for smallholder farmers, rural communities and the environment, offers a counterpoint to the 'triple win' portrayal of SAGCOT outlined above. Published consultations with civil society groups, NGOs, investors, academics, farmers and donors, and discussions with key informants during the fieldwork raise a number of concerns about who is driving SAGCOT, what kind of development it is promoting, how SAGCOT is being coordinated and implemented, and whether and how it will address a wide range of environmental, economic and social development concerns (Environmental Resources Management Limited 2013, Tanzania Natural Resources Forum 2012). Specific issue has been taken with the types of actors and motivations involved. Critics point out that the 'agricultural



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3 growth corridor' concept upon which SAGCOT is based was originally developed and  
4 spearheaded by a coalition of private sector actors and donors with commercial agricultural  
5 interests and activities in the region (Kaarhus 2011, Paul and Steinbrecher 2013). Indeed, early  
6 supporters and promoters of SAGCOT, in addition to Tanzania's former President Kikwete,  
7 include large, multinational agribusiness companies such as Yara International, Syngenta, and  
8 Unilever, bilateral donors such as USAID, and NORAD, and multilateral organisations such as  
9 the World Bank.

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11 Critique has moreover been directed at the models put forward for targeting smallholder farmers,  
12 including efforts to link smallholder farmers with large, commercial producers via contract  
13 farming (CF) arrangements such as OG schemes<sup>7</sup>. The concern is that these schemes may have  
14 negative impacts on smallholder livelihoods, food security and access to land (Kaarhus et al.  
15 2010, Sulle and Hall 2013). SAGCOT consultations and decision-making processes have also  
16 been criticized for having proceeded in a top-down manner, with early high-level political buy-in,  
17 rather than via broad consultations (Tanzania Natural Resources Forum 2012). Finally, much  
18 attention has been focused on the potential for SAGCOT investments to contribute to 'land  
19 grabbing', with fears that commercial farming interests will take precedence over those of  
20 smallholder farmers and livestock keepers, and that commercial actors will violate smallholders'  
21 land rights (Paul and Steinbrecher 2013). The potential negative environmental impacts of  
22 SAGCOT investments is a further area of concern (Environmental Resources Management  
23 Limited 2013).

### 40 **Research methods and approach**

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42 In discussing SAGCOT debates and assessing to what extent the polarized narratives around the  
43 initiative correspond with perceptions, experiences and realities of key stakeholders on the  
44 ground, we draw on three sources of data: i) a review of published and grey literature on  
45 SAGCOT; ii) qualitative interviews and consultations with central and district-level government  
46 and SAGCOT officials, donors, NGOs, public-and private-sector service providers, researchers,  
47 and large-scale investors in Morogoro and Mbeya Regions<sup>8</sup>; and iii) in-depth research on  
48 commercial partnerships between small- and large-scale farmers connected to two large  
49 agricultural estates that pre-date the SAGCOT initiative. Both estates are located in Morogoro  
50 Region, and are similar in size, at around 6000 hectares. One of them, Kilombero Plantations  
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3 Limited (KPL), has been designated and endorsed as a ‘flagship’ SAGCOT investment, due to its  
4 efforts to develop an innovative smallholder programme designed to boost smallholder rice yields  
5 for processing and sale alongside rice produced by the estate. The other commercial estate,  
6 Mtibwa Estates Limited (MSE) is located in Mvomero District, produces and processes  
7 sugarcane, and has existed in various forms since before Independence. The fieldwork informing  
8 ii) and iii) was conducted over 15 months in the period 2010-2014 after SAGCOT was launched<sup>9</sup>.  
9 The MSE and KPL smallholder schemes in particular, were chosen because during the course of  
10 the research, it became clear that although SAGCOT has attracted much attention in national and  
11 international policy fora, progress in implementation on the ground has been slow in the five  
12 years since it was officially launched. Insights from existing smallholder schemes in the Corridor  
13 region were thus thought to provide a relevant point of departure for exploring whether and how  
14 the narratives in SAGCOT debates reflect agricultural investment realities on the ground. The  
15 KPL and MSE schemes were chosen due to their location within the designated SAGCOT region,  
16 and because the crops that they produce – sugarcane and rice – have been assigned strategic  
17 priority under SAGCOT due to their potential to contribute to national development efforts  
18 through import displacement. Furthermore, the two schemes have experienced various  
19 combinations of public- private and donor investment and are pursuing agricultural investment  
20 approaches that combine small and large-scale farming. They thus offer an interesting example of  
21 the multiple objectives and interests that SAGCOT is seeking to balance in practice and the  
22 possibility to explore how some of the competing interests and objectives connected to  
23 agricultural investment play out in concrete circumstances.

### 41 **SAGCOT in practice: a fine balancing act**

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43 While SAGCOT narratives frame agricultural investments as either an ‘opportunity’, or a ‘risk’  
44 for smallholder farmers, rural communities and the environment, consultations with SAGCOT  
45 stakeholders and fieldwork at and near MSE and KPL estates revealed that agricultural  
46 investments are rarely as glamorous or as gloomy in practice as what either of these narratives  
47 suggest. Rather, policy makers, farmers, NGOs, government authorities and investors are  
48 struggling to understand, define and coordinate their roles in relation to SAGCOT, to articulate  
49 the value-added of the initiative, and to balance a range of interests, objectives and potential  
50 trade-offs associated with directing agricultural investments in ways that: i) combine and  
51 coordinate public- and private-sector investment; ii) balance small- and large-scale agriculture;  
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3 iii) address social, economic and environmental concerns iv) ensure inclusive and transparent  
4 governance processes while achieving quick and scalable impacts, and v) address the ‘land-grab’  
5 question. Below we present and discuss respondents’ perceptions and experiences of balancing  
6 these diverse interests and objectives in more detail and illustrate the challenges they face in  
7 practice to doing so.  
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### 12 *Combining and coordinating public- and private-sector investment*

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14 A key area of tension in the debates surrounding SAGCOT centres on which actors are driving  
15 the process, and what their interests and motivations are (Paul and Steinbrecher 2013). The view  
16 that the private sector is in effect ‘driving’ the SAGCOT agenda has drawn heavy critique in the  
17 literature on SAGCOT from proponents of the ‘risk’ narrative, who see the need for a strong state  
18 and civil society to guide agricultural investment processes and protect public interests and goods  
19 in the Corridor region (Sulle and Hall, 2013). SAGCOT is based on the idea of bringing the  
20 private sector on board to transform agriculture in Tanzania in partnership with the state (Coulson  
21 2012). Toward this end, developing broad-based ‘partnerships’ and acting as a public-private  
22 partnership (PPP) platform for agricultural investment, are among SAGCOT’s key functions and  
23 aims (Jenkins 2012).  
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33 Yet public- and private-sector stakeholders who were consulted during the research generally  
34 expressed a lack of faith in the PPP model that SAGCOT is promoting, with central government  
35 and district-level respondents expressing concern that the private sector is seeking to ‘exploit’, or  
36 ‘piggy-back’ on public sector investments, and private-sector informants, including medium and  
37 large-scale farmers and commercial estates, expressing doubts and frustration about the public  
38 sectors’ ability and commitment to uphold its end of the ‘partnership’. For example, a lack of  
39 reliable basic infrastructure was considered to constitute a key barrier to agricultural investment,  
40 as expressed succinctly by one large-scale investor from Kilombero District, who noted: “the  
41 single most important thing that SAGCOT can do is build an all-season road”. Incoherent and  
42 unreliable agricultural price policies, and unreliable figures on existing land-uses and land  
43 availability were further examples cited by large-scale input suppliers and rice and sugarcane  
44 investors of how a lack of public investment was perceived to be hindering private sector  
45 investment in the SAGCOT region.  
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### *Perceptions of public- and private-sector investment locally*

At the local level, attitudes and receptivity towards private- sector investors among smallholders' and communities' near MSE and KPL estates differ due to differing local experiences of living near the large estates before they were privatized. Both estates were originally developed and/or managed by the public sector and both subsequently underwent processes of privatization following structural adjustment reforms adopted in Tanzania during the 1990s<sup>10</sup>. However, the original public investment in KPL (then KOTACO) was never completed, and the local development it had promised did not materialize. This led smallholder farmers and village leaders who were interviewed at the time of the fieldwork to view the new (private) investor (Agrica) with a sense of optimism. Agrica's investments in community infrastructure and services and creation of jobs and agricultural training were regarded by smallholders and extension officers as positive developments relative to what little activity and development existed before. In contrast, at MSE, smallholder farmers and their associations perceived the relationship between the estate and farmers to have deteriorated following the estate's privatisation in 1999, when MSE, which was previously controlled by the Tanzanian government, was wholly sold to a local company<sup>11</sup>. In contrast to the situation at KPL, smallholder farmers at MSE described the relationship between the estate and smallholders as having been transformed from one of 'partnership' and 'assistance' under government ownership, to one of confrontation and hostility, and lacking accountability, transparency and a 'voice' for farmers, following the estate's privatization. One of the reasons that farmers feel they lack a voice in decision-making is that MSE was 100 per cent privatized and sold to domestic investors after being dismantled as a state parastatal in the 1990s. Although smallholders raised money to purchase five per cent of the shares in the estate, they were ultimately excluded from ownership (Matango 2006). This example illustrates that there are widely differing perceptions of and attitudes towards public and private-sector investment connected to smallholder schemes within the region that SAGCOT is targeting.

### *Coordinating SAGCOT investments*

A lack of coordination and oversight between national-level SAGCOT processes, and public- and private-sector and donor investments at the local-level was highlighted as a concern by national, district, and local level stakeholders. At the national level, at time of the fieldwork, The SAGCOT Centre had been established to act as a platform for guiding and coordinating investments from public and private sectors, donors, and international organisations<sup>12</sup>. The

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3 SAGCOT Catalytic Trust Fund (CTF) had moreover been established with initial financial  
4 backing from the Tanzanian government, the private sector and development partners and tasked  
5 with mobilizing and coordinating investment funds to specific geographic clusters and value  
6 chains in the SAGCOT region (Jenkins, 2012). By 2013, the CTF had received pledges of close  
7 to US \$100 million in initial financing from the World Bank and others. However, mobilising  
8 and releasing funds has proved more difficult: the first CTF funds for creating business linkages  
9 between smallholder farmers and value chain buyers operating in Tanzania were announced in  
10 June, 2015; five years after SAGCOT was launched. Central government officials who were  
11 interviewed during the fieldwork from within the Ministry of Agriculture were moreover highly  
12 sceptical to the fact that the SAGCOT CTF is not institutionally anchored in existing national  
13 governance frameworks. This was perceived to reduce its accountability and legitimacy to the  
14 public, as well as its sustainability. Adding on to the problems of cross-scale coordination and the  
15 public and private sectors' distrust about each other's motives were the concerns raised by a wide  
16 range of respondents during the fieldwork in relation to the lack of understanding at the local  
17 level about what SAGCOT is, what it aims to achieve and what its 'value-added' is<sup>13</sup>.

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31 At the district level, findings from fieldwork in Kilombero district, which constitutes one of the  
32 prioritised SAGCOT 'clusters', and where rice is a focal crop and the subject of the district's  
33 recently produced Commodity Investment Plan, revealed the existence of at least three separate  
34 agricultural extension and training initiatives targeting the district's rice farmers. One led by the  
35 district government, one led by a district-wide NGO, AKIRIGO<sup>14</sup>, and one initiated by KPL, in  
36 cooperation with the USAID NAFKA (donor-financed) initiative. The latter was providing  
37 training to farmers in nine villages surrounding the estate in the System of Rice Intensification  
38 (SRI) principles, and was receiving much attention from donors and government officials at the  
39 time of the fieldwork. Yet those not involved in the SRI training initiative, including the rice  
40 growers' association, expressed a mixture of frustration, confusion and uncertainty relating to  
41 what was perceived to be a lack of coordination between the various extension approaches and a  
42 perceived 'exclusion zone' around the SRI trainings. There was a perception that the private  
43 investor did not welcome parallel civil society training, awareness raising or empowerment  
44 efforts targeting smallholder rice farmers which might offer them additional marketing options  
45 for their rice that would compete with KPL's own investments in the region in which the SRI  
46 trainings were operating. Several government respondents at the district and national levels  
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3 suggested that the existence or emergence of ‘clusters within clusters’ will be necessary to  
4 maintain the profitability of investments in large rice and sugarcane processing facilities  
5 connected to large estates, in order to ensure throughput to their milling operations and prevent  
6 farmers from side-selling to potential competitors. This reveals an additional tension between  
7 SAGCOT’s stated aims of enhancing agricultural market competitiveness in the Corridor region,  
8 and the apparent need to protect particular investments from competition in order to ensure their  
9 financial viability.  
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### 15 *Balancing small- and large scale agriculture*

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17 One of the fundamental debates in relation to SAGCOT is whether and how it will benefit  
18 smallholder farmers in an era of ‘land-grabbing’. Whether smallholders, or large-scale,  
19 commercial farming operations, should be the engine for a country’s agricultural development, is  
20 a subject of ongoing debate in Tanzania and globally, and is closely connected to the ‘agrarian  
21 question’ and scholarship that seeks to understand the role of peasant agriculture in agrarian and  
22 societal transformations in different time periods and regions (Maghimbi, Lokina, and Senga  
23 2011). The continued relevance of this question in Tanzania and to debates about SAGCOT is  
24 highlighted by Andrew Coulson, who, writing about the Tanzanian government’s ‘Kilimo  
25 Kwanza’ declaration, explains: “From almost as long as what today is Tanzania had contacts with  
26 international markets there have been arguments about whether agricultural exports should be  
27 grown on small farms, or large” (Coulson, 2012, 1). It is moreover reflected in the fact that  
28 smallholder farmers far outnumber large-scale farmers in the country: Tanzania’s agricultural  
29 census from 2007/08 reported 1006 large-scale farms in Tanzania according to a definition of  
30 large-scale farms being above 20 hectares of land or 50 heads of cattle (NBS 2007/08). In  
31 comparison, there were about six millions small scale agricultural households in the same  
32 2007/08 census (NBS 2007/08).  
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47 The need for agricultural investments in Tanzania to include and benefit smallholder farmers is  
48 clearly articulated in all of Tanzania’s past and current agricultural development strategies and  
49 policies. In the SAGCOT Greenprint, smallholder farmers are recognized as being the major  
50 investors in the Corridor region (EcoAgriculture Partners 2012, 21). Nonetheless, the SAGCOT  
51 Blueprint promotes a combination of smallholder and large-scale commercial production and  
52 contract farming (CF) arrangements such as outgrower (OG) schemes that combine them.  
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3 Views about the potential of OG schemes, and partnerships between small- and large-scale  
4 farmers more generally, on the ground were mixed. On the one hand, a number of stakeholders  
5 who were consulted at the district and local levels during the research felt that commercial  
6 partnerships between smallholder farmers and large estates would disadvantage smallholder  
7 farmers, as illustrated by the following quotes:  
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13 “I don’t see how [SAGCOT] can benefit small farmers because it is about investment and large  
14 land holdings and land grabs” – District Agricultural and Livestock Development Officer,  
15 Morogoro Region  
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20 “The nucleus-estate model is not a win-win at all, because people are here to do business, so it  
21 will not benefit small farmers” – Medium farmer and service provider, Mbarali District  
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24 Yet findings from household interviews with smallholders, key informant interviews, and  
25 observations at MSE and KPL estates connected to their established, and nascent, smallholder  
26 outgrower schemes, respectively, painted a more positive picture, suggesting that smallholders in  
27 the SAGCOT region may welcome large-scale investments in land if they contribute to  
28 improving and diversifying rural households’ incomes and access to agricultural markets, training  
29 and services without exposing farmers to additional risks or undermining their land rights.  
30 Household and group interviews with smallholders living near MSE and KPL estates, and  
31 participant observation of their farming activities, indicated that they combine food production  
32 with cash crop production (of contracted and other crops), farm fragmented plots of land, engage  
33 seasonally in non-farm activities such as petty trading and short-term migration, combine crop  
34 and (intensive or extensive) livestock production, and grow a diversity of crop types and  
35 varieties, rather than specialising in just one or two, in order to spread the production, marketing  
36 and institutional risks they face. At MSE, smallholder households in one community that  
37 participates in the established OG scheme were found to own more land and practice more  
38 diversified livelihoods compared to non-OG households in the same village (West 2015).  
39 Furthermore, there was generally high interest and demand among non-participating smallholder  
40 farmers in villages near both KPL and MSE to participate in the smallholder programmes  
41 connected to the estates. Farmers cited opportunities to receive agricultural training, access inputs  
42 (such as improved seed at KPL) that could increase their yields and incomes, build social  
43 networks and contacts, and receive payments for a cash crop (sugarcane at MSE) that requires  
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3 less inputs of labour compared to traditional food crops, as reasons for why they would like to  
4 participate in the schemes (ibid).  
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8 At the same time, problems of power asymmetries and issues of mistrust in the smallholder-estate  
9 relationship and political economy factors connected to the crops sown can amplify the marketing  
10 risks for both small- and large-scale producers, and make it difficult for smallholders and large  
11 estates to be true business partners (West and Haug Forthcoming). OG farmers who were  
12 interviewed at MSE felt that their negotiating position has deteriorated since the estate was  
13 privatized. This feeling was reinforced by the fact that MSE is the only buyer of farmers' cane (a  
14 monopsony situation) and cane production costs have been rising over the past several years,  
15 contributing to reduced profitability for smallholders. Late payments from MSE to smallholders  
16 compound these problems, as farmers are unable to hire labour for early weeding or purchase  
17 fertilizers and other inputs that are important for good cane husbandry. There is moreover  
18 widespread mistrust among smallholders producing cane on contract for MSE that the estate  
19 manipulates the 'rendement' (sugar content) analyses of OG cane delivered to the factory, and  
20 upon which prices for cane are set. Untimely and uncoordinated cane harvesting was also cited as  
21 a problem during the fieldwork. In contrast, research on KPL's nascent OG scheme showed that  
22 farmers have a much stronger negotiating power with the estate compared to at MSE, due to the  
23 existence of a parallel market for rice, and the difficulty that KPL estate faces in preventing side-  
24 selling from farmers. This is clearly beneficial for smallholder farmers, but arguably less  
25 beneficial for KPL in light of the governments' unclear import and export policies (Haug and  
26 Hella 2013) and KPL's need to ensure constant throughput to its rice mill<sup>15</sup>. Domestic rice prices  
27 in Tanzania dropped by more than 50 per cent in 2013 following government sanctioned imports  
28 of duty-free rice, and have remained low ever since, threatening KPL's profitability as well as the  
29 viability and expansion of its smallholder programme. Despite these problems, the research  
30 suggests that farmers living near the two OG schemes would generally welcome the opportunity  
31 to participate in a commercial partnership with a large estate, provided that it does not expose  
32 them to greater financial or other risks than they face in local markets, render them economically  
33 dependent, or undermine their land rights.  
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### *Balancing social, economic and environmental concerns*

Calls for increasing agricultural commercialization raise questions about how SAGCOT will balance social, economic and environmental concerns. The SAGCOT Greenprint identifies a number of ‘early win’ opportunities for mainstreaming Agricultural Green Growth (AGG) strategies into SAGCOT investments, which it argues will ensure more efficient use of natural resources and inputs, reduce the risks that agricultural producers face, increase ecosystem benefits, and reduce environmental damage that may arise from agricultural intensification efforts (EcoAgriculture Partners, 2012). Precision agriculture, agro-forestry, integrated crop-livestock systems, conservation agriculture and the system of rice intensification (SRI) are among the AGG approaches that the Greenprint identifies (ibid).

Yet while SAGCOT overtly seeks to strike a balance between environment and development objectives, findings from fieldwork suggest that commercial stakeholders perceive environmental issues to be an ‘add on’, rather than core to SAGCOT’s objectives. Interviews with key informants in the donor community who supported the development of SAGCOT and its Greenprint suggested that the framing of an early draft of the Greenprint was perceived to place excessive emphasis on environmental risks of agricultural commercialization, rather than emphasising sustainability as a business opportunity. This framing was not well received by the business and investment community, and was subsequently revised. Suggestions that the SAGCOT Greenprint is “for NGOs and academics”, while the Investment Blueprint is “for investors”, described by one donor representative, further underscore that environmental issues may be seen as an ‘add on’, rather than core to the SAGCOT approach.

At the local level, meanwhile, research with smallholders living near KPL who had received training in SRI suggests that while applying SRI principles can enhance farmers’ yields, farmers will not apply SRI methods unless they are able to meet their households needs and preferences and produce profits while reducing the production and/or marketing risks that they face. The profitability and desirability of SRI and other forms of rice production for individual farmers depends on a suite of factors, including the types and quality of land that the farming household has access to, rice prices in domestic markets, availability and costs of labour, oxen power, and machinery at the right times, and the consumption and marketing characteristics of different rice varieties. Traditionally, SRI production requires the ability to control water entering the rice

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3 fields during the growing season. Yet the majority of rice production in villages near KPL, as in  
4 the rest of Tanzania, depends on spatially and seasonally variable rainfall, as most farmers do not  
5 have access to irrigation. The experiences with SRI in villages near KPL thus illustrates that it is  
6 not necessarily easy to apply AGG investments in ways that lead to the desired social, economic  
7 and environmental outcomes.  
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### 10 11 12 *Ensuring inclusive and transparent governance while achieving impacts*

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14 A central critique of SAGCOT has focused on the perceived ‘top-down’ way in which it has been  
15 designed and the lack of transparency, inclusiveness and accountability in consultation and  
16 planning processes. National and regional stakeholder consultations in connection with the  
17 development of the Greenprint and an Environmental and Social Management Framework  
18 (ESMF) highlighted a lack of meaningful engagement with smallholder farmers and livestock  
19 keepers, a lack of identifiable criteria for prioritizing different regions and crops for investment,  
20 and concerns about the ways in which large investors are to acquire land and water rights, as key  
21 concerns (Environmental Resources Management Limited 2013, Tanzania Natural Resources  
22 Forum 2012). In response to civil society pressures to enhance smallholder participation in  
23 SAGCOT consultations, in 2014 SAGCOT signed a Memorandum of Understanding (MoU) with  
24 the Agricultural Council of Tanzania (ACT), Agricultural Non-State Actors Forum (ANSAF) and  
25 the Tanzania Horticulture Association (TAHA), which together represent over 10,000 small-scale  
26 farmers in the SAGCOT region (Mtei 2014). The MoU aims to strengthen smallholder farmers’  
27 participation in designing and implementing SAGCOT and defines the roles and responsibilities  
28 of the different SAGCOT partners in relation to one another (ibid.). However, the MoU comes  
29 several years after SAGCOT was launched. According to civil servants and key informants in the  
30 government, environmental concerns and civil society opposition to SAGCOT on the basis that it  
31 may encourage land grabs is also slowing the pace at which SAGCOT is being implemented.  
32 This has led the government to take a cautious approach to implementing SAGCOT and to  
33 instead call for the development of social and environmental guidelines for investments targeting  
34 agricultural land. The slow pace at which guidelines are being developed has led potential  
35 investors to view that SAGCOT is excessively bureaucratic. Frustration at how slowly it is being  
36 implemented and pressure to deliver results has apparently led the government to adopt an  
37 alternative strategy – called ‘Big Results Now’ (BRN) to ensure SAGCOT’s implementation<sup>16</sup>  
38 (URT 2014).  
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### *Addressing 'land-grabbing' concerns*

In Tanzania, and in the context of SAGCOT, the debates concerning large-scale versus small-scale farming interests and the transparency of consultation processes are closely linked to the question of how new large-scale farms are going to acquire land. As Nelson et al. (2012, 3) note, the 'land-grab' issue in Tanzania is "part and parcel of...wider social and political struggles over citizenship, governance, and economic policy". The authors point out that the land grab question has been a focal point for local mobilization and resistance and has been used in public debates to challenge existing political and power relations in Tanzanian society (Nelson, Sulle, and Lekaita 2012). Although SAGCOT is promoting the development of a national 'land bank' and aiming to formalise village land-use plans as a way to deal with the potential 'land grab' issue, the available data and views differ widely as to how much arable land is available for investment that is not in use by any right-holders. While it is estimated that public institutions such as military camps and prisons control more than two million hectares of land that is suitable for agriculture (TNBC 2009), key informants in research, academia and the government indicated that this land is not necessarily attractive land, due to its remoteness. Neither is this land necessarily 'un-used'; in cases where land has lain idle for many years, farmers and livestock keepers may have moved into and settled on the land.

Findings from research at KPL and MSE however suggests that there is a need to exercise caution when applying the term 'land grabbing' to all types of large-scale agricultural investment in the SAGCOT region. Although KPL has been criticized for evicting farmers and pastoralists from the area (The Oakland Institute, Greenpeace Africa, and Global Justice Now 2015), the KPL and MSE estates were established before debates on land grabbing in Tanzania had reached their current heights. Both estates were demarcated more than 30 years ago, when pressures on land and water resources in the region were much lower. Since that time, Morogoro region, in which the two estates are located, has become a site of competition for a variety of land-uses, including agriculture, livestock keeping, wildlife, wetlands, forest and biodiversity conservation, in addition to commercial forestry, mining, and fishing (Environmental Resources Management Limited 2013). At the time of fieldwork, interviews with smallholder farmers, livestock keepers and key informant interviews with elderly residents and village leaders in villages near KPL and MSE suggested that instances of local land-grabbing and land-use conflicts between farmers and pastoralists (some involving violence) constituted a more salient problem than the alleged 'land

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3 grabbing' by KPL estate. SAGCOT is located in a relatively well-endowed region in terms of  
4 climate, rainfall, soils and infrastructure, compared to most other parts of the country, and local  
5 conflicts over land, water and other resources have been documented in other studies from the  
6 region (Benjaminsen, Maganga, and Abdallah 2009). The fieldwork confirmed that smallholder  
7 farmers and livestock keepers are increasingly moving into this high-potential region from other  
8 parts of Tanzania in search of farmland and pastures. Sixty-two percent of households  
9 interviewed in one sub-village of Mkangawalo village, adjacent to KPL in Kilombero, had  
10 immigrated to the village from other parts of Tanzania since 2005 in search of attractive farmland  
11 and pastures and the prospects of a 'better life'. The problem was described by key informants as  
12 being exacerbated by corrupt village governments and a lack of coordinated land-use planning at  
13 village and district levels. This was corroborated by interviews with public- and private-sector  
14 SAGCOT stakeholders at the local, district and national levels, who consistently highlighted that  
15 existing land-use conflicts and pressures in the region and the lack of enforceable land-use plans  
16 and transparent land-use planning processes at village, district and watershed levels are posing  
17 major challenges to SAGCOT's implementation for communities as well as for investors.  
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## Conclusion

The findings presented in this paper challenge the polarized narratives of ‘opportunity’ and ‘risk’ that characterise current debates about the SAGCOT agricultural investment initiative in Tanzania. We find that smallholder farmers may welcome large-scale investments in land if they contribute to improving and diversifying rural households’ incomes and access to agricultural markets, training and services without exposing farmers to additional risks or undermining their land rights. Further, we find that not all large-scale agricultural investments constitute “land grabbing” and that local land-use conflicts and investments in farmland constitute an important dimension of the land question. These findings challenge the simplified ‘risk’ narrative in SAGCOT debates that portrays smallholder farmers, rural communities and the environment as being the ‘victims’ of large-scale agricultural investment. Conversely, although proponents of SAGCOT suggest that ‘triple wins’ can be achieved by pursuing agricultural investment approaches that combine multiple actors, interests and objectives, the research suggests that no two investments are alike, and that there is inherent complexity, including potential trade-offs and conflicting values, interests and power relations in agricultural investments that seek to combine public- and private sector finance, address the needs of small- and large-scale farmers, and balance social, economic and environmental goals. This complexity underscores the need for more coordinated, inclusive and transparent institutional and governance frameworks to guide SAGCOT investments. We argue that policy efforts to guide agricultural investments within and beyond SAGCOT should focus less on trying to get the overarching agricultural investment ‘models’ right and more on understanding how to promote and incentivise diverse agricultural investment pathways that take full account of differentiated local investment actors, realities, priorities, contexts and needs.

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<sup>1</sup> The Tanzania Vision2025 aims to transform Tanzania into a medium-income developing country by 2025 and provides the overarching guidance for all other development policies, plans and strategies in the country.

<sup>2</sup> Also known by the Swahili acronym MKUKUTA-II

<sup>3</sup> The Tanzanian government launched the Big Results Now (BRN) programme in 2013. It aims to remove bottlenecks to and fast-track development progress in multiple sectors, including agriculture. BRN is based on the so-called ‘Malaysian development model’, and, like SAGCOT promotes smallholder commercialisation and aggregation, and employs a ‘laboratory’ approach

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6 to identify and overcome key bottlenecks constraining the production and marketing of targeted  
7 crops, which include rice, maize and sugarcane.

8 <sup>4</sup> The amount of land that is available for investment and not in use is, however, disputed.

9 <sup>5</sup> The term ‘modern’ is contested in this context. It can refer to both high external input-based,  
10 commercial farming, as well as low external input-based smallholder farming that employs  
11 environmentally friendly forms of ‘sustainable intensification’.

12 <sup>6</sup> AGG is closely related to definitions of ‘climate-smart agriculture’ and to the concepts of Green  
13 Growth and the Green Economy and sustainable intensification.

14 <sup>7</sup> According to Baumann (2000), contract farming refers to “a system where a central processing  
15 or exporting unit purchases the harvests of independent farmers and the terms of the purchase are  
16 arranged in advance through contracts” (Baumann 2000, 7). The ‘nucleus estate-outgrower’  
17 (hereafter OG) form of CF promoted under SAGCOT involves the establishment of a core estate  
18 and processing factory, around which smallholder farmers produce the contracted crops on their  
19 own land, which they then sell to the estate for processing.

20 <sup>8</sup> Key informants interviewed included senior public servants and policymakers (Ministry of  
21 Agriculture, Food Security and Cooperatives; Ministry of Lands; Ministry of Environment;  
22 Tanzanian Investment Centre; Sugar Board of Tanzania, RUBADA); members of the SAGCOT  
23 secretariat; public and private agricultural input suppliers; formal and informal seed sector actors  
24 for rice and sugarcane; public-, private- and donor-funded extension agents in Kilombero,  
25 Mvomero and Mbarali Districts; bilateral donors; academic staff at Sokoine University of  
26 Agriculture; local and national NGOs, farmer organisations and cooperatives; and private  
27 investors, management, and staff connected to large rice and sugarcane estates involving varying  
28 degrees of smallholder production in Morogoro and Mbeya regions.

29 <sup>9</sup> Fieldwork connected to MSE and KPL estates consisted of semi-structured interviews (n=142)  
30 with OG and non-OG households of different wealth categories in two villages (one located  
31 adjacent to each scheme), participant observation of individual and group farming activities;  
32 group discussions and participatory rural appraisal exercises with male and female farmers and  
33 key informant interviews with extension agents, village executives, livestock keepers, farmer OG  
34 associations, estate personnel and employees and a range of other actors connected to the  
35 schemes. Supplementary field visits and key informant interviews were also conducted in  
36 Mbarali District, Mbeya Region in order to contextualise the findings from research at MSE and  
37 KPL.

38 <sup>10</sup> KPL estate was formerly the site of a joint venture between the governments of North Korea  
39 and Tanzania known as the Korea Tanzania Agriculture Company (KOTACO). However, the  
40 farm was never fully developed or entirely operational and was liquidated in 1993. Thereafter it  
41 reverted to the Rufiji Basin Development Authority (RUBADA), a public entity, from whom it  
42 was leased to a variety of tenants until 2007, when KPL was formed as a public-private  
43 partnership between Agrica Tanzania Limited (ATL: a subsidiary of Agrica Limited, Great  
44 Britain) and RUBADA.

45 <sup>11</sup> The site of what is now Mtibwa Sugar Estates Ltd. (MSE) was originally established in 1939 as  
46 a sisal farm, and passed through numerous owners before being privatized in 1999 when it was  
47 sold to Tanzania Sugar Industries Ltd. (TSIL). Between 1969 and 1999, MSE was controlled by  
48 the Tanzanian government, through an ownership and management partnership between NAFCO  
49 and various private and donor interests.  
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6<sup>12</sup> The government, through the Ministry of Agriculture, Food Security and Cooperatives hosts  
7 the SAGCOT National Technical Committee and oversees the SAGCOT Centre.

8<sup>13</sup> This view was succinctly expressed by former president Kikwete during a speech that he gave  
9 while touring KPL estate in October, 2011, during which he asked members of the SAGCOT  
10 secretariat in attendance to explain ‘how a small farmer can know what SAGCOT is and what it  
11 can do for him or her?’

12<sup>14</sup> Association of Kilombero High Quality Rice Growers

13<sup>15</sup> Rice prices in Tanzania are normally protected by a 75% import tariff, but have been low since  
14 2013 after the government issued importation permits for 60,000 megatonnes of rice to offset  
15 shortages. Domestic rice prices dropped by more than 50 per cent in the wake of the imports. See:  
16 <http://exchange.co.tz/rice-prices-rises-as-supply-of-illegal-cheap-import-declines/>

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18<sup>16</sup> Refer to note 3  
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**Combining external and internal agro-investments for  
smallholder development in Tanzania**

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Keywords:	agricultural investment, Tanzania, smallholders, contract farming, stall-fed dairying, livelihood trajectories

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## **‘Combining external and internal agro-investments for smallholder development in Tanzania’**

### **Abstract**

This paper investigates whether and how external agricultural interventions targeting Tanzanian smallholders interact with, shape and support smallholders' own agricultural investment strategies, values and priorities and have strengthened local livelihood trajectories over time. Drawing on quantitative and qualitative data from mixed methods research with men and women smallholders of different wealth categories in a village that is located next to a contract farming scheme, and on insights from the smallholder agricultural investment and rural livelihoods literatures, I discuss how and why smallholder agro-investment capacities and strategies in the village differ and investigate how households' agricultural investment strategies and their engagement in external interventions shape the vulnerability and resilience of their livelihoods to uncertainties. I then draw on life history interviews with female contract farmers to identify the factors that have enabled them to translate their participation in external agricultural investments into improved livelihood trajectories for themselves and their families. While Tanzania's agricultural investment and development policies and strategies are promoting contract farming 'outgrower schemes' as part of a smallholder-inclusive modernisation pathway, I find that women and men outgrowers in the village combine external and internal sources of knowledge and innovation, and engage in a wide variety of crop- and livestock production activities in order to create resilient and sustainable livelihood trajectories and improve their well-being over time. The findings suggest that contract farming is part of a more dynamic and complex agricultural development pathway than what is envisaged in national policies and strategies.

1  
2  
3 **Keywords:** agricultural investment, modernisation, Tanzania, smallholders, contract farming,  
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5 stall-fed dairying, livelihood trajectories  
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## 8 9 **1. Introduction**

10 Investing in agriculture is considered to be a pre-requisite for raising smallholder agricultural  
11  
12 productivity and incomes, reducing rural poverty, ensuring local and global food security, and  
13  
14 contributing to sustainable and equitable development (Lipton 2005, Poulton, Kydd et al. 2006,  
15  
16 De Janvry 2010, FAO 2014). While much attention, in Tanzania and internationally, has been  
17  
18 directed at agricultural investments that involve large-scale commercial land acquisitions in an  
19  
20 era of ‘land grabbing’ (Zoomers 2010, Borras, Hall et al. 2011, Havnevik, Matondi et al. 2011,  
21  
22 Nelson, Sulle et al. 2012), smallholder farmers are the main investors in agriculture worldwide  
23  
24 (HLPE 2013). Understanding and overcoming the investment barriers that smallholders face and  
25  
26 enhancing their capabilities to invest in their own agriculture is therefore an urgent development  
27  
28 priority (Vermeulen and Cotula 2010, Committee on World Food Security 2014). Yet if enhanced  
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30 investment in agriculture is a pre-requisite for pro-poor and pro-growth development, whose  
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32 investment values and development priorities count? This paper examines this question by  
33  
34 presenting and discussing findings from research that examined how external agricultural  
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36 interventions targeting Tanzanian smallholders interact with, address and support smallholder  
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38 women and men’s agricultural investment capacities, strategies, priorities and values and shape  
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40 their livelihood trajectories over time. In doing so, the paper seeks to contribute new insights on  
41  
42 whether and how agricultural investments that are promoted as part of efforts to ‘modernise’ and  
43  
44 ‘transform’ Tanzania’s agricultural sector can be directed in ways that enhance smallholder  
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46 livelihoods and empower smallholders as key investors in agricultural development processes.  
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### **Formal agricultural investment policies and initiatives in Tanzania**

Agriculture accounts for 70 per cent of total employment in Tanzania, roughly 70 per cent of rural households' incomes and approximately twenty-five per cent of the country's GDP<sup>1</sup> (URT/MAFC 2014, World Bank 2015). Tanzania's past and current agricultural policies, strategies and plans have strived in various ways to augment smallholder agricultural productivity, reduce rural poverty, increase agriculture's contribution to national economic growth and enhance the resilience of rural livelihoods to risks and uncertainties (TNBC 2009, URT 2011, URT/MAFC/NAP 2013). There is a strong focus in current agricultural policies on strengthening the private sector's role in agriculture, in line with ongoing economic liberalisation processes and in contrast to past state-led agricultural development approaches (URT/MAFC/NAP 2013). The government has launched several high-profile agricultural investment initiatives in recent years, including the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) and 'Big Results Now' (BRN) in order to encourage greater private sector investment in key value chains in breadbasket regions of the country (AgDevCo and Prorustica 2011, URT 2014). SAGCOT and BRN are both promoting 'outgrower' schemes, a form of contract farming that combines crop production on a large, nucleus estate, with crops that are produced by smallholders on their own farms according to pre-agreed purchase agreements (Glover 1990). Outgrower schemes are seen as a way to integrate smallholders into agricultural value chains, and are promoted as a viable 'smallholder commercialisation pathway' especially in connection with production of rice and sugarcane, for which there is growing domestic demand in Tanzania (URT 2014).

## **2. Conceptualising and analysing smallholder agricultural investments**

The paper takes its empirical point of departure in a village that is located next to an existing outgrower scheme for sugarcane, in Morogoro Region, which is a focal area for SAGCOT and

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<sup>1</sup> The WB figures include forestry, hunting, and fishing, as well as cultivation of crops and livestock production.

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2  
3 BRN efforts, and draws its conceptual framework from the High Level Panel of Experts (HLPE)  
4 on World Food Security 2013 report on *Investing in smallholder agriculture for food security*.  
5  
6  
7  
8 The latter recognizes that smallholder farmers are key agricultural investors and emphasises the  
9  
10 need to understand and overcome the investment barriers that they face in order to achieve broad-  
11  
12 based development and poverty reduction (HLPE 2013). Agricultural investment in this paper  
13  
14 refers to the process of capital formation and capability enhancement in and through smallholder  
15  
16 agriculture. Following HLPE (2013), which draws on the Sustainable Rural Livelihood (SRL)  
17  
18 framework (Chambers and Conway 1991, Scoones 1998, Scoones 2009), smallholder agricultural  
19  
20 investments are facilitated by and may be directed towards different kinds of ‘capitals’, including  
21  
22 natural, human, social, financial and physical. Unlike commercial agricultural investments,  
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26  
27 smallholder investments often take the form of labour investments (human capital),  
28  
29 improvements in natural capital (for example investments in building soil fertility) and  
30  
31 investments in social networks (social capital), in the absence of secure and reliable income and  
32  
33 savings (financial and physical capital) (HLPE 2013).  
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37 These capitals are also known as ‘livelihood resources’ in the rural development literature  
38  
39 (Scoones 1998: 3). Access and entitlements to livelihood resources are both a means and an end  
40  
41 of sustainable rural livelihoods (Chambers 1995, Chambers 1997), and in this paper I consider  
42  
43 them to be key means and ends of agricultural investment and development efforts that seek to  
44  
45 include and empower smallholders. On the one hand, livelihood resources serve different  
46  
47 functions that are required for a means of living (a ‘livelihood’), and on the other, entitlement to  
48  
49 these resources is necessary for attaining sustainable livelihood outcomes, whether these  
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51 outcomes are measured quantitatively or qualitatively (Chambers and Conway 1991, Scoones  
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55  
56 2009). Following insights from Amartya Sen’s work on *capabilities* (Sen 1999), and drawing on  
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2  
3 work by De Haan and Zoomers (2005) on ‘livelihood trajectories’ my aim in this paper is to go  
4  
5 beyond the notion of agricultural investment as ‘capital’ accumulation to investigate how  
6  
7 smallholders can be empowered to engage in agricultural investments that enhance their  
8  
9 livelihood capabilities and contribute to sustainable livelihood trajectories and improved well-  
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11 being over time.  
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16 Access and entitlement to livelihood resources are mediated by institutions, the ‘rules of the game’  
17  
18 that structure the pursuit of particular investment or livelihood strategies (North 1990).  
19

20  
21 Institutions encompass the formal and informal laws and rules that shape individual and  
22  
23 collective behaviour and include social institutions such as gender, ethnicity and religion as well  
24  
25 as local and national governance processes and forms of collective action that may support and  
26  
27 empower smallholders as investors (Chambers and Conway 1991, De Haan and Zoomers 2005,  
28  
29 HLPE 2013). Smallholders often face high transaction costs and risks in accessing agricultural  
30  
31 markets due to the dispersed nature of farms, poor road infrastructure, imperfect information  
32  
33 about markets and market prices (Poulton, Dorward et al. 2010). In addition, they face high  
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35 climatic and social risks and uncertainties due to relying on household labour to engage in rain-  
36  
37 fed farming for both food and income (Netting 1993, Scoones 1996, Mongi 2010). Contract  
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39 farming is increasingly promoted as a way to overcome some of the marketing and other risks  
40  
41 and constraints that farmers’ face (World Bank 2007, Oya 2012). However, the need for  
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43 transparent, inclusive and fair contractual arrangements that protect smallholder rights and  
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45 interests are highlighted in the literature (Vermeulen and Cotula 2010). Moreover, it is widely  
46  
47 recognised that reducing the transaction costs and risks that smallholders face requires concerted  
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49 public, in addition to private sector investment (Poulton, Kydd et al. 2006, Hazell, Poulton et al.  
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51 2010).  
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### 3. Data and methods

The data informing this paper was collected by the author during 15 months of fieldwork in Lungo village (population ca. 1000<sup>2</sup>), in Mtibwa Ward of Mvomero District, in Morogoro Region in the period 2010 - 2014. The village is located adjacent to the 6000-hectare Mtibwa Sugar Estates Limited (MSE), a large sugarcane producer and processor that has existed in various ownership and management forms since the 1930s. Before it was privatised in 1998, the estate was owned and managed by the public sector. An outgrower scheme targeting smallholder sugarcane farmers in villages surrounding the estate was established in 1996<sup>3</sup>. In addition, a stall-fed dairying project was initiated in Lungo in the 1990s by researchers at Sokoine University of Agriculture in Morogoro, in cooperation with local farmers, under the umbrella of a local NGO known as SURUDE (Foundation for Sustainable Rural Development). The following questions guided the research: i) How and why do smallholder agricultural investment capacities and strategies in the village differ? ii) How do households' agricultural investment strategies, and their engagement in external interventions, affect the vulnerability and resilience of their livelihoods to uncertainties? iii) What factors have enabled female contract farmers to translate their participation in external interventions into improved livelihood trajectories and meaningful development outcomes for themselves and their families?

To answer the first and second research questions, I draw on quantitative and qualitative data that was gathered through semi-structured household questionnaires with a representative sample of 50 smallholder households of different wealth categories ('poor'; 'average' and 'rich') that were

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<sup>2</sup> The author's estimate, based on a total of 184 households that were identified by sub-village chairs in preparation for wealth-ranking of households, multiplied by the average household size (5,3) reported across household interviews (n=50).

<sup>3</sup> Prior to 1996, smallholder cane farmers sold their sugarcane to MSE at spot market prices.

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2  
3 ranked by knowledgeable local residents<sup>4</sup> according to locally determined criteria<sup>5</sup>. Additional  
4  
5 insights were gained through informal conversations, group discussions, and participant  
6  
7 observation of a range of community, agricultural and domestic activities and inform the analysis  
8  
9 for answering question two. To answer the third research question, I draw on life history  
10  
11 interviews (see: Goodson 2001) and regular interactions, conversations and observations with  
12  
13 two female respondents whose households both participate in the outgrower scheme, and with  
14  
15 whom I developed a close rapport during the fieldwork.  
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## 20 21 **4. Findings**

### 22 23 **4.1 Heterogeneous smallholder investment capacities and strategies**

24 The household data (summarised in Table 1) reveal a picture of heterogeneous smallholder  
25  
26 agricultural investment capacities and strategies that are linked to households' differential access  
27  
28 to livelihood resources such as land and labour, which are unequally distributed within the  
29  
30 community<sup>6</sup>. Overall, five broad 'categories' of smallholder agricultural investment were  
31  
32 identified. The first category consists of very poor households that produce mostly maize (and  
33  
34 rice, if possible) and habitually depend on off-farm work for their food security and income.  
35  
36 These households own little, if any, of their own land, and their agro-investment strategies are  
37  
38 aimed at 'coping and surviving'. Elderly, sick and female-headed households are over-  
39  
40 represented in this category. The second category includes poorer households that engage  
41  
42 primarily in food crop production, rent in farms, keep small livestock such as sheep, goats, and  
43  
44 local chickens, and go for casual work on others' farms or engage in petty trade. These  
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50  
51 <sup>4</sup> Consisting of village executive officers, sub-village chairmen/women and long-terms residents

52 <sup>5</sup> Criteria included ownership of land and livestock (amount and quality; numbers and types); whether the household  
53 has access to a reliable source of off-farm income; whether the household is able to produce or purchase enough food  
54 to meet its annual needs; the types of crops grown by the household (cultivation of sugarcane and ownership of a  
55 cane farm was considered to be a sign of relative wealth); the level and quality of education provided to children of  
56 the household and the quality of the home (building materials used for the foundation, whether of mud/clay or fired  
57 bricks).

58 <sup>6</sup> Household interviews were undertaken in the 2011 Long Rains (March –May) season.  
59  
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3 households are poor in assets, but their investment strategies are geared towards accumulating  
4  
5 assets over time. They are typically younger households with small children, or recent migrants  
6  
7 to the community, and they tend to have more labour power, compared to very poor households.  
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10  
11 The third category of households produce a wide range of crops for food and sale, own their own  
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13 farms, which are larger than those of poorer farmers, engage in the sugarcane outgrower scheme,  
14  
15 and may engage in irrigated vegetable farming, stall-fed dairy production or both. A key feature  
16  
17 of the agricultural investment strategies of smallholders belonging to this category is their  
18  
19 relatively higher engagement in external interventions, and more diversified forms of agricultural  
20  
21 production, compared to the poorest, and wealthiest, households, respectively. Typically,  
22  
23 smallholders belonging to this category are households that were ranked as being ‘average’ or  
24  
25 ‘wealthy’ during the household wealth ranking exercise. They share several additional  
26  
27 characteristics, which include being among the founding residents of the village, having older  
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29 household heads, belonging to the Mpare ethnic majority, and engaging to a greater extent in  
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31 community groups compared to poorer households.  
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3 The fourth category of households are those that keep ‘large’ livestock (cattle) of local breeds,  
4 which are grazed extensively. These households produce a limited range of food crops for their  
5 own consumption, but livestock keeping is the main focus of their investments. Households  
6 belonging to this category range from poor to wealthy and include Maasai households, and  
7 households of ethnicities that are not traditionally associated with pastoralism, as mixed farming  
8 has become a more common feature of agricultural livelihoods within the community over time.  
9  
10 A common feature of these households’ investment strategies is that they rely on mobilising  
11 social capital, including relationships to kin and neighbours, to enact their livestock keeping  
12 strategies, such as when pooling resources to pasture and water cattle, and moving them to distant  
13 pastures during drought or conflict.  
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28 The fifth category of smallholders overlaps to an extent with the fourth, and consists of  
29 households that were ranked as being ‘wealthy’, and who, as Table 1 shows, control nearly seven  
30 times as much land as poor households. Wealthy households are distinguished by having a  
31 permanent, secondary source of income, typically connected to having completed higher  
32 education, maintaining large landholdings, or both. Permanent employment generally consists in  
33 off-farm work (for example being an employee at the nearby sugarcane estate) or being engaged  
34 in an agricultural business, such as buying up and selling onwards rice and maize from other  
35 smallholders to larger towns and centres in the District. Households in this category do not  
36 depend on agriculture for their livelihood strategies to the same extent as other households, due to  
37 having a regular additional income source.  
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#### 52 **4.2 Barriers and constraints to engaging in different forms of agricultural production**

53 Below, I describe in more depth the factors that enable and constrain smallholder investments in  
54 three different forms of agricultural production that are especially prevalent among households  
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3 belonging to the third category of households, described above: the sugarcane outgrower scheme,  
4  
5 livestock keeping and irrigated vegetable production. While the outgrower scheme can be  
6  
7 considered an external intervention or ‘innovation’, livestock keeping and irrigation practices in  
8  
9 the village combine both internal and external elements of innovation. Despite the reported  
10  
11 benefits of engaging in these activities for reducing households’ livelihood vulnerability and  
12  
13 enhancing their resilience, I find that there are important barriers and entry costs that prevent  
14  
15 poorer smallholders from participating in all three forms of production.  
16  
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#### 20 21 *The MSE sugarcane outgrower scheme*

22 Table 2 provides an overview of the characteristics of outgrower and non-outgrower households  
23  
24 that were interviewed during the research. It shows that sugarcane production is dominated by  
25  
26 ‘average’ and ‘wealthy’ households in the village. This is also reflected in the fact that ownership  
27  
28 of a cane farm was considered to be a sign of wealth during household wealth ranking exercises  
29  
30 in the village. According to long-term residents, Lungo village was established in 1971 when 26  
31  
32 families originating from the Moshi/Kilimanjaro Region relocated voluntarily to the area via  
33  
34 Kabuku in Tanga Region under the governments’ villagisation (*Ujamaa*) policy to grow  
35  
36 sugarcane on a collective cane farm in Lungo, connected to the nearby sugarcane estate. Families  
37  
38 who voluntarily relocated were given land by the village government on which to produce food  
39  
40 and cash crops, including sugarcane. According to farmers, the original village sugarcane farm  
41  
42 was dissolved in the 1980s and parceled up among the founding households of the village and  
43  
44 their families. Since that time, suitable land for sugarcane cultivation in the village has become  
45  
46 more scarce, as noted by a wealthy farmer, who explained that: ‘Land for sugarcane farming is  
47  
48 not easily available. It has already been taken by others’. This has led to an increase in the value  
49  
50 of sugarcane farms over time that makes it difficult for poorer households to acquire one. During  
51  
52 the heyday of sugarcane farming in the 1980s and 90’s, before MSE was privatized and  
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3 purchased by a domestic investor, farmers who had been given or inherited a sugarcane farm  
4  
5 reported that they made good money from selling sugarcane to the then publically managed estate.  
6  
7 They were seen as having status and prestige in the community. However, when MSE was  
8  
9 privatized in 1999, the profitability of sugarcane farming was widely reported to have declined.  
10  
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12  
13 According to farmers, sugarcane farming no longer generates the kinds of wealth that it did in the  
14  
15 past. This is due to rising production costs (especially transport costs), late cane payments, and  
16  
17 harvesting uncertainties. Those who continue to grow sugarcane must be able to tolerate the  
18  
19 downside production and marketing risks, for example when sugarcane is destroyed in  
20  
21 ‘accidental fires’ or is harvested but cannot be transported (as occurred during flooding in 2011).  
22  
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24  
25 The following quotes illustrate this point:  
26  
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28  
29 ‘Sugarcane profits are more unreliable now, and the payments are late. If your cane is harvested  
30  
31 in October, you might not be paid until December or January. In the meantime, the weeds have  
32  
33 grown high in your cane field and you need to pay more to hire labourers to do the weeding’ –  
34  
35 *male respondent, average household*  
36  
37

38  
39 ‘With sugarcane production, you have to be ok with sometimes getting a loss. Our sugarcane has  
40  
41 all been harvested this year, but it has been a difficult season for many farmers due to the early  
42  
43 rains that have caused harvesting and transport difficulties’ – *male respondent, wealthy*  
44  
45 *household.*  
46  
47

48  
49 The research found that, despite these risks, households who were given or inherited sugarcane  
50  
51 farms continue to grow cane, for the income security that it provides, its’ low labour requirements  
52  
53 relative to rice<sup>7</sup>, the fact that the cane cropping calendar complements (rather than competing  
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57  
58 <sup>7</sup> Cane harvesting activities are largely mechanized  
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3 with) food cropping calendars<sup>8</sup> and the fact that cane withstands drought to a greater extent than  
4  
5 rice and maize, thus reducing households' vulnerability to food crop failures. The following  
6  
7 statements from smallholder cane growers express this point:  
8  
9

10  
11 'I will not stop growing sugarcane because when there is a good harvest it provides good income  
12  
13 with little labour' – *female respondent and household head, average household*  
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15  
16  
17 'I will continue to plant sugarcane, like a mother who loses a pregnancy. You don't give up. You  
18  
19 try again' – *female respondent and household head, wealthy household*  
20

21  
22 'No one will ever completely leave it [sugarcane production]. Everyone knows it has its ups and  
23  
24 downs, but in the end there is no other crop that gives its profits in light of the labour  
25  
26 requirements' -- *male respondent, average household*  
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29  
30 Households that do not engage in the outgrower scheme expressed a desire to do so. They noted  
31  
32 its labour-saving benefits, but lamented the high entry costs associated with renting or purchasing  
33  
34 suitable land on which to grow cane. As noted by one poor, male farmer, 'I would like to rent a  
35  
36 sugarcane farm, but the cost is high (200 000 TSH/3 years)'. A female farmer stated, 'if we had  
37  
38 some money, we would grow a few acres of sugarcane, but not more rice, because I wouldn't  
39  
40 manage to do all the weeding. Cultivating rice is hard work'.  
41  
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44

#### 45 *Livestock keeping, the rise of mixed farming and stall-fed dairying*

46 While production of sugarcane and the MSE outgrower scheme played a central role in the  
47  
48 village's establishment and further development of its founding residents and their families,  
49  
50 livestock production was found to play an important role in households' agricultural investment  
51  
52 and livelihood strategies. Among other things, it provides an important savings role for many  
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58 <sup>8</sup> Sugarcane is normally harvested in the Vuli season, while food crops are grown in the Masika season.  
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3 smallholder households, in addition to enhancing nutrition and providing a flexible source of  
4  
5 income when needed. Household interviews, informal and key informant interviews and  
6  
7 observations in the village all indicate that mixed farming, combining crop and livestock  
8  
9 production, is widespread (although with differences in size of livestock and type of production  
10  
11 system among poorer and wealthier households). The rise of livestock keeping as part of mixed  
12  
13 farming practices in the village has taken two distinct forms. One has involved the gradual  
14  
15 integration by farmers of local breeds of cattle, goats and sheep into their crop production  
16  
17 systems following the relocation of a Maasai family and their 500 cattle to Lungo at the invitation  
18  
19 of the village government in the 1980s. The other has involved a stall-fed dairying intervention  
20  
21 that was initiated by researchers and a local NGO in the 1990s.  
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27  
28 The latter was initiated as a cooperation between researchers from Sokoine University of  
29  
30 Agriculture (SUA) in Morogoro and a local NGO known as SURUDE. The initiative, a heifer-in-  
31  
32 trust scheme<sup>9</sup>, targeted women in the village and encouraged them to engage in stall-fed  
33  
34 production of improved dairy cattle. According group discussions, women who were targeted by  
35  
36 the dairy cattle initiative welcomed the initiative as a way to enhance their households' nutrition,  
37  
38 and to obtain an independent source of income from their husbands. A community group, known  
39  
40 locally as 'Mshikamano' was formed and continues to be maintained by beneficiaries of the  
41  
42 intervention. It has been able to attract follow-up interventions in training, in the construction of  
43  
44 community infrastructure, and in introducing improved forage for the dairy cattle. However, as  
45  
46 indicated in Table 1, the initiative has bypassed poorer households. Household interviews and  
47  
48 informal conversations revealed that the initiative also bypassed pastoralists. According to  
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55 <sup>9</sup> According to Sumberg and Lankoandé (2013: 262), heifer-in-trust schemes have been promoted by a range of  
56  
57 actors in Tanzania over the last four decades as a tool to strengthen and increase the asset base of resource-poor men  
58  
59 and women smallholders, enhance household incomes and food security, and establish, sustain and empower  
60  
independent farmers' groups.



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2  
3 extension officers and beneficiaries of the intervention, potential participants were required to  
4  
5 contribute a one-time 60 000 TSH contribution towards the purchase of an improved dairy cow.  
6  
7 Thereafter, the system of ‘get a calf – give a calf’, was employed, whereby male calves born to  
8  
9 the cow were retained by the owner, while the first female calf was given onwards to a household  
10  
11 who wished to obtain a calf. In principle, this system should have ensured that any needy  
12  
13 household wanting to acquire an improved dairy calf, could obtain one. However in practice, and  
14  
15 as shown in other studies of milk-based interventions in Africa, the household data do not suggest  
16  
17 that the initiative has benefitted the most vulnerable or needy in the community (Kabumbuli and  
18  
19 Phelan 2003). This may be due to the fact that rearing dairy heifers requires significant outlays of  
20  
21 labour, management skills and other resources which poor smallholders, and in particular, poor  
22  
23 women smallholders, have difficulty providing (Vera 2003, Sumberg and Lankoandé 2013). It is  
24  
25 hypothesized that, in the absence of incentives and motivations to ensure that the system of  
26  
27 ‘giving a calf’ targeted the most ‘vulnerable’ members of the community, beneficiaries of the  
28  
29 intervention have employed the system of giving calves to build and strengthen their own social  
30  
31 ties and capital.  
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#### 40 *Irrigated vegetable production*

41 The ability to access irrigation provides households with an insurance against climate-induced  
42  
43 food crop failure and opportunities for earning an income outside of the main agricultural seasons.  
44  
45 Household interviews revealed that sale of vegetables and production of vegetables in home  
46  
47 gardens is an important activity for women and female-headed households of different wealth  
48  
49 categories in the village. However, interviews with vegetable producers showed that dry season  
50  
51 vegetable production is undertaken only by average and wealthier male farmers who have capital  
52  
53 to invest in irrigation pumps and crop protection measures. A local irrigation association was  
54  
55 established in 2007 by the former secretary of one of the associations that serves sugarcane  
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1  
2  
3 outgrowers in Lungo. It consists of eight members, all of whom are male. Five out of six of these  
4  
5 members who were interviewed also reported engaging in the outgrower scheme, five engage in  
6  
7 stall-fed dairy production, and four engage in both forms of production. Several of these farmers  
8  
9 reported making good profits from irrigated onion production, which they subsequently invested  
10  
11 in purchasing land to expand their rice and sugarcane production. Others noted the importance of  
12  
13 having a regular and flexible source of income during the 'dry' season, before the sugarcane and  
14  
15 regular food crops could be harvested<sup>10</sup>. Despite these reported benefits, a number of farmers  
16  
17 noted that irrigated vegetable production is expensive, risky and 'difficult'. It requires having  
18  
19 access to appropriate land (next to a water source), an irrigation pump<sup>11</sup>, investments in irrigation  
20  
21 hoses, and is hard work to pump the water into the fields. The high risk of losing a crop due to  
22  
23 pest and disease pressures necessitates frequent applications of crop protection chemicals.  
24  
25 Moreover, growing highly perishable vegetables such as tomatoes and peppers requires access to  
26  
27 a market that can absorb large quantities at one time, something that local markets are not always  
28  
29 able to do. Irrigated farms located near the river are moreover vulnerable to flooding.  
30  
31 Observations showed that several of these farms and the related investments farmers had made in  
32  
33 levelling them and creating terraces were completely destroyed by flooding caused by unusually  
34  
35 high rainfall in early 2014. Knowledge of how to grow irrigated vegetables was not reported to be  
36  
37 widespread. In addition, irrigation activities compete for land and water resources with local  
38  
39 livestock keepers, who reported facing increasing difficulties in accessing the river and other  
40  
41 water points to water their livestock during the dry season.  
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54 <sup>10</sup> The benefits of irrigation in some cases also extend to food crops. Farmers who had invested in an irrigation pump  
55 or who have land that is located next to a spring were observed to be irrigating their rice during and following a long  
56 dry spell in 2012. These farmers were able to harvest a crop of rice in a season when many other farmers' rain-fed  
57 rice crops failed.

58 <sup>11</sup> A new diesel pump was reported to cost 300 000 TSH.  
59  
60

1  
2  
3 While emphasizing the importance of certain activities over others for the food or income  
4 security of their households, smallholders that are engaged in the outgrower scheme, livestock  
5 production and irrigated vegetable production noted that it is the totality of the activities in which  
6 the household engages that is important for ensuring its well-being and its resilience in the face of  
7 uncertainties. These farmers explained that they are able to ensure sufficient food production and  
8 income for the household year-round by diversifying their crop production portfolio. They  
9 emphasised the importance of engaging in crop and livestock-keeping activities that complement  
10 one another in terms of labour requirements and that provide a continuous source of food and  
11 income according to when during the year they are planted and harvested. A wealthy, male  
12 outgrower noted that:  
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28 Maize is harvested in August or September. We save and store it and sell it later in  
29 the year (January/February) and get a higher price. Rice and maize are food, while  
30 sesame and sunflower are for sale. Sugarcane is harvested around October, and we get  
31 money for that. In July we harvest sesame and sell it. August is the time for selling  
32 sunflowers.  
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40 In this respect, the low share of poor households engaged in the outgrower scheme, stall-fed  
41 dairying, and irrigated vegetable production, three activities that were described by participating  
42 households as contributing positively to their incomes, well-being and resilience, is striking.  
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44

45 Table 1 shows that poor households are far less likely to participate in these three forms of  
46 agricultural production, compared to average and wealthy households.  
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#### 53 **4.3 Agricultural diversification as a key strategy for reducing vulnerability**

54 The agricultural investment portfolios of households in turn have an important bearing on the  
55 vulnerability and resilience of their livelihoods to climatic, marketing, and other types of  
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3 uncertainties. As discussed above, households that engage in the outgrower scheme, stall-fed  
4  
5 dairying and irrigated vegetable production are able to diversify, intensify or extensify their  
6  
7 agricultural and livestock production, and other food and income-earning strategies within and  
8  
9 between seasons and years. However, the ability to respond flexibly to uncertain conditions  
10  
11 requires having access and entitlement to the right kind and mix of resources and capacities and  
12  
13 mobilising them at the right time. Not all households have equal access or entitlement to these  
14  
15 resources or capacities. Table 1 shows that in addition to owning and controlling less land, poor  
16  
17 households devote a larger share of their cultivated acreage to rain-fed maize and rice  
18  
19 production<sup>12</sup>, the staple food crops, compared to average and wealthy farmers<sup>13</sup>. This makes them  
20  
21 more exposed and vulnerable to climatic fluctuations that influence rainfall, compared to  
22  
23 households that are engaged in a range of agricultural production activities or have access to a  
24  
25 permanent source of off-farm income. This is especially the case for maize production, which is a  
26  
27 central component of households' food security. Maize and rice are grown in the Long Rains  
28  
29 season, and both are sensitive to fluctuations in rainfall, including drought and long dry spells  
30  
31 (both crops), and flooding (maize). According to respondents of all wealth categories, in the past,  
32  
33 maize was commonly grown in both the Long and the Short Rains (Vuli)<sup>14</sup> seasons. However,  
34  
35 there was a widespread local perception that the Vuli rains were no longer reliable, with negative  
36  
37 consequences on households' maize production and food security.

38  
39 Lack of access and entitlement to good quality land and labour are problematic for poor  
40  
41 households, for whom rice is one of the only potential 'cash' crops. Female respondents noted the  
42  
43 versatility of rice as being one of its key qualities. In addition to constituting a source of food, its  
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46  
47 <sup>12</sup> Poor households devoted 93% of their cultivated acreage in 2011/12 to production of these two crops, compared to  
48  
49 66% of average households and 74% of wealthy households

50  
51 <sup>13</sup> 95 percent of poor households have access to a rice farm (n=19), but a majority (61%) rent or borrow in land to do  
52  
53 so, while the majority (63%) of poor households own their maize farm

54  
55 <sup>14</sup> The Vuli season runs from October to December

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2  
3 good storability enables households with surpluses to sell small quantities throughout the year as  
4  
5 cash needs arise. However, rice is also particularly sensitive to dry spells and drought. It is  
6  
7 therefore considered advantageous to have access to a rice plot in a 'bonde' (lowland) area, or  
8  
9 close to a permanent water source such as a spring or river that can be relied on for supplemental  
10  
11 irrigation in case of low or erratic rainfall. Many poor households reported renting in their rice  
12  
13 farm on an annual basis from different farmers. In such a situation, it may be difficult to secure  
14  
15 permanent access to a lowland area. Moreover, the rental price for a lowland plot is higher than  
16  
17 for an upland plot. The ability to engage in rice production is also constrained by the availability  
18  
19 of household labour, or income with which to hire labour. A number of elderly respondents and  
20  
21 female respondents of childbearing age (especially those ranked as 'poor' households) reported  
22  
23 planting a reduced area, or failing to plant rice at all in some years, due to being pregnant or  
24  
25 caring for a newborn child, looking after a sick relative, or being ill or unwell themselves.  
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32 Spatial diversity of farms enables households to cope with and adapt to climatic, market and  
33  
34 other uncertainties as it allows crops and varieties to be targeted to specific micro-environments  
35  
36 and gives farmers greater flexibility to respond to changes mid-season (for example, in cases  
37  
38 where early rains prevent ploughing of a lowland farm by tractor, or late rains make it necessary  
39  
40 to plant maize in lowlands to ensure a harvest). Table 1 shows that average and wealthier  
41  
42 households have access to a greater number of distinct farm plots compared to poorer households.  
43  
44 Observations and discussions with farmers over several seasons showed that this enables them to  
45  
46 exploit landscape differences owing to separation of farms according to soils and slope when  
47  
48 sowing particular crops (for example, maize, sunflower and sugarcane are commonly grown in  
49  
50 'uplands', while rice is grown in 'lowlands'). Having more farm plots moreover enables land that  
51  
52 has grown 'tired' to be fallowed, giving households with more plots greater flexibility and more  
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2  
3 choice in relation to the timing, nature, duration and location of agricultural production. It also  
4  
5 enables households to grow a wider range of crops throughout the year, ensuring a more even  
6  
7 distribution of household labour and income (Ellis 1998). The location of farm plots is also  
8  
9 important – many poorer households who were interviewed accessed farms that were located far  
10  
11 away from their homes (up to a two-hour walk away). This imposes physical and financial costs  
12  
13 and limitations associated with accessing farms, and guarding them from thefts, intrusion of  
14  
15 livestock, and destruction by wild animals. Table 1 further shows that poor households are under-  
16  
17 represented in community groups and associations, and do not engage in permanent, off-farm  
18  
19 employment. This limits their ability to develop and accumulate productive natural, social and  
20  
21 financial capital. Ownership of small livestock such as sheep, goats and chickens is an important  
22  
23 source of financial capital (savings) among poorer households, and seasonal agricultural labour  
24  
25 on others' farms, and petty trading are important livelihood activities for poorer as well as some  
26  
27 'average' households. However, these jobs are less secure, reliable and remunerative compared to  
28  
29 permanent off-farm employment. Several prominent community groups and associations in the  
30  
31 village are linked to the contract farming scheme and stall-fed dairying initiative, and act as  
32  
33 platforms for collective learning, decision-making, and political lobbying for their members. Poor  
34  
35 households who are unable to participate in such groups are excluded also from the material  
36  
37 benefits that they extend to their members, such as provision of agricultural credit and inputs.  
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#### 46 **4.4 Gender relations, agricultural investments and livelihood trajectories**

47  
48 Despite the prevalence of mixed crop- and livestock-production in the village, local agricultural  
49  
50 investment and development discourses and visions<sup>15</sup> for the future frequently pit 'livestock  
51  
52 keepers' against 'farmers'. Two opposing visions for agricultural 'investment' and 'development'  
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57 <sup>15</sup> Expressed during village executive and community group meetings and in informal discussions with livestock-  
58 keeping families  
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3 were frequently expressed in public and informal settings during the fieldwork period. One is  
4  
5 championed by (primarily) men sugarcane farmers and focuses on lobbying the District  
6  
7 government to allow for construction of a new sugarcane factory at Lungo village that will  
8  
9 compete with Mtibwa sugarcane factory and ensure farmers a fairer price for their cane. The  
10  
11 second advocates for increasing allocations of village land for pastures for extensive livestock  
12  
13 production. Both narratives belie the reality that in *practice* many households engage and invest  
14  
15 in both crop and livestock production. Some of the reasons for this are explored in the following  
16  
17 section which draws on life histories from the female heads of two households that participate in  
18  
19 the outgrower scheme (both households) and stall-fed dairying intervention (one household).  
20  
21 Both womens' families originate from the Kilimanjaro Region, in northern Tanzania and both  
22  
23 belong to households that were ranked as being of 'average' wealth. One is of Mchaga, and one  
24  
25 of Maasai ethnicity. The life histories reveal that, for both women, livestock production (in both  
26  
27 its intensive and extensive forms) constitutes an important source of independent and flexible  
28  
29 income that can be directed towards improving the health, well-being and education of their  
30  
31 families.  
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39 *Mama Kalaita: 'Tutumie mifugo kwa maendeleo yetu'* <sup>16</sup>

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41  
42  
43 Mama Kalaita is a 45-year old Maasai widow, with five children. She, her husband, her firstborn  
44  
45 and their 500 cattle moved to Lungo in 1986, at the invitation of the village government, due to a  
46  
47 problem of acute malnutrition in the village. Residents linked the problem of malnutrition to a  
48  
49 shortage of milk for their children (as expressed by one respondent, who noted: '*at that time,*  
50  
51 *people travelled all day by foot to be able to trade bananas and maize flour for milk to feed their*  
52  
53 *children*'). Back then, Mama Kalaita recalls that the rains were good, there was ample land  
54  
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56

57  
58 <sup>16</sup> In English: 'Let's use livestock for our progress/development'.  
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3 available for pasturing their cattle, and the village government was working well. According to  
4  
5 his family, Baba Kalaita was the first to introduce and promote mixed farming to residents of  
6  
7 Lungo. During the 1980s and early 1990s, milk from their traditional cattle could be bartered for  
8  
9 in exchange for crops and other items at the government shop in the village, and helped to  
10  
11 overcome a problem of malnutrition among children in the village. Over time, the family became  
12  
13 integrated into the community, cattle and land were exchanged and sold between farmers and  
14  
15 pastoralists and farmers increasingly combined crop and (extensive) livestock production to meet  
16  
17 their food and income needs. This was seen as a positive development locally. Many of the cattle  
18  
19 seen today in Lungo village originate from the family's cattle herd. Baba Kalaita used the money  
20  
21 he earned from selling cattle to buy land from other farmers on which to cultivate food and cash  
22  
23 crops, including sugarcane. The family purchased four plots of land totaling 16 acres between  
24  
25 1986 and 1996 with the income that they earned from selling cattle, including 10 acres for  
26  
27 sugarcane, and six for sowing food crops (maize and rice). Tragically, Baba Kalaita was killed in  
28  
29 a sugarcane fire in 1996, leaving his wife to raise their young family<sup>17</sup>. Being illiterate and unable  
30  
31 to find additional work and with a young family to feed and educate, Mama Kalaita relied on  
32  
33 income earned from selling their sugarcane to the nearby (then government-owned) factory,  
34  
35 supplemented by sale of livestock, to send her children to school. Due to not re-marrying, this was  
36  
37 a choice she was able to make. As a result of these investments, her eldest daughter completed  
38  
39 Form 4 (one of very few children in the village to do so) in 2012, and went on to do a diploma in  
40  
41 education. The income that she earns as a government teacher helps to support the family. Her  
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54  
55 <sup>17</sup> However, his legacy lives on in the slogan that he painted on the roof of their home (one of the first brick homes to  
56 be constructed in the village) in the early 1990s, '*Tutumie mifugo kwa maendeleo yetu*'.



1  
2  
3 eldest son studied computer science and went on to start an IT shop in a nearby town. His income  
4  
5 also helps to support their family.  
6  
7

8  
9 However, extensive livestock production has come under increasing pressure spatially and  
10  
11 politically over the years, owing to various developments within and beyond the community.  
12  
13 Recently, the households' investments in sugarcane farming and in livestock have been  
14  
15 threatened by a series of challenges to both forms of production. Reduced pasture (owing to  
16  
17 climate variability and an increasing number of farms), conflicts with local farmers for access to  
18  
19 limited pasture and water resources, and pressure from the government to destock, are among the  
20  
21 main challenges that threaten the family's livestock production. Drought in 2010 and a long dry  
22  
23 spell in 2012, combined with pressure on local pasture resources from both local, and distant,  
24  
25 pastoralists migrating into the area in search of water and grass for their cattle, led the family and  
26  
27 several of their neighbours to pool their cattle and move the herd approximately 50 kilometers  
28  
29 away to a local mountain, where a verbal contract with farmers living their enabled them to  
30  
31 pasture their animals in exchange for milk and a small cash payment. In 2012, Mama Kalaita's  
32  
33 family again moved the cattle herd during the dry season, this time to the nearby Wildlife  
34  
35 Management Area for several months, where they faced threats of government violence and fines,  
36  
37 and wild animals. The family's cattle herd has also been the target of several cattle thefts,  
38  
39 including one in 2012 in which five cows were stolen. The threat of thefts and reduced  
40  
41 availability of pastures have been compounded by the fact that Mama Kalaita's son, who had  
42  
43 assisted with pasturing their livestock during the dry season, moved to Zanzibar to find work in  
44  
45 the tourism industry in 2013. Low and late payments for sugarcane, combined with a long dry  
46  
47 spell in 2010 that destroyed Mama Kalaita's sugarcane seed crop, which she had originally  
48  
49 obtained on loan from Mtibwa Estate, have reduced her ability to maintain her sugarcane farm. In  
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3 concert, these factors and the high costs of educating her children, have constrained Mama's  
4  
5 ability to invest in maintaining both her livestock herd and her sugarcane farm.  
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15 *Mama Jifunza: the importance of dairy farming, 'multi-activities' and control over income for*  
16  
17 *her household's well-being*  
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19

20  
21 Life history discussions with a second local resident, Mama Jifunza, and interactions with her and  
22  
23 her and her family while living in their home throughout the fieldwork, revealed the importance  
24  
25 of dairy cattle production, her involvement in local and external agricultural interventions, and  
26  
27 her engagement in 'multi-activities' to the households' well-being. Mama Jifunza related that  
28  
29 when she first moved to the village to join her husband, and was raising a family (of nine  
30  
31 children), they were poor and she relied on making and selling local brew to obtain some income.  
32  
33 However, in the 1990s, Mama Jifunza was invited to participate in the 'Mshikamano' dairy cattle  
34  
35 intervention. Her keen interest and engagement in the initiative led to invitations to participate in  
36  
37 several farmer-to-farmer exchanges to other parts of Tanzania. She was later also chosen to  
38  
39 participate in a 6-month midwifery training at the nearby regional hospital, and is now one of  
40  
41 four village midwives providing services to local women and their families. During the course of  
42  
43 the fieldwork, she participated, or was approached to participate, in at least four different local  
44  
45 agricultural development and training initiatives (among them a farmer field school, with land  
46  
47 donated by her husband and training in home garden vegetable production). In 2013, she was  
48  
49 nominated to a political position within the village, and donated a half-acre of land for use to  
50  
51 build a church-based school for children. In addition to growing a variety of food crops, keeping  
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1  
2  
3 a vibrant home garden that includes medicinals, being a village midwife and keeping stall-fed  
4  
5 dairy cattle, she and her husband have installed two solar panels on the roof of their home, which  
6  
7 they use for lighting and charging mobile phones for local residents. Mama also makes and sells  
8  
9 local medicine, using plants grown in her home garden and from the nearby forest and outfields.  
10  
11 She enthusiastically embraces any and all livelihood interventions that come to the village, even  
12  
13 those (such as a biogas intervention initiated under SURUDE) that have failed. Her oft expressed  
14  
15 personal philosophy is that you will not get ‘maendeleo’<sup>18</sup> by looking inward and having a  
16  
17 mindset focused only on what is happening in the village, but through interaction with people  
18  
19 from ‘outside’, through which you can gain new ideas, contacts, inspiration and income-earning  
20  
21 opportunities.  
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27  
28 During the course of our discussions and interactions spanning nearly four years, Mama Jifunza  
29  
30 emphasized that dairy farming has been the most important source of income for her households’  
31  
32 development. She notes that:  
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34

35  
36 I don’t like hearing people talk badly about the cows, or someone’s cows<sup>19</sup>, because I  
37  
38 know where cows have brought me. People are making a lot of noise, but they will cry  
39  
40 [without cows]. Almost everyone in the village drinks milk now, and people are in good  
41  
42 health as a result. Are they in good health because of meat? No, it is because of milk.  
43  
44 Each and everyone is looking for milk nowadays because they have understood that it is  
45  
46 medicine. And imagine if the cows leave? I don’t know what would happen. God would  
47  
48 bury this place.  
49  
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56  
57 <sup>18</sup> Kiswahili word for ‘development’

58 <sup>19</sup> Here she is making an indirect reference to local conflicts between livestock keepers and farmers  
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2  
3 She explains that income from dairy farming has been most important for her households'  
4  
5 development for four reasons. Firstly, income from milk and sale of male cows have helped her  
6  
7 to send her children to school, and pay for improvements to the house. For example, through  
8  
9 sales of cattle and milk, along with the proceeds she earned from her share of the sugarcane  
10  
11 farmer field school harvest in 2012, she was able to hire someone to add two rooms to their home  
12  
13 in 2013. She plans to use these rooms to rent out to guests, including researchers, in the future.  
14  
15

16  
17 Secondly, she controls the income earned from milk sales. Although sugarcane brings important  
18  
19 and valued income to the household, according to mama Jifunza, it is her husband who controls  
20  
21 this income. Baba Jifunza does not like to spend this income on housing improvements and does  
22  
23 not believe in the value of 'educating someone else's wife'. Therefore, she explains, the  
24  
25 households' development has come through her own efforts and from the income she earns from  
26  
27 multiple initiatives. She explains that selling milk and bulls provides more income and a more  
28  
29 stable income than midwifery, production of local medicine, or charging neighbours' mobile  
30  
31 phones. Income from midwifery is unreliable as there are four midwives in the village, and she  
32  
33 can go a month with no patients (she also notes that people use more birth control now compared  
34  
35 to before). While sale of 'dawa ya kienyeji' (traditional medicine) is important seasonally (after  
36  
37 the Masika harvest, when people have money to spend), it still doesn't compare to milk earnings.  
38  
39 Charging mobile phones 'ni hela ya mboga mboga tu' (In English: it is money for vegetables, i.e.,  
40  
41 it constitutes an insignificant source of income). Production of food crops is mainly for  
42  
43 household consumption, but in years of surplus<sup>20</sup>, rice in excess of the households' needs is  
44  
45 exchanged or sold for maize.  
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58 <sup>20</sup> The family produced a surplus of rice in 2011, and 2012  
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3 Thirdly, milk contributes to her household's nutrition. Household nutrition as a common theme in  
4  
5 my discussions with Mama Jifunza over the years and observations of what she plants, what the  
6  
7 family and I eat, the importance she attaches to drinking milk, making local medicines, and her  
8  
9 role as a village midwife. She continuously emphasizes that she doesn't use 'chemicals' on the  
10  
11 food she grows, and takes pride in the fact that food is fresh and that the household has a diverse  
12  
13 diet. During the Masika season in 2014, she added two new crops, soybean and regular beans, to  
14  
15 her households' food crop portfolio, using seed she obtained from her relatives in Moshi. 'Not for  
16  
17 sale', she says, but because it is a nutritious crop for her family, can be added to the morning chai  
18  
19 (tea), and is very good as 'lishe' (porridge) for young children. In 2012 the farm that is now  
20  
21 planted to soya and bean (and some maize) was planted to sugarcane. But when we visited the  
22  
23 farm in 2014, Mama Jifunza confided that she refuses to devote time to sugarcane anymore (aside  
24  
25 from participating in the farmer field school, which her husband chairs, and from which she gets  
26  
27 her share of the proceeds) because her husband doesn't share the income that he earns from their  
28  
29 other sugarcane farms with her.  
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37 Fourthly, she has gained valuable training and skills through her participation in the dairy cow  
38  
39 and subsequent agricultural and livestock interventions. Mama Jifunza states that education has  
40  
41 been crucial to her household's development, and laments that she was not able to educate her  
42  
43 eldest son and daughter. As a result of educating one of her youngest daughters, the daughter now  
44  
45 has a good job and can in turn help her mother and family out when needed. Her daughter helped  
46  
47 her mother to buy a second solar panel for the roof of their home, and this has led to a new  
48  
49 income earning activity for the household (charging mobile phones). When Mama Jifunza was  
50  
51 sick with malaria in 2014, her daughter's husband came to take her to the hospital, paid the  
52  
53 hospital fees, and gave her money for food. Through the dairy improvement project she was sent  
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3 for farmer exchange to Njombe, in Southern Tanzania. This exchange led to further opportunities  
4  
5 for training in Arusha and Nairobi. And it is through these projects, and Mama's connections to  
6  
7 researchers at SUA in Morogoro, that I came to be in Lungo – and staying with Mama Jifunza  
8  
9 during the fieldwork. My staying there lead to further 'maendeleo' for the household. Among  
10  
11 other things, payment to her for my food/accommodation enabled her to finish the walls in two of  
12  
13 the bedrooms and the hallway in their home, and to install a porcelain latrine behind the house.  
14  
15

16  
17  
18 In summary, Mama Kalaita and Mama Jifunza's life stories offer insights into how agricultural  
19  
20 investment priorities and values are articulated, contested and enacted dynamically within and  
21  
22 across households and over time. Both women emphasize the linkages between investing in  
23  
24 livestock, the contribution of milk to household nutrition and health, and the importance of re-  
25  
26 investing the income from livestock keeping (sale of milk in Mama Jifunza's case; sale of cattle,  
27  
28 in Mama Kalaita's case) in financing their childrens' (and in particular their girl children's)  
29  
30 education. These investments and re-investments are considered to enhance the long-term well-  
31  
32 being and economic resilience of their households and livelihood trajectories. While investing  
33  
34 time, labour and land to sugarcane production and livestock keeping have played important roles  
35  
36 in Mama Kalaita's family's development, sugarcane production has played a limited role in the  
37  
38 development of Mama Jifunza's household due to the fact that she does not control the sugarcane  
39  
40 income. Mama Jifunza's investments in 'multi-activities' in other areas, and in particular related  
41  
42 to keeping stall-fed dairy cattle, are re-directed at ensuring food security and cash income which  
43  
44 she controls and can direct toward supporting the food security, health and education of her  
45  
46 family.  
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## 5. Discussion

The findings suggest that contract farming is part of a more dynamic and complex agricultural development pathway than what is envisaged in Tanzania's national agricultural policies and strategies. While agricultural investment initiatives such as SAGCOT and BRN are promoting outgrower schemes as part of a smallholder-inclusive modernisation pathway, I find that it is through creatively combining external and internal resources and knowledge and engaging in a wide variety of crop- and livestock production activities that households are able to build resilient livelihood trajectories in uncertain institutional, social and ecological contexts. The finding that agricultural diversification is *especially* prevalent among households that participate in the outgrower scheme is surprising, given that this form of production is being promoted as part of a 'modernisation' pathway in major agricultural investment and development initiatives.

The findings add to the growing body of literature on smallholder differentiation in African countries (see: Ellis 1998, Jayne, Mather et al. 2010) by showing that smallholder agricultural investment capacities, strategies, priorities, and values in the village differ widely within and across households. In addition, they show how external and internal agricultural investment dynamics in the village have reinforced particular livelihood trajectories and contributed to differentiated livelihood outcomes over time (De Haan and Zoomers 2005). The temporal dimension is further underscored by life history interviews with women smallholders which show that agricultural investments and capital accumulation within households are dynamic processes that occur over time in connection with different 'life stages' and households' changing demographics and fortunes.

In line with previous scholarship, I find that smallholders value agricultural and income diversification, and pursue flexible forms of production, rather than yield maximization or

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2  
3 specialization, to meet their food and income needs in dynamic and unpredictable environments  
4  
5 (Netting 1993, Scoones 1996). These strategies are however more prevalent among households  
6  
7 that participate in external interventions, compared to non-participants. Poor households reported  
8  
9 facing high entry costs and barriers to participating in external interventions – including the  
10  
11 outgrower scheme and stall-fed dairying - due to land scarcity and high land rental costs, limited  
12  
13 financial and labour resources, high costs of cash crop production, and the need to concentrate  
14  
15 limited land and labour resources on production of staple food crops. In lacking the resources and  
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17 capabilities to participate in external interventions, poor households remain under-represented  
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19 and marginalized socially, economically and politically in the community.  
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25 The potential value to poorer households of participating in external interventions which are  
26  
27 labour -saving (the outgrower scheme) and land-saving (stall-fed dairying) comes to light  
28  
29 especially in view of ongoing and intensifying pressures on land-use in the community and the  
30  
31 reported negative impacts of climate variability and change on staple food crops upon which  
32  
33 poorer households depend for a large share of their agricultural production. Poorer households'  
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35 exclusion from these external interventions thereby carries the risk of reinforcing existing poverty  
36  
37 and vulnerability dynamics and perpetuating agricultural investment and livelihood strategies that  
38  
39 are focused on 'coping and surviving' (Berdegue 2005, Eriksen, Brown et al. 2005). Yet while  
40  
41 the findings confirm that access and entitlement to assets, markets and institutions play important  
42  
43 roles in facilitating and constraining smallholder agricultural investments (HLPE, 2013), they  
44  
45 also reveal the need to take a long-term perspective when assessing the potential poverty-  
46  
47 reducing impacts of external interventions. While the quantitative data show that external  
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49 interventions seem to have bypassed poorer households in the community, the qualitative data  
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3 suggest that they have benefitted residents who moved to the community many years ago, and  
4  
5 improved their material conditions and well-being over time.  
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9 The life histories of Mama Kalaita and Mama Jifunza add additional nuance to this picture by  
10  
11 illustrating how intra-household gender and power relations play key roles in shaping women  
12  
13 smallholders' agricultural investment decisions and outcomes over time (Mwaseba and Kaarhus  
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15 2015, Quisumbing, Rubin et al. 2015). The fact that investments in both crop and livestock  
16  
17 production have played important roles in these women's households' livelihood trajectories and  
18  
19 contribute to other households' livelihoods adds nuance to the observed local conflict between  
20  
21 farming and livestock keeping interests in the community by showing that these activities are  
22  
23 often intertwined in practice (see also: Ohna, Kaarhus et al. 2012). Their stories also raise  
24  
25 questions about dominant policy discourses in Tanzania that advocate concentration and  
26  
27 specialisation in particular forms of crop production while overlooking the demonstrated  
28  
29 importance of mixed farming involving livestock keeping to meeting smallholders' own  
30  
31 investment and development priorities (Benjaminsen, Maganga et al. 2009, Covarrubias, Nsiima  
32  
33 et al. 2012, Smucker, Wisner et al. 2015). In emphasising the vital link between agricultural  
34  
35 investments, financial autonomy, investments in their children's nutrition and education, and the  
36  
37 well-being and resilience of their households over time, the women's stories underscore the need  
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39 to look beyond quantitative factors such as assets, income and productivity when assessing the  
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41 value of agricultural investments to and by women and men smallholders.  
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49  
50 Mama Kalaita and Mama Jifunza's stories caution against making easy generalizations about  
51  
52 the importance and significance of particular agricultural activities to particular types of  
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54 households; investing in and accumulating land to engage in the sugarcane outgrower scheme  
55  
56 have played an important role in a Maasai household whose cultural identity and income  
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3 traditionally depended on investments in extensive livestock keeping; Conversely, investment  
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5 and engagement in intensive livestock production has played a crucial development role in a  
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7 household that has traditionally depended on crop production for its income and identity. Perhaps  
8  
9 most importantly, their stories show that rather than being passive beneficiaries or ‘victims’ of  
10  
11 external agricultural investments and initiatives, smallholders are active and creative agents that  
12  
13 combine and shape their participation in external interventions in order to create sustainable,  
14  
15 meaningful and resilient livelihood trajectories.  
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## 20 21 6. Conclusion

22 Taken together, the findings caution against promoting a single crop, production form, marketing  
23  
24 arrangement or blueprint ‘smallholder development pathway’ in dynamic, unpredictable, diverse  
25  
26 and risky agro-investment environments and farming contexts (Thompson and Scoones 2009).  
27  
28 Rather than promoting ‘one-size fits all’ approaches, agricultural investments that are undertaken  
29  
30 as part of efforts to ‘modernise’ and ‘transform’ Tanzania’s agricultural sector should recognize,  
31  
32 support and empower women and men smallholders as key investors in agricultural development  
33  
34 processes. Tanzanian policy makers, civil servants, and other agro-investment stakeholders  
35  
36 should work to remove the barriers and constraints that limit and prevent smallholder investments,  
37  
38 and acknowledge that smallholder inclusive agro-investment strategies such as contract farming  
39  
40 are part of more dynamic and complex agricultural development pathways than what is envisaged  
41  
42 in national policies and strategies.  
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Table 1: Characteristics of poor, average and wealthy households in Lungo Village (n=50)

Variable	Poor households (n=19)	Average households (n=24)	Wealthy households (n=7)
Average amount of land cultivated in 2011 (acres) and (range)	2,9 (0-10)	8,3 (2-21)	12,4 (3-35)
Average amount of land owned (acres)	2,4 (0-12)	10,3 (0-21)	16 (0-52)
Average amount of land rented in or borrowed (acres) and (range)	1,3 (0-4)	0,8 (0-4)	1 (0-4)
Mean number of plots accessed and (range)	2 (1-5)	3 (1-8)	4(2-10)
Percentage of household heads with primary education or above	68	88	100
Average number of years living in the village	20	30	28
Average age of household head	44	53	48
Average size of household (people)	5,3	5,3	4,8
Average number of dependents < 5 years	0,3	0,5	0,8
Ethnicities	Mpare minority (37%)	Mpare majority (67%)	Mpare majority (57%)
Households involved in 1 or more community group or association (per cent)	16	80	57
Household heads engaged in permanent, off-farm employment (per cent)	0	8	57
Percentage of respondents that are currently (or formerly) sugarcane farmers	16 (32)	75 (83)	71 (71)
Percentage of total cultivated acreage <sup>21</sup> devoted to sugarcane <sup>22</sup>	6	27	29
Percentage of total cultivated acreage devoted to maize production	54	42	35
Percentage of total cultivated acreage devoted to rice production	39	24	39
Percentage households involved in stall-fed dairy production	<1	29	57
Percentage households involved in irrigated vegetable production	0	21	14
Percentage households keeping small livestock (grazing)	42	13	29
Percentage households keeping large livestock (non-dairy)	16	33	29

<sup>21</sup> Total cultivated acreage includes land that is owned, rented in, or borrowed by the household for crop production.

<sup>22</sup> The actual proportion of farmers' cane farms that were planted to cane (rather than to other crops) in 2011 was 72% for poor farmers, 79% for average farmers, and 86% for wealthy farmers, on average.

Table 2: Characteristics of smallholder outgrower and non-outgrower households

Variable	Non-OG households (n=21)	OG households (n=29)
Average landholding owned (acres)	2,1	13
Average cultivated area in 2011 (acres)	2,8	10,1
Mean number of plots household has access to	2	4
Average number of years living in Lungo	15	32
Average age of household head	42	55
Average household size (no. of people)	4,4	5,3
Percentage of households educated to primary level or above	72	85
Percentage of households originating from Kilimanjaro area (Mpare, Mchaga, Maasai )	44	82
Wealth categories (per cent)	Poor: 67 Average or wealthy: 33	Poor: 15 Average or wealthy: 85
Percentage of households participating in 1 or more community group or association (*not relating to OG production)	< 1	100 (*33)

## **The Vulnerability and Resilience of “Inclusive” Agro-investments in Tanzania**

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## **The Vulnerability and Resilience of “Inclusive” Agro-investments in Tanzania**

**Abstract:** This paper compares and contrasts two cases of smallholder-inclusive agricultural investment in Tanzania and investigates the factors that shape their vulnerability and resilience to risks and uncertainties that influence their performance and viability as a development strategy. In doing so, the paper extends the literatures on inclusive agro-investments and rural vulnerability and resilience by exploring how they are connected to one another and to broader questions of political economy and the role of the state in directing agricultural investments in inclusive and responsible ways. Drawing on observations and interviews with smallholders, key informants and management and staff of two large-scale rice and sugarcane estates, we discuss how issues of ownership, voice, risks and rewards shape how smallholders and estates negotiate their relationships in these investments in practice. We find that a lack of transparent and reliable policies and mechanisms for governing access to land, resolving contractual disputes, and marketing the crops in question reinforces power asymmetries between the participants, enhancing the risks, and undermining the potential development impacts of these partnerships. The two estates moreover appear to enjoy different levels of state protection that render their commercial operations more or less vulnerable and resilient to various political and economic risks. These findings raise questions about the long-term sustainability and social and economic viability of both investments. We conclude that smallholder-inclusive agro-investments in Tanzania are unlikely to fulfil both a commercial and a development function in the absence of consistent, transparent and enforceable ‘rules of the game’ that incentivize and reward responsible agricultural investment behaviour.

**Keywords:** agricultural investment, development, Tanzania, vulnerability, resilience, political economy, governance

### **1. Introduction**

The potential for agricultural investments to transform rural communities, economies and the environment – for better or worse – is widely recognized.<sup>1</sup> The “right” kind of agricultural investments may provide opportunities for smallholder farmers to access



employment, agricultural production technologies, skills and training, and connect them to inputs, credit, and markets.<sup>2</sup> But agro-investments may also be directed in ways that transform agriculture towards large-scale farming and deprive smallholder farmers and rural communities of access to land, water and other natural resources, and constrain local decision-making power, result in uneven economic development and heighten smallholders' vulnerability and marginalization from development processes.<sup>3</sup>

This paper contributes to ongoing discussions about how to direct agricultural investments in ways that reduce rural poverty and vulnerability, improve smallholder livelihoods and contribute to national economic development goals.<sup>4</sup> At the international level, recognition that agricultural investments carry both opportunities and risks for smallholder farmers, rural communities, investors, governments, and the environment has resulted in efforts to develop international guidelines and principles for directing agricultural investment in more inclusive and responsible ways.<sup>5</sup> Contract farming (CF) arrangements have been proposed as one form of agricultural investment that may ensure that smallholders and communities benefit from agricultural commercialization efforts.<sup>6</sup> A range of definitions of CF exist. According to the Rural Finance Learning Center, contract farming refers to:

“[...] agricultural production carried out according to an agreement between a buyer and farmers, which establishes conditions for the production and marketing of a farm product or products [...] Another term often used to refer to contract farming operations is ‘out-grower schemes’, whereby farmers are linked with a large farm or processing plant which supports production planning, input supply, extension advice and transport”.<sup>7</sup>

This paper compares and contrasts two cases of CF in Tanzania that form part of the latter definition of CF: outgrower (OG) schemes, which combine agricultural production and processing on a “nucleus” estate with production by smallholders on their own land. Our objective in doing so is to determine whether and under what

conditions smallholder-inclusive agro-investments such as OG schemes can achieve their commercial and development goals in practice. The two schemes are located in Morogoro Region, within the designated Southern Agricultural Growth Corridor of Tanzania (SAGCOT), where the government is promoting a mixture of small- medium- and large-scale agricultural production and inclusive investment approaches such as OG schemes, that combine them.<sup>8</sup> A comparative case study research design was employed to understand the role that the two schemes play in local livelihoods and risk management strategies, and to assess the factors that shape the vulnerability and resilience of the relationships between the estates and smallholders to uncertainties and the potentials and limitations of OG schemes as a rural development strategy. The findings draw on long-term fieldwork during which participant observations and interviews were undertaken with commercial estate owners, smallholder outgrowers, non-participating smallholders, surrounding community members, and key informants in a wide range of formal and informal settings.

The paper's topic has both practical and policy importance in a context where agriculture forms the backbone for rural employment, incomes and food security in Tanzania, and constitutes a cornerstone of national development policies and efforts.<sup>9</sup> It is also a salient topic in light of the fact that smallholders dominate Tanzania's agricultural production, and that high-profile agricultural investment initiatives in Tanzania, including the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) and Big Results Now (BRN) are promoting OG schemes as a way to modernize and commercialize the agricultural sector. SAGCOT<sup>10</sup> is an ambitious public-private agricultural commercialization partnership that was initiated by former Tanzanian president Kikwete in 2010 and is promoted as a flagship programme of the government's "Kilimo Kwanza" (Agriculture First) declaration.<sup>11</sup> Big Results Now

aims to replicate the so-called “Malaysian development model” in Tanzania and targets multiple sectors, including agriculture. It emphasizes cross-sectoral planning, and employs a “laboratory” approach to overcome key bottlenecks constraining production and marketing of prioritised crops.<sup>12</sup> Both initiatives are heavily promoting commercial partnerships such as OG schemes between small- and large-scale farmers, as having “win-win” potential to reduce rural poverty and contribute to inclusive and sustainable national economic development.<sup>13</sup>

But despite the optimism expressed in the official documents that are promoting smallholder-inclusive investments in SAGCOT and BRN, research suggests that Tanzania’s agricultural sector faces myriad challenges. A lack of coordination among existing donor, government and private sector initiatives targeting agriculture and shortcomings in implementing and achieving results from ongoing agricultural development programmes and policies, including the Agricultural Sector Development Programme (ASDP), Tanzania Agriculture and Food Security Investment Plan (TAFSIP), and Kilimo Kwanza initiatives, and tensions between the goals of various policy initiatives, have been highlighted as major overarching concerns.<sup>14</sup> Moreover, while the country’s economy has recorded impressive growth during the past years, averaging about seven per cent, this has not translated into reduced poverty or greater food or nutrition security for Tanzania’s citizens.<sup>15</sup> Poverty remains endemic in rural areas, smallholder farmers lack access to basic agricultural inputs and to credit, agricultural productivity is low, and land-holdings are small and fragmented.<sup>16</sup> Market prices for agricultural produce are moreover highly variable,<sup>17</sup> and agricultural production depends overwhelmingly on seasonally and spatially variable rainfall that exposes farming households to climatic risks such as droughts and flooding.<sup>18</sup> Climate change is expected to augment climate variability and to act as a “threat multiplier” ,<sup>19</sup>

adding to the adaptation deficit in the agricultural sector, and exacerbating smallholder farmers' vulnerability.<sup>20</sup> These challenges form an important backdrop for understanding the potentials and limitations for inclusive agricultural investments in Tanzania to improve smallholder livelihoods, reduce rural poverty and contribute to national economic development efforts.

## ***2. Background and conceptual framework***

### *2.1 Agricultural investments for development: aggravating rural vulnerability or enhancing resilience?*

The paper applies and extends insights from the literature on vulnerability and resilience in developing countries, which has typically focused on smallholders and rural communities, to agricultural investments involving large-scale commercial agricultural producers. In the global environmental change literature, "vulnerability" is considered to be a function of exposure and sensitivity to shocks and risks, and the capacity to cope with and adapt to them.<sup>21</sup> Vulnerability is dynamic and contextual, varies within and between households and communities, and is shaped by societal structures and processes of change that influence the distribution of power, resources, poverty, inequality, and social, economic, political and ecological marginalisation within society.<sup>22</sup> Many vulnerability studies in Africa focus on smallholder farmers and livestock keepers, due to high rates of poverty in rural areas, smallholders' high dependence on rain-fed agriculture and climate-sensitive natural resources, and underlying processes of social, economic and political inequality that reduce rural peoples' abilities to cope with and adapt to social, economic and environmental adversity.<sup>23</sup> From this perspective, smallholders may be considered "victims" of global social, economic and environmental processes of change that are driving both

agricultural investments and climate adaptation (and mitigation) efforts, and which create unequal patterns of “winners” and “losers”.<sup>24</sup>

A contrasting perspective is that smallholders and rural communities are resilient and adaptable to change.<sup>25</sup> This view has been substantiated by ethnographic and anthropological studies of rural communities and farming systems, which highlight that women and men smallholders possess extensive local knowledge, experience and skills, and that they demonstrate considerable agency, ingenuity and creativity in seizing opportunities and crafting livelihoods amidst dynamic, and often difficult, social, political and environmental circumstances.<sup>26</sup> While the concept of resilience has diverse scientific roots, it has gained widespread popularity in research, policy and practitioner communities in recent years.<sup>27</sup> Resilience has to do with the capacity and ability of social and ecological systems to withstand and “bounce back” from disturbances, shocks and adversity, and is concerned with issues of adaptation and feedbacks within dynamic, complex, non-linear and non-equilibrium socio-ecological systems.<sup>28</sup>

## *2.2 Responsible agro-investment, risk management and the role of the state*

The concepts of “risk” and of “governance” cut across the literatures on rural vulnerability, resilience and responsible and inclusive agricultural investment. Risk management is central to agricultural production, whether it is undertaken by small, or large-scale units, and is a key aspect of inclusive agricultural investments such as contract farming.<sup>29</sup> This paper adopts a definition of risk that embodies the potential for losses as well as benefits, as expressed in the 2014 World Development Report, where the authors argue that although

“[m]uch of the emerging literature on risk in a development context emphasizes the important role that risk management can play in increasing resilience to negative shocks...risk management also has an essential role in helping people and

countries successfully manage positive shocks... Thus the goal of risk management is both to decrease the losses and increase the benefits that people experience when they face and take on risk”<sup>30</sup>

Research on CF and OG schemes that incorporating smallholders into the business through contracts forms a central component of risk management. Indeed, Cotula and Vermeulen (2010) highlight that sharing of ‘risks and rewards’ is a key aspect of inclusive agro-investments such as CF. In the new institutional economics (NIE) literature, contracting is seen as a way to overcome the market imperfections and coordination failures that characterize rural economies in developing countries.<sup>31</sup> Contracting may lower the costs and risks that smallholders face in accessing agricultural markets, inputs, services and information while ensuring the firms that purchase and process smallholder crops with a reliable supply of raw materials.<sup>32</sup> CF and OG schemes may increase grower incomes and offer higher wages and better working conditions than local growers offer.<sup>33</sup> In addition, OG schemes offer a politically attractive alternative to large-scale foreign direct investments in land, such as those historically associated with the plantation system under colonial rule, and with the contemporary phenomena of “land grabbing” in Tanzania and other countries.<sup>34</sup>

The Principles for Responsible Investment in Agriculture and Food Systems (CRS-RAI principles) adopted by the Committee on World Food Security in October, 2014, emphasize that states have a key role to play in governing agricultural investments in transparent, inclusive and accountable ways.<sup>35</sup> Transparency and accountability are emphasized especially in connection with processes for accessing land and other resources, which are highly contentious in Tanzania.<sup>36</sup> From a political economy perspective, the potential for smallholder-inclusive agricultural investments to reduce rural poverty and contribute to sustainable economic development hinges

crucially on whether or not the Tanzanian state has the capacity and is politically motivated to implement pro-poor agricultural investment and development policies.<sup>37</sup> Assessments of the Tanzanian government's performance in implementing past and current national agricultural policies in transparent, inclusive and accountable ways and in the interests of broad-based poverty reduction, are, however, disappointing.<sup>38</sup> Key concerns that have been highlighted include the fact that smallholders regularly lack a "voice" in national agricultural policy and decision-making processes, that Tanzania is highly dependent on donors to finance its agricultural development agenda, and that there exists a persistent tension in and disconnect between official agricultural policy discourse, and practice regarding the desired role of the state- and the private sector in agricultural investment and development efforts.<sup>39</sup>

### ***3. Research sites and methods***

The authors undertook primary fieldwork during 15 months in the period 2010-2014. The research focused on two large agricultural estates, both located in Morogoro Region – Mtibwa Sugar Estates Limited (MSE) and Kilombero Plantations Limited (KPL), and on two villages located adjacent to the estates. The two estates were chosen because they are located within the region that has been targeted by the SAGCOT and BRN initiatives, and because the crops that they produce and process - rice and sugarcane – are considered to have strategic potential to contribute to national economic development efforts by displacing imports.<sup>40</sup> MSE and KPL estates are both located in flat valleys at the foot of mountain ranges that form part of the Eastern Arc Mountain chain at between 250 and 350 meters above sea level, and border wetlands that are subject to seasonal flooding. They were both originally developed and managed by the public sector, but differ along a number of dimensions, which are summarized in Table

1 (*Insert Table 1 here*). At the time of fieldwork, the two nucleus estates were cultivating between 5000 (KPL) and 5400 (MSE) hectares of rice and sugarcane (MSE), in addition to purchasing varying quantities of rice and sugarcane from smallholders in surrounding communities. The OG scheme at KPL was at a piloting stage at the time of the fieldwork, while the MSE OG scheme has existed formally since 1996.<sup>41</sup> The following research questions guided data collection and analysis:

- (1) How are ownership, voice, risks and rewards shared in the two schemes?
- (2) What risks do MSE and KPL estates face, and how do these risks influence the dynamics of vulnerability and resilience in their commercial partnerships with smallholders?
- (3) How do governance and political economy factors shape these dynamics and what does this suggest about the viability of OG schemes as a rural development strategy in Tanzania?

Participant observation of smallholder agricultural practices in Lungo village, bordering MSE, and observation of farmer trainings in Mkangawalo village, bordering KPL, formed the entry point for the research. Repeat qualitative interviews were undertaken with management and staff of KPL and MSE and OG farmer associations, extension officers, service providers and key informants over time in various settings, and a range of grey literature connected to the investments was reviewed. At the smallholder level, 142 semi-structured interviews were undertaken with 80 OG and 62 non-OG households in Lungo and Mkangawalo villages with the help of two local interpreters. Table 1 provides further details about these interviews. Households in Lungo were selected following enumeration and participatory wealth ranking of all households in the village by knowledgeable residents according to local criteria.<sup>42</sup> The Lungo household sample reflects the relative population and distribution of households of



different wealth categories in different sub-villages. In Mkangawalo village, wealth ranking was undertaken in Kidete and Mgudeni sub-villages, which offer contrasts in terms of their proximity to the main road, markets and Udzungwa Mountains relative to the floodplain. Here, interviewed households that did not take part in the System of Rice Intensification (SRI) training (non-OG households)<sup>43</sup> reflect the approximate distribution of wealth categories and livelihood contexts in the two sub-villages. SRI-trained households (OG households) were drawn from Kidete, Mgudeni, Iole and Idulike sub-villages and are overrepresented in the household sample, relative to their share of the population. Follow-up interviews were undertaken with 25 of these SRI farmers in 2012/13 and 2013/14 to gauge households' experiences in applying the training and participating in the nascent OG scheme. Additional insights were gained from informal interactions and observations with smallholders and estate staff during long-term periods of residence in and near both villages. Short visits were also made to other rice and sugarcane estates and smallholder schemes in order to contextualize and triangulate the research findings.<sup>44</sup>

#### ***4. A tale of two estates and their smallholder schemes***

At the start of the fieldwork, MSE and KPL estates and their partnerships with smallholders were described by media and key informants as representing contrasting pictures of responsible agricultural investment in the SAGCOT region. An initial visit to MSE in 2010 coincided with protests by angry farmers who had lit the estate cane on fire in defiance of the ruling government party, CCM's<sup>45</sup> presidential election campaign that was touring with loudspeakers at the time of the visit. A year later, the KPL estate was visited by former Tanzanian President Kikwete, who toured the "model" investment and delivered a speech about the government's intention to launch the

Southern Agricultural Growth Corridor of Tanzania (SAGCOT) initiative in Kilombero District.<sup>46</sup> However, subsequent fieldwork revealed that there was a disconnect between the popular portrayal of the two agricultural estates, and the ways in which smallholders and MSE and KPL were navigating their relationships in practice. In short, despite being perceived to be an open and transparent investor, having an inclusive and responsible social and environmental investment profile on paper, and having succeeded in training farmers and increasing their rice yields, the KPL smallholder OG scheme was still not operational at the time of writing. Conversely, while our initial impressions of MSE had painted a picture of a “dying industry”, the reality on the ground defied this description. Widespread complaints among OG farmers, their associations, and surrounding communities regarding low cane prices and a lack of transparency and accountability in the relationship between smallholders and the estate notwithstanding, the MSE OG scheme “persisted” in a form that respondents considered to be economically and socially sub-optimal. Although our initial impressions had suggested that the nascent commercial relationship between KPL and smallholders was socially, economically and politically “resilient”, while that at MSE was “vulnerable”, further research suggested the opposite to be the case. We elaborate further on these findings below.

### ***5. Navigating ownership, voice, risks and rewards***

Long-term research suggests that the dynamics of vulnerability and resilience in the relationships between KPL and MSE estates and smallholders are connected to how ownership, voice, risks and rewards are perceived, shared and navigated in the schemes. Table 2 summarizes these four dimensions of ‘inclusiveness’.<sup>47</sup>

### *5.1 Ownership and voice*

MSE was established in 1939 as a sisal farm and passed through numerous owners before being privatized in 1999<sup>48</sup> when it was sold to Tanzania Sugar Industries Ltd. (TSIL), a local company incorporated in Tanzania (see Table 1).<sup>49</sup> The owners have since acquired a title to an additional 30,000 hectares of land known as “Dakawa Estate” that is located approximately 60 kilometres from the main estate, on land that was previously owned by the government. 20 000 hectares of this land have been earmarked for irrigated sugarcane production.<sup>50</sup> KPL estate was developed in 1986 as a parastatal joint venture between the governments of North Korea and Tanzania.<sup>51</sup> It ran into financial problems and was liquidated in 1993, after which time it reverted to the Rufiji Basin Development Authority (RUBADA).<sup>52</sup> Thereafter it was leased to a variety of tenants who failed to fully develop the farm until 2008, when Agrica Tanzania Limited purchased majority shares in the farm, and it became a public-private partnership between Agrica (owning 92% of the shares) and RUBADA (owning 8% of the shares).

While both estates were established before debates on “land grabs” and conflicts over land had reached their current heights, recent years have seen increasing immigration of farmers and pastoralists into Morogoro Region. Although KPL estate (when it was originally developed as KOTACO) was established on land outside of the legal jurisdiction of the villages, as per the national land laws, it was never fully developed and, consistent with village by-laws, a number of smallholders moved onto and began to farm the land.<sup>53</sup> The owners and managers of KPL contend that it abided by World Bank resettlement guidelines when relocating and compensating project affected persons.<sup>54</sup> However, the details and outcomes of resettlement are contested by smallholder farmers and leaders in nearby villages, and have led to claims that KPL

represents the opposite of responsible agricultural investment.<sup>55</sup> At MSE, several respondents noted that the development of Dakawa Estate may lead to conflicts with pastoralists whose grazing lands have already been reduced by the establishment of the nearby Wami Mbiki Game Reserve<sup>56</sup>. The new concession moreover consists of wooded and forested land that must be cleared, and according to a knowledgeable informant, the sandy soils of the concession make it unsuitable for irrigated cane production. Key informants noted that MSE's acquisition of Dakawa Estate is likely to reduce the estate's dependence on OG cane and further undermine its willingness to invest in developing and maintaining a good rapport with OG farmers. Neither the government nor smallholders retained shares in the company when it was privatized, which further weakens OG voices in decisions that concern them. Key informants noted that the government promised to sell a portion of the shares to OGs, who raised money to do so, but the money was returned with no explanation.<sup>57</sup>

Smallholders' "voice" vis-à-vis the estates is connected to their collective lobbying and bargaining power in contractual negotiations and agreements with the estates. Contractual arrangements at MSE are governed by the Cane Supply Agreement (CSA) that is negotiated by the estate and the two OG associations<sup>58</sup> that serve the approximately 5000 OGs in 34 villages that surround the estate. The CSA for the period 2009-2011 details the price, which is based on the rendement (sugar content) and volume of cane delivered, and the method of price determination between estates and OGs. The fact that MSE is the only buyer and processor of farmers' cane reduces OGs' bargaining power. Compared to the sugar market, which is characterized by monopsony, the domestic rice market is competitive, with multiple actors along the value chain. This considerably strengthens smallholders' bargaining power in relation to prices. Attempts by KPL to fix the prices offered to OGs based on volume of rice

delivered, while keeping these slightly higher than local market prices in 2012, to reduce the possibility of side-selling by farmers, were not successful due to farmers' perceptions of the unfairness of the conversion rates. Thus, while 11 bags were originally negotiated as a set repayment rate for the loan extended to farmers for inputs and production in 2012, this had to be negotiated and reduced to four bags at harvest, due to the high cost of rice in the local market at that time<sup>59</sup>. Meanwhile, in the second season of its trial operation, the entire OG scheme was negatively affected by the government's decision to reduce the 75% import tariff on rice. The result was a slump in national rice prices that made the estate unwilling to purchase farmers' rice over and above covering the cost of repayment of production loans extended to OG farmers at the start of the season. Tables 3 and 4 provide additional information on trends in OG production of the contracted crops over time.

### 5.2 Risks and rewards

The risks and rewards in the schemes are related to the roles played by rice and sugarcane in smallholders' agricultural production and livelihood strategies and political economy and governance factors that shape the investments and their sub-sectors. On the smallholder side, repeat visits to Lungo village revealed that although a number of the farmers originally lamented that they intended to abandon or convert their sugarcane to other crops, few in fact did so. *Table 3* shows the number of OGs in Lungo delivering cane to MSE and amounts and share of total cane delivered, 2000-2011. It suggests that the number of OGs delivering cane after 2005/06 (a drought year) has decreased only slightly, while amounts of cane delivered have remained relatively constant. Further research showed that despite its low profitability, sugarcane offers an important income security, and, to some extent helps households to mitigate climatic and market

uncertainty related to cultivating food crops.<sup>60</sup> Sugarcane's low labour requirements are particularly important for those who are elderly, sick, and for single-headed or labour-constrained households who do not have the resources with which to hire labour to engage in rice production, which is much more labour intensive, and more vulnerable to drought compared to sugarcane (ibid). A female smallholder who did not own a sugarcane farm noted, "If we had some money, we would grow a few acres of sugarcane, but not more rice, because I wouldn't manage to do all the weeding. Cultivating rice is hard work". Rather than abandoning sugarcane, OG farmers in Lungo village were actively lobbying the government to allow for construction of a new, smaller cane factory that could act as a competitor to MSE, and petitioning to have village land allocated for that purpose.

During the fieldwork, KPL, in partnership with USAID and Norfund, was providing training to farmers in surrounding villages in the System of Rice Intensification (SRI), a set of principles that has received international attention for its claims to dramatically increase smallholder rice yields.<sup>61</sup> OG farmers who were interviewed in Mkangawalo Village were initially very pleased with the SRI training that they received. Table 4 shows that farmers who participated in the training were able to roughly double their yields, compared to conventional practices. However, during follow up interviews in 2013 and 2014, farmers complained that the production loan arrangements with KPL are exploitative and risky when crops fail due to unforeseen flooding, as was widely reported to have occurred in 2014. Farmers also indicated that they found the SRI methods to be too "expensive" in relation to the low price offered in the market for the early-maturing, short, semi-aromatic variety (SARO5) that KPL had promoted, relative to the tall and aromatic "Supa" varieties that farmers traditionally broadcast in their fields. By 2014, only 11 of 25 farmers who were initially interviewed

and received SRI training in 2011/12 were employing SRI methods and the area planted using SRI methods had declined by more than two-thirds.

Table 2 summarizes the main operational challenges and risks facing KPL and MSE estates as commercial producers of rice and sugarcane. The risks were identified through interviews with estate staff and OGs, observations, and reviews of available grey literature and data. At MSE, key informants and MSE staff lamented a lack of skilled and trained technical staff in the irrigation department; a lack of running capital for purchasing basic office supplies and equipment; an old and outdated factory that is inefficient and suffers from frequent break-downs; difficulty in accessing spare parts for repairs; lack of dedicated agronomic and OG departments; high costs and risks associated with developing “Dakawa Estate”; unpredictable quantities and quality of OG cane deliveries due to “malicious fires”, the vulnerability of rain-fed OG cane to drought and flooding, poor management of smallholder cane farms; mismanagement and use of irrigation water and deterioration of canal infrastructure on the main estate leading to saline soils in some locations; poor road infrastructure, lack of sufficient harvesting capacity among OG associations, frequent changes in management and skilled staff and low morale among existing staff due to perceptions of poor management, as being key challenges that affect the estate’s commercial performance. Late cane payments to OGs and estate workers that prompted government intervention in 2014 were alleged to relate to MSE’s inability to service loans obtained through international banks. Informants explained that the company is frequently delayed in paying its taxes to the District. Factory closure and harvesting difficulties in the 2011/12 season caused sugar production to fall far below the estate’s targets, and production declined to pre-privatization levels in 2013/14, suggesting that the estate faces mounting economic difficulties.<sup>62</sup> Sugar Board of Tanzania (SBT) data shows both a substantial

increase in area planted to OG cane after MSE was privatized, and a declining share of OG area harvested, compared to area planted. OG records also indicate that nearly twice as many smallholder OGs are registered compared to the number that delivered cane in 20010/11. This suggests that OG associations and the estate are unable to harvest and/or process all of the cane that smallholders are willing and able to supply.

Speculation concerning how the estate is able to persist as a viable commercial entity was widespread during the fieldwork. Many respondents expressed a ubiquitous concern that “the owners on paper are not the true owners”. MSE was widely rumoured to be connected to a high-level former CCM politician and his family, who reportedly owns a large cane farm in Mvomero. The overall impression gained during fieldwork is that MSE’s economic resilience seems to be facilitated by being well connected politically in a way that enables the company to access new land and loans to invest in developing “Dakawa Estate”.<sup>63</sup> Magongo (2008) and Mmari (2012) both report local perceptions of “political patronage” as confounding the relationship between OGs and MSE. It is unclear whether the estate and its OG scheme are economically viable and potentially profitable, or are simply being protected against their creditors and potential competitors through patronage. Detailed financial information about the company and its owners was not forthcoming. MSE’s main shareholders, Super Group, appear to be doing well, and have acquired international loans to expand their operations at Kagera Sugar Estate Limited (KSL).<sup>64</sup>

At KPL, concerns were expressed informally during fieldwork by the management and staff that investors were “falling over each other” to invest in the smallholder SRI and nascent OG scheme, with much less attention focused on the financial and operational risks facing the estate, and its long-term economic viability. Interviews and observations revealed that the estate faces a number of risks as a pioneer



investor. From the company's perspective, the government's decision to lift the import tariff on rice in 2013 and the unpredictable policy signals it sends in this respect, high taxation rates (especially the District crop CESS), and the lack of a viable all-season road are critical threats to its profitability and long-term economic viability. Additional challenges concern *inter alia*, having large, fixed investments in machinery and farm infrastructure; frequent pest and disease outbreaks and difficulty controlling weeds; unreliable rains and the heterogeneity of soils and water tables throughout the farm, which render mechanised operations difficult during periods of high rainfall; the parallel local market on which KPL competes with smallholders own production; the informal nature of the domestic rice trade; the need to coordinate rice milling to meet changing market demands (qualitative and quantitative) throughout the year; a lack of uniform seed and seed production strategy at the estate; the fact that smallholders can achieve higher yields and better quality rice than large estates<sup>65</sup>; uncertainty over the viability of the SRI scheme in the light of parallel market, the chosen rice variety, and low rice prices; and dependence of the estate's profitability on producing two crops of rice per year. The latter will require irrigating during the dry season from the Mngeta River, whose flows vary considerably throughout the year. An irrigation specialist who was interviewed pointed out that the Mngeta River flows are decreasing in response to climate change and that historical flow records cannot be used as a basis for planning for future irrigation investments. Rice crop performance under the center pivot irrigation trials in 2010 and 2011 was moreover assessed by the management to be disappointing, and suggests that more than irrigation may be needed to enable the estate to achieve the high yields upon which its profitability depends. At the time of writing, the company has yet to make a profit margin on purchasing and selling smallholder rice.<sup>66</sup>

In summary, KPL's strong social and environmental profile on paper seem to give it political legitimacy among donors, but the evidence so far does not support the view that the estate can be a profitable rice producer/processor that is capable of a sustainable commercial engagement with smallholders. Although the downfall of KPL estate would probably not hurt the region's smallholders from a marketing perspective, since smallholders already produce rice for the local market, and may be welcomed by some, if it led to land redistribution, it would arguably remove a crucial link to much needed and welcomed training, inputs, community development funds and employment opportunities that are facilitated by the existence of KPL as a pioneer investor in this peripheral region.<sup>67</sup> Lacking actionable political protection, KPL remains economically and politically *vulnerable* to the risks that it faces. Conversely, at MSE, OG farmers' dependence on sugarcane for the income it provides relative to its labour requirement, and its role in mitigating risks associated with food crop production, combine with the lack of an alternative buyer for farmers' cane and MSE's reported reliance on political patronage to expand its nucleus estate and reduce its reliance on smallholders to create a situation where MSE can continue to perform its operations and engage smallholder farmers in a partnership that smallholder OGs perceive to be exploitative and unpredictable. Despite its reported poor social and economic performance, and the social and environmental concerns associated with the plans to develop "Dakawa Estate", the MSE OG scheme appears to be economically and politically *resilient* to the risks that it faces.

### 5.3 Economic viability and "rules of the game"

According to the literature on responsible and inclusive agricultural investments, OG schemes should perform the role of both development actors and profitable businesses,

if they are to improve smallholder livelihoods, reduce rural poverty and contribute to national goals of sustainable and inclusive economic development. However, our research shows that it is difficult in practice to forge inclusive, economically viable and sustainable partnerships between smallholders and large estates that lower both types of actors' vulnerability to risks and uncertainties. At the start of the fieldwork, KPL staff and owners expressed their dedication to pursuing an inclusive business model as a genuine economic component of their business. Such commitment is a prerequisite for inclusive business models to be sustainable<sup>68</sup>. However, "... economic viability is a precondition for agricultural investments to benefit the local population"<sup>69</sup>. Despite having a responsible social investment profile on paper, KPL estate and its partnerships with smallholders are vulnerable to a range of risks connected to the political and marketing characteristics of rice and the unpredictable policies that govern its domestic marketing. Conversely, the MSE OG scheme persists despite a lack of adherence of core RAI principles of transparency, inclusiveness and accountability to the smallholders with which it engages. It appears to be politically and economically resilient to the risks that it faces.

Our research suggests that the opportunities for and processes by which large estates obtain access to land and the extent to which they are able to control the market for the crops in question and make profits themselves, are key factors that affect their ability and willingness to engage in sustainable, transparent and accountable relationships with smallholders. These issues are shaped by wider institutional, governance and political economy factors associated with the sub-sectors and investments in question. KPL faces a number of operational and economic risks as a pioneer investor that are amplified by the price volatility of rice. According to Therkildsen (2011) periodic lowering of the import tariff is politically motivated by

several factors, which include the need to ensure affordable food staples for urban consumers, not least in Zanzibar, which is a net importer of rice, and whose food security is important for the political stability of the Union.<sup>70</sup> The need to maintain the political support of powerful trading companies and cartels/oligopolies, who have tended to be favoured by lucrative import licenses for rice and sugarcane, also affect these dynamics (*ibid.*). The economic risks facing KPL are further amplified by the fact that there is no monopsony market (as at MSE) and that smallholder rice farmers have an economic advantage in producing high quality rice on small, family holdings. Smallholder farmers who produce rice on contract for KPL, however, benefit from the flexibility afforded by the parallel market for rice, the fact that SRI training can be transferred to other crops, that rice is both a food and a cash crop, and that farmers have a strong bargaining power vis-à-vis the estate, because alternative buyers for their rice exist.<sup>71</sup>

Conversely, despite facing numerous operational risks and displaying signs of poor economic performance and behaviour towards smallholder OGs, MSE seems to be “protected” from economic risks by the assurance that farmers will deliver their sugarcane, and the lack of an alternative market or competitor that would force MSE to improve its competitiveness vis-à-vis smallholders. Key informants and interviewees widely cited political patronage as the reason why MSE continues to persist as a viable commercial entity, and is able to acquire new land, in spite of its poor social and economic performance. Despite the low cane prices offered by MSE, the research also showed that OG farmers continue to grow cane for the role that it plays in reducing costs and risks in their broader production portfolios, including climatic risks associated with food crop production. This example helps to explain the persistence of a poorly performing OG scheme on the farmer side of the relationship.

RAI principles emphasize that states have a central role to play in setting and enforcing frame conditions that are conducive to responsible agricultural investment (CFS, 2014). While the official state policy in Tanzania may be to promote inclusive, fair and transparent commercial partnerships between small- and large-scale farmers, the government's own performance in these respects may fall short in practice.<sup>72</sup> If the government does not intervene when investments perform poorly, or fails to recognize and incentivize investment efforts that are socially and economically inclusive, then it should come as no surprise that the potential development benefits of such investments may be undermined. Conducive agricultural investment policies, including a level playing field on price and taxation policies, are needed to ensure that engaging in OG schemes is economically rewarding for both small-and large-scale participants.<sup>73</sup> Institutional reforms that ensure transparency and equity in land acquisition processes, land-use planning and enforcement mechanisms, and land and water use rights are also needed.<sup>74</sup> These should go hand-in-hand with enforcement mechanisms that ensure that large, commercial estates conform to environmental and social legislation.<sup>75</sup> The state may also influence the "development" function of commercial agricultural estates by setting rules and institutional, legal and regulatory frameworks that benefit smallholder farmers and communities.<sup>76</sup> The state moreover has a monitoring role to play in assessing whether CF and OG schemes are operating in accordance with responsible agricultural investment principles, principles of corporate social responsibility (CSR) and other 'impact investment' guidelines'.<sup>77</sup> This should be done as part of efforts to assess to what degree and under what conditions commercial partnerships between small- and large-scale farmers are the "right" way to go, in light of the risks and benefits to participants, the environment and society.

Tanzania's many national agricultural development policies and strategies emphasize the need to include smallholders and rural communities in agricultural commercialization and modernization efforts. Hence, the promotion of OG schemes under SAGCOT and BRN, which are designed to link smallholders to profitable agricultural investments and value-chains. However, given the risks facing large, commercial estates, depending on the crop, and on local circumstances, there may exist alternative, less risky, and more effective ways of increasing agricultural production and incomes among smallholder men and women farmers and contributing to national economic development than promoting OG schemes that require a large, nucleus estate.<sup>78</sup> Regardless of whether the government chooses to invest in and support small-scale or large-scale agricultural production, or both, it is important to ensure a transparent and level playing field for agricultural investment that is "rules based" rather than "deals based" and to avoid advocating "blueprint" agro-investment approaches that fail to consider the wider social, environmental and formal and informal institutional contexts that shape the vulnerability and resilience of particular investments to risks and uncertainties.

## **6. Conclusion**

Investigating the dynamics of vulnerability and resilience in commercial partnerships between smallholder and large-scale rice and sugarcane estates in Tanzania suggests that political economy and governance factors associated with the investments, crops and sub-sectors in question create risks for large agricultural estates that may reduce their ability to engage in sustainable and rewarding partnerships with smallholders. An absence of transparent, effective, reliable and equitable institutions, policies and mechanisms for governing access to land, resolving contractual disputes, and marketing

the crops in question reinforces power asymmetries and reduces trust and commitment between small- and large-scale participants, enhancing the risks, and undermining the potential development impacts of these schemes. Despite having a responsible investment profile on paper, KPL does not appear to enjoy any serious actionable political protection from the government and is exposed to economic and reputational risks and uncertainties that threaten to undermine its commercial viability. Conversely, despite facing widespread complaints from OG farmers, their associations, and surrounding community members, and signs that it faces economic difficulties, the MSE OG scheme appears to exhibit high levels of “resilience” to the risks that it faces. These findings suggest that the dynamics of vulnerability and resilience in commercial partnerships between small- and large-scale farmers are largely shaped by the “rules of the game” - in particular, how much or little the state directly or indirectly “protects” particular investments and investors from political and economic risks. These factors in turn shape the viability and sustainability of the investments and their potential to make positive contributions to smallholder livelihoods and rural development. In the absence of transparent, coherent and reliable institutional, governance and frame conditions that incentivize and reward responsible agricultural investment behaviour, it is unlikely that smallholder-inclusive agro-investments can achieve their commercial *and* development objectives.

Table 1 Notes<sup>79 80 81 82 83 84 85 86</sup>

Table 2 Notes<sup>87 88 89 90 91 92</sup>

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- <sup>1</sup> World Bank, *Agriculture for Development*; Cotula et al., *Land Grab*; World Bank, *Rising Global Interest*.
- <sup>2</sup> Vermeulen and Cotula, *Making the Most*.
- <sup>3</sup> Kaarhus et al., *Agro-investment in Africa*; Lavers, “Land Grab”.
- <sup>4</sup> De Janvry, “Agriculture for Development”; Hazell et al., “Future of Small Farms”.
- <sup>5</sup> FAO et al., *Principles*; CFS, *Principles*. Additional guidance for responsible agricultural investment is found in the 2005 Voluntary Guidelines on the Right to Adequate Food in the Context of National Food Security, (VG-Food) and in the 2012 Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT).
- <sup>6</sup> FAO, *Contract Farming*.
- <sup>7</sup> “Contract Farming”, no date.
- <sup>8</sup> AgDevCo and Prorustica, *Investment Blueprint*.
- <sup>9</sup> URT, *National Agricultural Policy*; URT, *Food Security Investment*.
- <sup>10</sup> The proposed SAGCOT region encompasses an area of approximately five million hectares of land in the central and southern regions of the country. According to the Prime Minister’s Office, SAGCOT aims to bring 350,000 hectares of farmland into commercial production in this region over the coming two decades, raise annual agricultural revenues by US\$1.2 billion and lift 450,000 households out of poverty.
- <sup>11</sup> TNBC, *Kilimo Kwanza*; Coulson, “Kilimo Kwanza”.
- <sup>12</sup> URT, *Tanzanian Development Vision*.
- <sup>13</sup> AgDevCo and Prorustica, *Investment Blueprint*; Kikwete, “Tanzania’s Transformation”.
- <sup>14</sup> Hella, Sulle and Kisusu, *Drivers of Success*; Cooksey, *What Difference*.
- <sup>15</sup> Pauw and Thurlow, “Agricultural Growth”; World Bank, “GDP Growth Rates”.
- <sup>16</sup> Maghimbi, Lokina and Senga, *The Agrarian Question*.
- <sup>17</sup> Hella, Haug and Kamile, “Crisis or Opportunity”.
- <sup>18</sup> URT, *Climate Change Strategy*.
- <sup>19</sup> Paavola, “Vulnerability”.
- <sup>20</sup> Mongi, Majule and Lyimo, “Vulnerability and Adaptation”; Sanga, Moshi and Hella, “Pangani”.
- <sup>21</sup> Turner et al., “Vulnerability Analysis”; Adger, “Vulnerability”.
- <sup>22</sup> Eriksen, Brown and Kelly, “Dynamics of Vulnerability”.
- <sup>23</sup> Paavola, “Vulnerability”; O’Brien, Quinlan and Ziervogel, “Vulnerability Interventions”.
- <sup>24</sup> Leichenko and O’Brien, “Environmental Change”.
- <sup>25</sup> Mortimore, “Sahel”.
- <sup>26</sup> Richards, “Coping with Hunger”; Mortimore and Adams, “Farmer Adaptation”; Crane, Roncoli and Hoogenboom, “Agriculture as Performance”.



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- 27 Brown and Westaway, “Agency, Capacity and Resilience”
- 28 Ibid.
- 29 Eakin, “Weathering Risk”; Nicol et al., “Financial Risks”.
- 30 World Bank, *Risk and Opportunity*, 12.
- 31 Kirsten and Sartorius, “Linking Agri-business”.
- 32 FAO, *Contract Farming*.
- 33 Barrett et al., “Smallholder Participation”; Bellemare, “As you Sow”; Herrmann, “Agricultural Investments”.
- 34 Oya, “Contract Farming”.
- 35 The principles state, inter alia, that responsible agricultural investments should “contribute to sustainable and inclusive economic development” (Principle 2), “conserve and sustainably manage resources, increase resilience and reduce disaster risk” (Principle 6) and “incorporate inclusive and transparent governance structures, processes and grievance mechanisms” (Principle 9).
- 36 Havnevik, Matondi and Beyene, eds., *Biofuels*; Nelson, Sulle and Lekaita, “Land Grabbing”.
- 37 Cooksey, “Politics, Patronage, Projects”.
- 38 See note 13.
- 39 Ibid.
- 40 See note 7.
- 41 Matango, “Mtibwa Outgrowers Scheme”. MOA was established by 25 farmers in 1996 in anticipation of MSE’s privatization.
- 42 Households were categorized as being “poor”, “average” or “wealthy”, based on locally determined criteria that included ownership of land and livestock, access to off-farm income, food security status, education and quality of home.
- 43 This training was intended to boost rice yields and prepare farmers to sell their rice to KPL
- 44 To Illovo Sugar Estate (producing sugarcane) and Kilimo Cha Yesu (KCY) farm (producing rice) in Kilombero District, and Mbarali Highland Estate and Madibira Smallholder Scheme (both producing rice) in Mbarali District, Mbeya Region.
- 45 Chama Cha Mapinduzi (CCM, in English: Party of the Revolution) is the ruling and dominant political party of Tanzania.
- 46 Coleman, “Agrica”.
- 47 Vermeulen and Cotula, *Making the Most*. The authors highlight sharing of ‘ownership’, ‘voice’, ‘risk’ and ‘rewards’ as key aspects of inclusive agro-investments.
- 48 URT, “Privatisation in Tanzania”. MSE was divested by way of share sale in 1998, with 95% of shares in the company purchased by TSIL, and 5% of shares retained by the government. According to the report, the sales agreement was signed in December, 1999<sup>27</sup>

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- 49 Between 1969 and 1999, MSE was controlled by the Tanzanian government, through an ownership and management partnership between the National Agricultural and Food Corporation (NAFCO), a government parastatal, and various combinations of private and donor interests.
- 50 MSE, “Environmental Audit Report”, vi.
- 51 Known as the Korea Tanzania Joint Agricultural Company (KOTACO).
- 52 The Rufiji Basin Development Authority (RUBADA) is a corporate body established by the Act of Parliament No. 5 of 1975 with responsibility for sustainable and balanced socioeconomic development activities in the basin.
- 53 Greco, “Local Politics”.
- 54 Kayonko, “External Review”.
- 55 Oakland Institute et al., “Irresponsible Investment”.
- 56 HAKIARDHI, “NARCO Ranches”. The report documents several actual and potential land-use conflicts associated with the Dakawa concession.
- 57 See also note 40.
- 58 Mtibwa Outgrowers Association (MOA) and Turiani Cane Outgrowers and Other Crops Primary Cooperative Society (TUTUCOCPRCOS).
- 59 KPL SRI manager, personal communication, 13.08.13. Farmers were paid 8000 Tanzanian shillings (TSH), compared to 6000 TSH for a ‘debe’, corresponding to ca. 13, 5 kg milled rice.
- 60 West, “Linking Small- and Large-scale”.
- 61 Glover, “System of Rice Intensification”.
- 62 Sugar Board of Tanzania, 2015. See sugar production figures: [www.sbt.go.tz](http://www.sbt.go.tz)
- 63 See note 51.
- 64 IFC, “Kagera Sugar”. KSL is privately owned by Super Star Forwarders Company Limited and Superdoll Trailer Manufacturing Company Limited, the same two companies that have a majority ownership shares in MSE.
- 65 KPL achieved rain-fed yields of 4 tonnes/ha in 2011/12. SRI-trained smallholders achieved up to 8 tonnes/ha under the same conditions. Reported rice yields among smallholders producing under formal and informal irrigation systems in Mbarali District were above 5 tonnes/ha.
- 66 KPL, “Agrica reponse”.
- 67 Herrmann, “Agricultural Investments”.
- 68 Vermeulen and Cotula, *Making the Most*, 7.
- 69 Ibid, 5.
- 70 Therkildsen, *Policy Making*.
- 71 See note 60.

- 72 Cooksey, *What Difference*; Smalley, Sulle and Malale, *Agricultural Commercialization*.  
73 Poulton et al., “State Intervention”.
- 74 TNRF, “Feedback and Recommendations”.
- 75 EcoAgriculture Partners, “SAGCOT Greenprint”; ERML, “SAGCOT SRESA”.
- 76 HLPE, *Investing in Smallholder Agriculture*.
- 77 O’Donohoe et al., *Impact Investments*, 5.
- 78 De Schutter, “Three Critiques”.
- 79 More information on KPL is available at: <http://www.agrica.com/html/project1.html>  
80 MSE, “Company Brief”
- 81 15 farmers from Mkangawalo village received SRI training in 2010. 250 additional  
farmers from six villages were trained in 2011, and in 2012, the programme was scaled up  
to reach 1200 farmers.
- 82 See: Agrica webpage: <http://www.agrica.com/html/background.html>
- 83 See note 54
- 84 The Norwegian Investment Fund for Developing Countries
- 85 Capricorn is a US-based impact investment fund that manages the assets of the  
SkollFoundation and Jeff Skoll.
- 86 AgDevCo is a UK-based social impact investor and agribusiness developer working in  
Africa.
- 87 Super Star Forwarders Company Ltd. and Superdoll Trailer Manufacturing Company Ltd.  
are related by common shareholding held by Nassor Seif (67%) and Seif Seif (33%), see  
<https://disclosures.ifc.org/#/projectDetailSII/4328> Superdoll is a leading manufacturer of  
high-end Doll trailers and tankers and exclusive dealer of Michelin Tyres in Tanzania. Key  
customers include Tanzania Breweries, a subsidiary of SAB Miller and Coca Cola.  
Superstar is a logistics services company in Tanzania with exclusive Total and Coca Cola  
contracts and relationships with other large companies. See: [http://www.superdoll-](http://www.superdoll-tz.com/sf.html)  
[tz.com/sf.html](http://www.superdoll-tz.com/sf.html)
- 88 MSE, “Training needs assessment”, unpublished.
- 89 The NAFKA Staples Value Chain Activity is a \$30 million project funded by USAID  
under the Tanzania Feed the Future (FtF) Initiative aimed at improving smallholder  
productivity and profitability within the maize and rice value chains in selected regions of  
Tanzania.
- 90 These tactics were reported by outgrowers and MSE and observed during fieldwork. See  
note 41, p. 23; MSE, “Company Brief”, 5-6.
- 91 Assess Consulting “Audit”.
- 92 Various unpublished and internal KPL reports in the author’s possession. See note 66.

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**Table 1: Overview of MSE and KPL smallholder schemes and village-level fieldwork**

<b>Key Variables</b>	<b>Mtibwa Sugar Estates Limited</b>	<b>Kilombero Plantations Limited<sup>79</sup></b>
Crop produced/processed	Sugarcane	Rice
Size of nucleus estate (hectares)	6400 total; 5400 under cultivation in 20011/12 <sup>80</sup> An additional 1300 ha were under cane production at 'Dakawa Estate' in 20011/12	5818 total, of which 318 ha ceded to project affected persons leaving 5429 ha gross farm area, of which 5000 ha were under cultivation in 2011/12
Established (privatized)	1939 (1999)	1986 (2008)
Outgrower/smallholder scheme established	1996/97	20011/12 <sup>81</sup>
Current ownership	Tanzania Sugar Industries Ltd., a private domestic investor	Joint venture between Agrica Tanzania Limited <sup>82</sup> , RUBADA <sup>83</sup> , Norfund <sup>84</sup> , Capricorn <sup>85</sup> , and AgDevCo <sup>86</sup>
Past Ownership structure	Government parastatal	Joint Venture (50%/50%) between the Government of Tanzania and the Government of North Korea
Number of Outgrowers/smallholders	5795 registered outgrowers, of which 2754 delivered cane in 2009/10	7200 farmers trained in SRI production methods through 2015; 803 of these received production loans to be serviced in cash and repayed in paddy at agreed prices.
Employment generated	1300 permanent workers 2200 seasonal workers (7 months per year)	271 permanent employees 848 part-time workers
Location, distance to nearest town and means of transport	Mvomero District, Morogoro Region 102 km North of Morogoro Town Secondary Road	Kilombero District, Morogoro District 80 km SouthWest of Ifakara Town; 450 km from Dar es Salaam Secondary Road and Railway
Milling capacity and processing infrastructure	Factory with installed crushing capacity of 150 tonnes/hour (3000 tonnes/day) and cogeneration power plant with maximum 11.5 MW power output	2 X 6-tonne/hour industrial rice mills 3,000 tonne automated cleaning and drying facility 500KW biomass gasification plant Refurbishment of 320KW mini-hydro station
Water source, extraction rates and type of irrigation	Wami River for sprinkler and 'big gun' irrigation of the estate (3,5 m <sup>3</sup> /second maximum allowable extraction rate); Diwali River for factory operations (1,5 m <sup>3</sup> /second allowable extraction rate)	215 ha trial under pivot irrigation in 2012 with plans to expand pivot irrigation to 3036 hectares. Water licence for 72 524 m <sup>3</sup> /day "average" abstraction from Mngeta River was obtained in 2014, with estimated maximum extraction of 2,11 m <sup>3</sup> /s. Supplemental irrigation via borehole/groundwater as needed.
Household interview sample and selection methods	50 households from Lungo village (184 households total), comprising 29 OG and 21 non-OG smallholder households of different wealth categories	92 households from two sub-samples of Mkangawalo village (2150 households) comprising i) 34 non-SRI households of different wealth categories from Kidete and Mgudeni sub-villages (490 households) and ii) 58 of 102 SRI-trained households from Kidete, Mgudeni, Ilole and Idulike sub-villages (ca. 800 households)

**Table 2: Ownership, voice, risks and rewards, MSE and KPL OG schemes**

<b>Dimensions of inclusiveness</b>	<b>Mtibwa Sugar Estates Limited</b>	<b>Kilombero Plantations Limited</b>
<b>Ownership</b>	Tanzania Sugar Industries Limited (TSIL) is owned by the Super Group of companies. Its subsidiary, SuperDoll Trailers Manufacturing Company. Ltd, controls 40% of the shares in MSE, while Super Star Forwarders Company Ltd. <sup>87</sup> , Super Motors Company Limited and Super Service Centre Company Ltd., each control 20% of the shares. <sup>88</sup> The principle owners of these companies are two Tanzanian brothers, Nassor Seif and Seif A. Seif.	Agrica Tanzania Limited (ATL) is a subsidiary of Agrica Limited, Great Britain, which is registered in Guernsey. Current investors in Agrica include Capricorn Investment Group; Norfund, the Norwegian Investment Fund for Developing Countries; and UK – based AgDevCo, a social impact investor and agribusiness developer. KPL’s smallholder scheme has received support from Norfund, the USAID NAFKA <sup>89</sup> programme and the African Enterprise Challenge Fund.
<b>Voice</b>	30-page Cane Supply Agreement stipulates inter alia cane price and division of proceeds. OG are in a weak bargaining position in relation to MSE due to the fact that the market is a monopsony and MSE is the only buyer of cane. Cane burning (“malicious fires”) and factory lock-downs are used as informal bargaining tactics. <sup>90</sup> Husbands and wives register in different OG associations and households “votes” with their memberships. OG associations have successfully lobbied the government for reductions and or removals of levies and taxes on cane production, and negotiated informal amendments to contractual agreements and payments (regarding rendement) with MSE in specific cases. OGs are actively lobbying the government to establish a new factory that would compete with MSE	The 2-page purchase contract for 2012 and 2013 specifies a fixed paddy price, the terms of repayment for the production loan issued to SRI-trained farmers, and the rice variety, and agricultural inputs and rice management practices smallholders should employ. Smallholders’ bargaining power is relatively stronger than at MSE due to the existence of the parallel local rice market. Smallholders negotiated a paddy price that was upward of what KPL had initially offered in 2012, due to higher prices in the local market than what had been agreed on in the contract. In 2013, they were paid above the local market price despite the steep decline of local rice prices following government sanctioned imports of duty-free rice.
<b>Risks</b>	Factory efficiency problems and frequent breakdowns, poor road infrastructure, cane harvesting and transport activities are vulnerable to flooding; low yields among OGs due to low cane prices and late payments which discourage active and timely management and investment in cane farms; economic and environmental risks and costs associated with developing “Dakawa Estate”; Saline soils; perceptions of poor management and low staff morale at MSE; allegations of political patronage and high-level political protection	High start-up costs;dependence on double cropping to be profitable; poor road infrastructure; vulnerable to importation of cheap, duty-free rice; bureaucratic delays in delivering investor tax exemptions and imported equipment and products; absence of pest and disease control research; predatory district taxation (crop CESS); reputational and local political risks associated with relocation and OG scheme; lacks actionable political protection, despite its status as a “flagship” SAGCOT investment
<b>Rewards</b>	Contributes to savings in foreign currency through production of sugar for local markets; 6.8 billion TSh. in OG revenues in 2007/08 Local employment benefits; investments in road, education and health infrastructure; sponsors sports and cultural activities; By 2009, the company had invested 1,436,100,000 TSh in maintaining and constructing roads, 87 375 000 TSh in construction of schools, dispensaries and a health clinic and 50,500,000 TSh in providing clean drinking water to villages <sup>91</sup>	Contributes to savings in foreign currency through increased domestic rice production; \$639,000/year in net local salaries and benefits; Employment benefits; \$150 000 Community Development Fund for villages that border the farm; Health Centre that provides \$60 000/year in subsidised health services to communities; SRI training provided to 7200 smallholders in 10 surrounding villages since 2010 <sup>92</sup>

**Table 3: Number of OGs delivering cane to MSE and amounts and share of total cane delivered, 2000-2011**

Season	LUNGO VILLAGE			ALL VILLAGES (n=34)		
	Number OGs delivering cane	Tonnes cane delivered	Share of total OG cane delivered (%)	Number OGs delivering cane	Cane delivered (tonnes)	OG share of cane delivered (%)
2000/01	160	7466	6	1778	120144	35
2001/02	315	23109	11	2907	207854	46
2002/03	367	18768	11	3069	176932	41
2003/04	437	20527	9	3544	240047	55
2004/05	444	13856	6	4306	241464	56
2005/06	415	10421	4	4797	259926	51
2006/07	155	7187	6	2288	129624	36
2007/08	200	9425	4	3428	230874	45
2008/09	285	12145	6	4026	214225	48
2009/10	166	9281	5	2754	184423	42
2010/11	159	10278	5	2640	190380	40
TOTAL (Average)	(282)	142463	(7)	(3231)	2195892	(46)

**Table 4: Rice farming practices among 25 SRI-trained farmers in Mkangawalo village over time**

<b>Variable</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>Difference 2011-2014</b>
Number of farmers using SRI methods	23	24	11	- 12
Number of farmers using traditional methods	20	21	25	5
Area planted using SRI methods (acres)	49,25	44,25	13,5	-35,75 (73% decrease)
Area planted using traditional methods (acres)	96,25	125	91,5	- 5,75 (9% decrease)
Average yields, SRI farms (tonnes/ha)	3,9	4,2	3,0	- 0,9
Average yields, traditional farms (tonnes/ha)	2,0	2,4	2,0	-----

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# 8

## CAN LINKING SMALL- AND LARGE-SCALE FARMERS ENHANCE ADAPTIVE CAPACITY?

Evidence from Tanzania's Southern  
Agricultural Growth Corridor

*Jennifer West*

### Introduction

A central question in the adaptation–development nexus is if and how agricultural investments that are undertaken as part of general development efforts can enhance the adaptive capacity of smallholder farmers and rural communities in the context of climate change. There is growing recognition that agricultural investments that include smallholder farmers as part of a core business strategy may provide broad social and economic benefits (World Bank 2013; Vermeulen and Cotula 2010). However, little is known about how particular agricultural investment models affect the adaptive capacities of rural households and communities. Tanzania provides an illustrative case of some of the challenges that must be addressed if agricultural investments targeting smallholder farmers are to support climate adaptation. Tanzania's National Adaptation Programme of Action (NAPA) and National Climate Change Strategy identify agriculture as the sector of the economy that is most vulnerable to climate change, with agriculture and food security being priority arenas for adaptation efforts (URT 2012b; URT 2007). At the same time, Tanzania is seeking to modernize and transform its agricultural sector through major initiatives that aim to attract greater private sector investment in the country's agricultural sector.

The Southern Agricultural Growth Corridor of Tanzania (SAGCOT) is a prominent example of these initiatives. SAGCOT, which forms the policy context for the discussion in this chapter, aims to set a benchmark for sustainable and responsible agricultural investment and development in Africa, and has attracted wide attention nationally and internationally (Jenkins 2012). A flagship

programme of the Tanzanian government's *Kilimo Kwanza* (Agriculture First) strategy for increasing private-sector investment in the agriculture sector, SAGCOT's goals are 'to deliver rapid and sustainable agricultural growth, with major benefits for food security, poverty reduction and reduced vulnerability to climate change' (AgDevCo and Prorustica 2011: foreword). In its efforts to target smallholder farmers, SAGCOT is promoting outgrower (OG) schemes – a form of contract farming (CF) that links independent smallholder farmers to a large, centralized processing unit or commercial farming operation through contracts that specify one or more conditions of crop production and marketing (Little and Watts 1994). OG schemes have been established in various African, Asian and Latin American countries over the past 50 years and have enjoyed wide popularity among governments, donors and multilateral development agencies for their perceived potential to deliver development benefits to smallholder farmers and rural communities (Tyler and Dixie 2013). In combining small- and large-scale farming, OG schemes offer an alternative to an agricultural development approach that favours *either* large-scale commercial agriculture, *or* smallholder production. However, the literature is divided as to whether OG schemes represent an opportunity or a threat for smallholder farmers, rural communities and the environment (Oya 2012: 4). This chapter extends the literature on OG schemes and contract farming by exploring *how OG schemes can support the adaptive capacities of smallholder farmers and rural communities to climate variability and change in the context of ongoing development challenges, opportunities and constraints*.

How agricultural investments can support smallholder farmers' adaptive capacity is a pertinent question for governments, donors and investors seeking to promote agricultural development in Tanzania. Tanzania's agricultural production is dominated by smallholder production (Hella et al. 2011). More than 80 per cent of the population relies on agriculture for food security, income and employment (URT 2012a). Smallholder farmers and rural areas face numerous development challenges associated with poor health status, low life expectancy, malnutrition, food insecurity, limited employment opportunities, poverty, low producer prices, and lack of access to reliable infrastructure, information and services (UNDP 2013; Paavola 2003). Climate variability and change represent an additional source of uncertainty in this context (Paavola 2008). The projected impacts of climate change in Tanzania include a warming in the mean temperature of 1.5–5°C by 2100 (depending on the emissions scenario), with greater relative warming during dry seasons compared to wet seasons and in inland areas compared to coastal regions of the country (Watkiss et al. 2011). Changes in the onset and duration of the rainy seasons, and the incidence and intensity of drought and heavy rainfall, are already observed by farmers around the country, and are expected to affect irrigation potential, agricultural productivity and hydropower production in the future (URT 2012b; URT 2007). Smallholders are recognizing and responding to climate variability and change, although they face barriers and limits to adapting (Sanga 2013; Mongi 2010; Mary 2009).

## Conceptual framework

To answer the research question, the chapter draws on literatures on CF and OG schemes, and adaptive capacity. In the literature on climate change, adaptive capacity, together with exposure and sensitivity to climatic risks, are central components of vulnerability (Smit and Wandel 2006). Vulnerability varies between and among individuals, regions, sectors and social groups and over time due to differences in social, economic, environmental and institutional conditions, and the distribution of assets, resources and entitlements in society (IPCC 2007). The term ‘adaptive capacity’, as applied in this chapter, refers to the capacity of individuals, households, communities and the wider socio-ecological systems of which they are a part to adjust to, and thrive, in the face of uncertainties. It includes the ability to deal with immediate ‘surprises’ and long-term risks, climatic and otherwise, as well as the capacity to seize opportunities, recognizing that people do not respond to climate variability and change in isolation from other processes of change (IPCC 2014). The interplay between participation in OG schemes and adaptive capacity is explored in relation to seven factors: economic resources; risk management; technology; information and skills; infrastructure; institutions; and equity. These factors are broadly referred to as ‘determinants’ of adaptive capacity in the climate change literature (Keskitalo et al. 2011; Smit and Wandel 2006; Eakin and Lemos 2006; Yohe and Tol 2002; Smit and Pilifosova 2001). They also resonate with the literature on CF and OG schemes, which suggests that successful OG schemes promote local development and smallholder welfare by increasing household incomes (Bellemare 2012; Barrett et al. 2012; Miyata et al. 2009; Warning and Key 2002); by enhancing access to agricultural markets, inputs, technology and training (Abebe et al. 2013); by reducing production and marketing risks (Glover and Kusterer 1990); by strengthening equity, transparency and trust in OG relationships (Kirsten and Sartorius 2002; Glover 1987); and by contributing to local development through investments in jobs, infrastructure and services (Tyler and Dixie 2013; Poulton et al. 2008). Below I outline these factors in more detail and describe the ways in which they are operationalized in this chapter.

Access to economic resources can enhance households’ communities’ and societies’ abilities to withstand and recover from climatic shocks and undertake investments to adapt to climate change (Eakin and Lemos 2006). I operationalize this determinant by assessing whether and how OG production contributes to or undermines the *stability*, *diversity*, and *flexibility* of participating households’ agricultural incomes. ‘Risk management’ refers to the process of managing and spreading risks, and includes both formal (e.g. commercial insurance) and informal channels (Yohe and Tol 2002). In OG schemes, the estate (the buyer) normally assumes the marketing risks while the smallholder producer assumes the production (including climate) risks (Glover and Kusterer 1990). I assess how OG schemes are affecting smallholders’ adaptive capacity by discussing how participation in OG schemes affects the agricultural production and the

marketing risks that farmers face. Access to appropriate technologies (e.g. early warning systems, improved crop varieties) can enhance adaptive capacity by expanding farmers' response options in the face of uncertainties – but it may also result in 'lock-ins' that lead to maladaptation (Barnett and O'Neill 2010). The term 'information and skills' includes factors such as literacy, education, training, communication networks and knowledge dissemination forums (Eakin and Lemos 2006). There is increasing recognition that co-production of knowledge and collaborative and iterative learning processes, as opposed to top-down transfers of information and technology, are needed for effective adaptation (Tschakert and Dietrich 2010). For example, while scientific and 'expert' knowledge is necessary to develop improved rice varieties that are high yielding or can withstand drought, knowledge of farmers' production circumstances and preferences is needed to select breeding materials with features – such as aroma and cooking qualities – that farmers value (Kafiriti et al. 2003). I operationalize these two determinants by asking whether the technologies, information and skills promoted by OG schemes are considered locally relevant and appropriate, and whether they promote two-way flows of information and collaborative learning, experimentation and adaptation. Investments in physical infrastructure such as roads, wells, hospitals, schools and markets can enhance a community's adaptive capacity by improving health, income and access to employment, resources and services (Eakin and Lemos 2006). However, infrastructural investment may be vulnerable to climatic risks, such as flash flooding (Keskitalo et al. 2011). I explore the extent to which OG schemes are investing in infrastructure that is adapted to current and future climate variability and change. 'Institutions' are the formal and informal structures, rules and incentives that govern individual, collective and societal behaviour (Ostrom 1990; North 1990). They play a key role in shaping adaptive capacity by mediating the barriers and incentives for accessing and using resources (Gupta et al. 2010). OG schemes are considered an 'institutional innovation' (Glover 1987) in which smallholder farmers enter into agricultural production and marketing partnership with large estates, formalized in a written contract. I explore the formation and role of smallholder OG associations and the role of institutional dynamics outside OG schemes in shaping smallholder farmers' bargaining power vis-à-vis the large estates. Equity is a concern that cuts across the determinants. It is closely connected to formal and informal institutions, which are subject to power relations and that structure the ways in which entitlements to adaptation resources such as financial and social capital, technology and information are allocated in society (Eakin and Lemos 2006). I outline how OG schemes are influencing equity at the community level by examining which households are participating in OG schemes, and why, and how access to land and water is negotiated and contested within and beyond the schemes.



### ***Research methods and study area***

The fieldwork informing this chapter was undertaken during five visits to Tanzania totalling 15 months in the period October 2010 to April 2013. Research focused on two OG schemes in Morogoro Region – one, Kilombero Plantations Limited (KPL), producing rice; the other, Mtibwa Sugar Estates (MSE), producing sugarcane – and two communities located adjacent to these schemes (see Table 8.1). Morogoro Region is characterized by high agricultural potential, relatively good backbone infrastructure (outside the rainy season), and generally adequate rainfall compared to other parts of the country (Environmental Resources Management Limited 2013; AgDevCo and Prorustica 2011). Both OG schemes are located in flat valleys/floodplains (250–350 metres above sea level) bordering wetlands at the foot of mountain ranges that form part of the Eastern Arc Mountain chain, a recognized global hotspot for biodiversity (Frontier Tanzania 2009). KPL and MSE schemes were chosen due to their location within the SAGCOT region, and because initial field investigations identified rice and sugarcane as having strategic potential to contribute to national development efforts through import displacement. Research explored what factors are important for understanding the contribution of OG schemes to adaptive capacity at the household and community levels. The author lived and conducted research in and near the two study sites throughout the fieldwork. A mixture of qualitative and quantitative methods was employed to collect data, including participatory observation of farming activities; key informant interviews with OG farmers, livestock keepers, estate personnel and a range of actors in the public, private, donor, non-governmental organization (NGO), civic and research sectors; and group discussions and participatory rural appraisal exercises with male and female farmers in the two communities. Semi-structured interviews ( $n=142$ ) with OG and non-OG households of different wealth categories were conducted in two villages to gain insight into farmers' views of MSE and KPL estates, the OG schemes, and wider farming systems and livelihoods. A review of policy documents relating to SAGCOT and national climate and agriculture policies, and the author's participation in meetings in villages and with Tanzanian researchers and policy-makers, donors, private-sector actors and agricultural development practitioners, helped to contextualize and triangulate the data collected through formal and informal interviews and observations.

### ***Assessing the contribution of OG schemes to adaptive capacity***

In this section, I describe how the two OG schemes are shaping adaptive capacity at the household and community levels in relation to the seven determinants of adaptive capacity described above.

**TABLE 8.1** Overview of Mtibwa Sugar Estate and Kilombero Plantations Limited Outgrower Schemes

<i>Key variables</i>	<i>Mtibwa Sugar Estates<sup>1</sup></i>	<i>Kilombero Plantations Limited<sup>2</sup></i>
OG crop sown	Sugarcane	Rice
Other crops grown by farmers	Rice, maize, sunflower, pigeon pea, pumpkin, vegetables	Maize, cassava, sweet potato, banana, watermelon, vegetables
District	Mvomero	Kilombero
Estate size (hectares)	6000 (5400 in use <sup>3</sup> )	5000
Number of outgrowers	3500	1200 (scaling up to 4500 in 2013)
Number of households interviewed	50 (29 OG/21 non-OG)	92 (57 OG/35 non-OG)
Current ownership structure	Private (domestic: Super Group of Companies)	Public-Private (Agrica, <sup>4</sup> RUBADA, <sup>5</sup> Norfund, <sup>6</sup> Swefund, Capricorn <sup>7</sup> ), International
Past ownership structure	Government parastatal	Joint venture between the Governments of Tanzania and North Korea.
Outgrower scheme initiated	1996/1997	2011/2012
Rainfall pattern, climate trends and key climate stressors identified	Bimodal rainfall pattern. Two main rain seasons: March–May (Masika) October– December (Vuli) Decreasing rainfall in the Vuli season; <sup>8</sup> Periodic rainfall shortages in the Masika; flooding in the Vuli; disappearance of the Vuli rains and increasingly unreliable rainfall patterns reported by farmers	Unimodal rainfall pattern Reliable rainfall in the main rain season (December–May) Periodic flooding <sup>9</sup> Unreliable onset of the main rains, increasing temperatures and increasing crop and livestock pests and diseases were reported by farmers
Sample population for household interviews	Lungo village (185 households)	Mkangawalo village (ca. 1300 households): Kidete, Mgudeni, Ilole and Idulike sub-villages
Sampling methods	Purposive: OG and non-OG farming households of different wealth categories	Purposive: OG and non-OG farming households and households of different wealth categories

## Notes

- 1 Background information on Mtibwa Sugar Estate can be found on the Sugar Board of Tanzania webpage: <http://www.sbt.go.tz/index.php/factories>
- 2 More information on KPL is available at: <http://www.agrica.com/html/project1.html>
- 3 See: Mtibwa Sugar Estates Limited 2009.
- 4 See the Agrica webpage: <http://www.agrica.com/html/background.html>
- 5 The Rufiji Basin Development Authority (RUBADA) is a corporate body established by the Act of Parliament No: 5 of 1975. The Authority is charged with multi-sectoral responsibility for promoting, regulating, coordinating and facilitating sustainable and balanced long-term ecological and socioeconomic development activities in the sectors of energy, agriculture, fisheries, forestry, tourism, mining, industry, transport and environment in the basin. The basin covers ca. 177,000 sq.km of land (about 20 per cent of Tanzania's land) and 30 per cent of runoff water.
- 6 Norwegian Investment Fund for Developing Countries.
- 7 Information on Capricorn and other KPL investors can be found at: <http://www.agrica.com/html/investors.html>
- 8 Mtibwa Sugar Estate Daily Rainfall records 1952–2012, unpublished data set analysed by the author.
- 9 A major flood occurred at Kilombero on April 19, 2011, prior to the onset of fieldwork. The flood rendered the main road from Ifakara to KPL estate impassable for a month, destroyed crops and pastures, and left several families in neighbouring villages homeless.

### *Economic resources*

OG production is one of a portfolio of agricultural and livelihood strategies pursued by OG households in both communities. Among interviewed OG households, rice and sugarcane are cultivated *in addition to* crops that are grown by non-OG households. Both OG and non-OG farmers grow rain-fed lowland rice and maize, and a variety of crops including sunflower, cassava, pigeon pea, cowpeas, bananas, pumpkin, and indigenous and improved vegetables for home consumption and sale. Many OG and non-OG households in Lungo village keep livestock, and poorer households in both communities engage in petty trading activities connected to local natural resources, such as fishing, brick production, production of local brew, and selling vegetables and snacks from local food stands. Better-off farmers also engage in processing and sale of crops to larger towns within the district. The ability to diversify economically and gain access to a broader range of income sources is an important component of adaptive capacity for dealing with uncertain production environments (Eriksen et al. 2005; Mortimore and Adams 2001; Ellis 1998). In the literature on OG schemes, diversification of income sources is also associated with enhanced bargaining positions for farmers, higher overall income levels and reduced exposure to risks (Glover 1990: 308).

The MSE OG scheme also enhances adaptive capacity by providing *stability* to participating households' incomes. Although at the time of the fieldwork, OG farmers and associations claimed that there was a widespread problem of farmers converting their cane fields to other crops due to low prices and late cane payments (see also: Assess Consulting 2011; Matango 2006), observations over the course of the fieldwork indicated that they continued to grow cane. Several factors explain this. Once it has been established, sugarcane, a perennial crop, requires less labour compared to rice, which is an important cash crop in the area. According to farmers, it is also more drought-tolerant than rice, and provides some income security for elderly, sick and female-headed households with a shortage of labour power to devote to labour-intensive farming activities. However, this security function may be compromised by adverse weather conditions that disrupt cane harvesting and delivery to the factory, as discussed under the section on 'risk management'. The labour requirements for cane cultivation complement those employed for growing food and cash crops, as sugarcane harvesting and early weeding of the ratoon<sup>1</sup> crop normally takes place between July and December, outside the main rainy season in which food (maize, rice) crops are sown. Cane payments, which arrive as a lump sum, also perform a savings role, enabling farmers to pay for large expenditures such as school fees and home improvements.

In contrast to sugarcane, rice provides a degree of *flexibility* to household incomes. Rice stores well as paddy (unmilled grain), compared to maize and other legumes. It can be consumed or traded for maize, or saved and sold in small quantities throughout the year, as household food and cash needs arise. The rice

variety that KPL promotes in its OG scheme is a publically bred, semi-aromatic, high-yielding, short-stature rice variety called 'SARO 5'<sup>2</sup> (Kanyeka 2005). This variety matures more quickly<sup>3</sup> than farmers' traditional rice varieties, which are tall and aromatic, and preferred for their cooking qualities and price premium in local markets, but which are photoperiod-sensitive and can be grown only in the main rainy season (Kafiriti 2003). The SARO variety regularly functions as a 'hunger food' because it can be grown and harvested before the tall varieties have matured, and at a time when rice prices are normally higher in the local market, giving farmers an option to sell, rather than consume, the rice and obtain cash (see also: Mwaseba et al. 2007). Participation in OG schemes thus enhances smallholder households' adaptive capacity by contributing to income diversification, stability and flexibility.

### *OG schemes and smallholder risk management strategies*

The data do not support the view that participation in OG schemes directly lowers production or marketing risks for smallholder farmers, but there are indications that it may do so in the context of the wider production systems in which OG production takes place. In principle, the fact that smallholder farmers in both OG schemes produce crops on contract for an agreed price should reduce the marketing risks that they face. However, no strong evidence was found for this in practice. This is partly explained by the fact that the marketing situation for sugarcane at MSE is one of monopsony: MSE is the sole local buyer (Matango 2006). While the price of OG cane is agreed and fixed ahead of the harvesting, the price specified in the contract is conditional on the sugar content, or 'rendement', of the cane, which is reduced during periods of heavy rainfall (Tarimo 1998). Sugarcane is highly perishable; and once it has been harvested, heavy machinery and nearby processing facilities are required to process it (Tarimo 1998). During the 2011 cane harvesting season at MSE, heavy rainfall over a 24-hour period led to a situation where the cane harvesting machinery could not enter farmers' fields, trucks got stuck in the mud or broke down, and the sugarcane delivered to the factory on lorries contained sand that was uprooted along with the cane due to the wet conditions. This led to factory breakdowns and closures that caused additional delays to the harvesting schedule. Some of the cane that had been cut deteriorated and eventually rotted in the fields, resulting in a total loss for several farmers in Lungo. Other farmers received low payments due to the low sugar content in the cane that was delivered late to the factory. According to OG farmers, such losses are not insured; they must be borne by individual farmers. Thus, production and marketing risks for sugarcane are intertwined. On the other hand, since there is no other local buyer for the sugarcane that farmers produce, it cannot be concluded that the MSE OG scheme increases marketing risks for farmers.

In contrast to sugarcane, rice has vibrant local and regional markets, with numerous participants and transactions along the value-chain (European

Cooperative for Rural Development 2012; Mwaseba et al. 2007). KPL estate sells the rice that it purchases from smallholder farmers onwards at domestic (spot) market prices to buyers in Dar es Salaam, where it is marketed to domestic rice consumers. Domestic rice prices in Tanzania vary widely within and between years (Hella et al. 2011). The existence of a parallel local market and the volatility of domestic rice prices make it difficult for KPL to 'get the price right' in negotiating a price with OG farmers. The existence of a parallel local rice market is clearly advantageous for smallholder farmers, as it gives them greater bargaining power in relation to price negotiations with KPL. The downside for KPL is that it faces the possibility of farmers renegeing on contracts and side-selling to the local market. This point is illustrated by the fact that in the 2012/2013 season, OG farmers negotiated a contract price for rice that was upward of what KPL had initially offered in farmers' favour, due to the existence of the parallel local market for rice, where prices were higher than those agreed previously in the contract.<sup>4</sup> However, households with adequate resources may prefer to take part in, rather than avoid, the seasonal price variations for rice, in order to increase their incomes. Participating in an OG scheme that involves a fixed price for rice may be less attractive to these households. Government efforts to discourage 'hoarding' of rice by lifting the ban on imports of rice when consumer prices become too high – as occurred in early 2013 – serve to heighten both the production and the marketing risks for farmers who are net sellers rice and 'bank' on the prices rising. The effect is both direct, in lowering producer prices, and indirect, in that it creates disincentives for future investments in rice farming (see Hella et al. 2011). Interviews with farmers and key informants at KPL indicated that rice imports in early 2013 had a distinctly negative impact on small- and large-scale rice producers, as well as local rice traders, who responded by stockpiling rice, to avoid having to sell at very low prices. Anecdotal evidence suggests that MSE also engages in stockpiling during periods of sugar imports, to avoid selling when sugar prices are low. The findings thus do not support the view that participation in OG schemes lessens the marketing risks for smallholder farmers. Smallholders and large estates alike face marketing risks that are to various extents connected to macro-level policy decisions.

However, there is some evidence that growing the contracted crops reduces smallholders' production risks in relation to the wider farming system. OG farmers at MSE explained that sugarcane is more drought-tolerant than rice. Drought and lack of sufficient moisture during the main growing season are particular concerns in relation to rice and maize, both of which are key food crops in Lungo. Growing sugarcane thus enables farmers to spread the production risks associated with food crops. In Kilombero, farmers grow a local version of the 'short' rice variety that KPL is promoting, to mitigate the impacts of late rains and seasonal flooding on their agricultural production. This variety was distributed as relief seed by the government in 2011 in the wake of widespread flooding in villages near KPL. When faced with flooding, rice farmers in Mkangawalo are

able to adapt the timing, location and methods of planting rice, dig channels to drain fields, employ or hire oxen for ploughing, plant quick-maturing varieties, and plant rice gradually over several months. Farmers' production strategies contrast markedly with those of KPL estate, which relies on heavy machinery, only one rice variety, and faces logistical constraints connected to coordinating planting and harvesting over large areas in the event of flooding. Thus, it is farmers' existing rice production strategies, rather than the existence of the estate per se, that lower the production risks facing farmers. However in cases where OG farmers receive agricultural credit via the estate and repayment is tied to the crop (instances of this were found in both schemes), farmers may bear increased production risks. KPL, in cooperation with local banks and a microcredit institution, provided loans to eligible farmers for production purposes at the start of the 2011/2012 season, with the agreement that it would be repaid by a set quantity of rice of the specified variety after harvest. When prices dropped in 2013 due to the government's decision to import rice, several farmers reported difficulties in repaying the production loans they had obtained under the programme. Thus, accessing credit for crop production in a context of climatic and or market volatility may be a risky undertaking for some farmers.

### *Provision of technology, information and training through OG schemes*

The fact that participation in OG schemes does not directly lower production or marketing risks for smallholders raises the question of whether farmers participate for other reasons. The possibility for smallholder farmers to gain access to agricultural technology, extension services and training was evident at both MSE and KPL. At the time of the fieldwork, KPL estate, in cooperation with the United States Agency for International Development (USAID) and financing from Norfund, was training 1200 farmers in the System of Rice Intensification (SRI). SRI is a set of principles for rice production that has garnered international attention due to claims that it dramatically increases smallholder rice yields, and reduces inputs (mainly of seed and water) through wider spacing of rice plants, alternate wetting/drying of rice fields, use of fewer seedlings/seeds, and careful selection of seed (Glover 2011; McDonald et al. 2006; Dobermann 2004; Stoop et al. 2002). SRI is actively promoted within SAGCOT and internationally as a climate-smart agricultural technology (EcoAgriculture Partners 2012). OG farmers at KPL who were interviewed as part of the research were very pleased with the SRI training they were receiving. Follow-up visits and interviews with smallholder farmers indicated that some had begun to experiment and adapt components of the training, such as the spacing principles and transplanting young seedlings, to their traditional, tall varieties, indicating that the skills learned through participation in the OG schemes have application and usefulness beyond the scheme itself. However, some participants noted that SRI is more labour-intensive and 'expensive' compared to traditional rice

cultivation practices, which are based on broadcasting seed, as opposed to direct seeding or making a nursery and then transplanting rice. According to KPL personnel and extension staff, the additional costs of planting, and of weeding, due to wider plant spacing, should be offset by the higher yields that farmers can obtain using SRI methods. However, it is not clear whether farmers adopt SRI as an entire 'package', or instead select elements that suit their farming systems and circumstances – as observed by other studies of rice technology adoption in Tanzania (Mwaseba et al. 2006). One of the central tenets of the SRI principles as originally conceived is farmer adaptation and experimentation (Stoop et al. 2002). However, the author's observations of and participation in SRI trainings at KPL indicate that SRI is promoted as a 'package' to be adopted, rather than adapted, by smallholder farmers. For example, both rice seed and fertilizer are supplied to farmers as part of the production loan extended under the SRI scheme, the latter through a partnership with the fertilizer company, YARA. However, discussions with farmers and extension staff indicated that soil fertility is generally high in the area, raising the question of whether inorganic fertilizer is actually needed.

At MSE, no formal system of providing farmers with access to inputs such as seed and fertilizers exists, even though the estate is well connected to national and international sugar research activities, and produces certified cane seed. Until 2012, OG and non-OG farmers in both schemes could access fertilizer through a government-sponsored seed and fertilizer subsidy for rice and maize. However, the scheme required farmers to contribute a minimum amount of cash, which limited the possibility for poorer households to participate. Many farmers and key informants also noted that these inputs often arrived too late, and several farmers in Lungo emphasized that fertilizing cane fields would lead to destruction of the soils in their area. OG farmers in Lungo reported that difficulties in accessing good seed cane and in securing loans for production in the absence of timely cane payments constrained their ability to invest in their cane farms, which in turn directly contributed to poor cane harvests. While farmers can acquire cane seed 'on loan' from MSE, they explained that the process is bureaucratically cumbersome, and the cost of seed cane is deducted from farmers' cane profits. Fear of losing a seed crop to drought or flooding leads farmers in Lungo to prefer sourcing seed from their own farms or from their neighbours.

At Mtibwa, government extension officers trained and financed under a joint European Union (EU)–Tanzania sugarcane cooperative initiative are tasked with helping smallholders improve their cane production through the establishment of farmer field schools and block farms linked to the donor-funded extension initiative.<sup>5</sup> In addition to piloting 'block farms' – where farmers pool their land and share production costs and profits – this initiative has been lobbying for the construction of smallholder irrigation schemes in several villages.<sup>6</sup> However, the economic feasibility and social acceptability of block farming and smallholder irrigation schemes for cane are not clear. During a focus group discussion with



sugarcane farmers in Lungo, farmers rejected outright the idea of block farming. They explained that it would not be feasible in their area, due to the scattered location of sugarcane farms, and differences in soil quality, topography and farmer management practices, which could bring down overall cane quality and prices for farmers, should they choose to pool their land. Key informants indicated that smallholder irrigation schemes would be beneficial to farmers, but were likely to induce farmers to grow rice, rather than sugarcane, due to its greater profitability. These observations indicate that while OG schemes may serve to enhance smallholder farmers' access to technologies, inputs, training and skills, there is room for improving the top-down manner of training in some cases, which fails to consider farmers' existing knowledge, experience, risk management portfolios and production concerns. However, given the weaknesses and bottlenecks in the existing public agricultural extension system, OG schemes and the public and private investment that they attract constitute an important opportunity to build on for enhancing smallholder farmers' agricultural production and adaptation options.

### *Infrastructure*

Both estates inherited worn-down infrastructure on acquiring them from the government (Coleman 2011; Mtibwa Sugar Estates Limited 2009; Halcrow Consulting 1995). KPL was originally demarcated and partially developed under North Korean–Tanzanian cooperation and lay idle for several decades before being put into production by KPL in 2008. The owners have invested in new farming equipment, a state-of-the-art rice mill, and a pilot pivot irrigation system that enables it to run at full capacity. Both MSE and KPL have contributed to maintaining roads on the estates, thereby improving accessibility to farmers' cane fields, and to local markets and public transport. Villages and towns located near the estates have expanded to provide additional services and employment to the growing permanent and transient workforces associated with the OG schemes. Both estates have financed the construction of schools and health clinics for local populations, and generated opportunities for casual and permanent employment on the estate. KPL voluntarily pays into a yearly community development fund that is divided proportionally among the three villages immediately bordering the farm, according to how much land they 'lost' when the original boundaries of the farm were again put into production (Kayonko 2011; Coleman 2011). Because the estate was originally demarcated in the 1980s and was never fully developed, a number of farmers and pastoralists had moved onto the farm in the ensuing years. The new management took care when relocating people to compensate farmers and pastoralists with cash settlements (payment for standing crops) and land, as well as constructing new homes for those affected by the relocation (Kayonko 2011; Coleman 2011). Investments in the two OG schemes have thus contributed to positive spillover effects on local economic development. While these investments are

laudable, the research suggests that investments in schooling, road and irrigation infrastructure at KPL are vulnerable to existing climate variability and change. Periodic flooding makes the seasonal road to the estate impassable, and in 2011, forced its closure for two months, cutting off access to fuel and equipment supplies (Coleman 2011). According to households in Mgudeni, a sub-village of Mkwangawalo, the estate's drainage infrastructure aggravated the impacts of the 2011 flooding, leading to inundation of farmers' homes, fields and the school that had been constructed with KPL community development funds. Moreover, KPL's profitability depends on harvesting two rice crops per year (NORAD 2013: 96). This will require irrigation from a river whose water-flow varies seasonally and which according to irrigation experts, like other rivers in the Kilombero Valley, is already being affected by climate change (Mavere 2012). These findings show that MSE and KPL OG schemes have been enhancing communities' adaptive capacities by investing in infrastructure that can improve households' access to healthcare services, education and markets. However, these investments will need to take into account the projected impacts of climate variability and change, and plan accordingly.

### *Institutions*

OG schemes consist of a range of formal and informal relations, rules and incentives, not least the contract itself, which defines the formal production-marketing relationship between smallholders and large estates. In addition to functioning as institutions in their own right, KPL and MSE OG schemes foster new institutions, as well as being impacted by informal institutions, market mechanisms and formal institutions at higher levels. While the contract defines the formal production and marketing relationship between smallholders and the two estates, the existence of KPL and MSE and the possibility for farmers to engage in contract production has promoted the development of OG associations that provide various benefits for smallholder farmers. These benefits include the possibility of participating in agricultural training, accessing extension advice, and enhanced voices for smallholders in negotiations with the estates, as well as being able to engage in political lobbying at higher levels.

At both KPL and MSE, the bargaining position of OG associations vis-à-vis the estate is clearly important in determining whether the OG contract is in smallholders' favour. As shown in previous sections, the existence (or absence) of alternative markets for the contracted crops plays a key role in determining farmers' bargaining power. The existence of a parallel local market for rice where rice prices were higher than those in the contract enabled OG farmers to renegotiate the contractual price in their favour. At MSE, the monopsony market for cane and the absence of an alternative buyer leave farmers in a decidedly weaker position when it comes to price negotiations. OG cane prices at MSE lag behind those of its closest competitor in Kilombero District. Farmers must

either accept the price that MSE offers, or convert their cane fields to other crops – an expensive and risky undertaking, as sugarcane is a perennial crop with high initial investment costs. According to OG farmers and key informants at MSE and Kilombero Sugar Company Ltd (KSCL), price differences between the two estates are due to differences in the managements' attitude towards OG farmers, the milling efficiency of the factories, and the fact that KSCL estate has no capability to expand in size, but must rely on increased production of cane from smallholder OGs for profitability. In contrast, MSE has acquired a new 30,000-hectare concession of land from the government, which it plans to develop partially for irrigated cane production.

However, in both cases, the OG associations provide benefits to smallholders that extend beyond their role in price negotiations with the estates. KPL has deliberately fostered the development of farmers' organizations through its SRI training and establishment of SRI demonstration plots and farmers' groups down to the sub-village level. Farmers have also received training in how to organize and register their SRI associations, and have held elections for the village and the Apex level SRI association to represent farmers' interests in contractual negotiations with the estate. Regular interactions with farmers during the course of these trainings and elections indicated that they greatly valued the group cooperation and social camaraderie fostered through the SRI training and demonstration plots. Farmers mentioned the 'motivating' role of these groups, the learning and sharing that they encouraged, the individual and group pride that they instilled, and the social ties among participants. At MSE, two different OG associations represent farmers' interests in contract negotiations with the estate. Among OG households in Lungo, husbands and wives commonly maintain separate memberships in these two associations, in order to facilitate switching between them, should their performance decline in the eyes of the farmer. These same associations are responsible for harvesting and delivering farmers' cane crops to the factory, and delivering cane payments from MSE to farmers. At the time of the fieldwork, the OG associations at MSE were actively engaged in lobbying the Mvomero District Commissioner to allow construction of a smaller cane factory that could compete with MSE, with the goal of raising the producer price in smallholder farmers' favour. This issue was taken all the way to the president, and discussed in the national parliament.

These findings show that OG schemes do not operate in an institutional vacuum. They interface with formal and informal institutions at the local level and with market mechanisms and policies at higher levels – most notably related to agricultural marketing but also indirectly, in the case of land-use and agricultural investment policies. While many of the institutional dynamics that ultimately affect OG crop prices are beyond smallholders' ability to control, OG associations enhance the adaptive capacities of smallholder farmers by helping to build social capital and cooperative ties among farmers, and strengthening their ability to lobby politically for their interests and rights at higher levels.

*Equity dimensions at community and scheme levels and beyond*

The need to consider whether and how development interventions enhance or undermine equity within and across communities is highlighted in the literatures on agricultural investment, contract farming and climate adaptation (World Bank 2013; Silici and Locke 2013; Eriksen et al. 2011; Vermeulen and Cotula 2010; Thomas and Twyman 2005; Adger et al. 2004; Warning and Key 2002; Little and Watts 1994). OG investments in infrastructure, markets, and agricultural inputs and technologies may help to overcome constraints to agricultural development and poverty reduction in rural areas and enhance local adaptive capacity. Yet, because OG schemes link very different sets of actors, they also carry the potential to create dependency and widen economic inequalities within and between communities and households (Porter and Phillips-Howard 1997; Little and Watts 1994). This may be problematic because development interventions that ignore existing power relations and social inequalities risk exacerbating the vulnerabilities and processes of social, political and economic marginalization (Eriksen et al. 2007).

Space considerations do not permit a full discussion of the equity issues surrounding the allocation of power and access to resources within the two communities studied here, and the ways in which OG schemes interact with these dynamics. However, several points can be mentioned. First is the question of who participates in and benefits from the two OG schemes. At KPL, farmers participating in the SRI training and OG scheme represent a mixture of small-, medium- and large-scale women and men farmers, with a greater participation by small and medium, compared to large farmers.<sup>7</sup> The stipulation for participation in the scheme is that farmers have access to ½ acre of land, and that they grow the contracted variety, using SRI principles. However, OG farmers in Lungo to a large degree represent the founding members of the community who were relocated from the Kilimanjaro region to the village in the early 1970s under the government's villagization policy.<sup>8</sup> Farmers were at this time allocated plots within a village sugarcane farm. These plots were later redistributed to farmers. Since then, the value of sugarcane plots has increased, making it difficult for farmers who moved to Lungo after villagization, and whose families are not among the original inhabitants, to acquire a sugarcane farm. This point is illustrated by the fact that ownership of a sugarcane farm was considered a sign of wealth by sub-village leaders and farmers during wealth-ranking of households in Lungo (West 2011).

A second factor that affects the potential for OG schemes to contribute to adaptive capacity at the community level is existing competition over land and water resources. While KPL and MSE estates have both existed for some time, increasing immigration into the region by farmers and livestock-keepers in both communities is leading to growing pressures on land and water resources. Conflicts between farming and livestock-keeping interests abounded in both locations at the time of the fieldwork, some of which resulted in loss of lives

and/or imprisonment. These conflicts are a microcosm of a much larger and pervasive dilemma at the national level that has yet to be adequately addressed (HAKIARDHI 2009). Whether and how livestock-keepers will benefit from investments in the OG scheme and agricultural investments in SAGCOT, and in Tanzania more generally, is thus an important question. The establishment of the Wami-Mbiki Wildlife Management Area whose borders pass near Lungo, and MSE's recent acquisition of a new, 30,000-hectare land concession from the government, may aggravate conflicts over land and water in future. The anticipated deforestation and need for irrigation that the new MSE concession will require raises issues of rights to adaptation resources such as land and water, and indicates that there is potential for OG schemes to contribute to maladaptation at community and landscape levels (Barnett and O'Neill 2010). Rather than suggesting that OG schemes reduce social, economic or environmental inequalities in participating communities in either the short or the long term the findings suggest that greater efforts are needed to empower marginalized groups, and to lower the entry costs to enable poorer households to participate in OG schemes. Since equity is fundamentally a development concern, stronger state involvement is needed to ensure that the benefits of OG schemes are equitably distributed and that access to and control over land and water resources are governed in a transparent, sustainable and equitable manner.

## Conclusions

The research presented in this chapter shows that agricultural investments that link large- and small-scale farmers can enhance the adaptive capacities of smallholder farmers and communities in various ways: by contributing to household income diversification, stability and flexibility; by enhancing access to technologies, inputs, training and skills that widen farmers' production choices; by investing in physical infrastructure that enhances community and household access to healthcare services, education and markets; and by helping to build social capital and cooperative ties between farmers, and strengthening their ability to lobby collectively for their interests and rights. The investments made by KPL and MSE have also attracted financing and initiatives from the government and from third parties. The spillover effects have been broadly beneficial for rural households and communities. Tellingly, non-OG farmers who were interviewed, including lower-income households, expressed their desire to participate, indicating that farmers perceive that there are welfare benefits to be gained from participating in OG schemes.

However, the evidence does not suggest that participation in OG schemes directly lowers smallholder farmers' production or marketing risks. This suggests that smallholder farmers may participate in OG schemes for reasons that have less to do with risk management, and more to do with the ancillary benefits available under the schemes. Neither do the findings show that the OG schemes serve to reduce social, economic or environmental inequalities

in participating communities. This suggests that greater efforts are needed to empower marginalized groups, and lower the entry costs for poorer households to participate and that stronger state involvement is needed to ensure that the benefits of OG schemes are equitably distributed.

The research also uncovered various ways and cases in which OG schemes have missed opportunities to enhance adaptive capacity, or are potentially undermining it. Promoting top-down agricultural training approaches that fail to incorporate local knowledge, extending agricultural credit to smallholders who produce under rain-fed conditions, and undertaking investments in areas where there is high competition over land and water resources and where road and irrigation infrastructure is vulnerable to existing climate variability and change are notable examples. These findings suggest that further investments in OG schemes should prioritize two-way learning processes in OG schemes; promote cooperation between the public and private sectors and civil society; lobby for greater equity, transparency and sustainability in land and water use; and seek to expand the benefits, while mitigating the potential risks to smallholders of participating in OG schemes for smallholder farmers and rural communities.

## Notes

- 1 A new shoot that grows from near the root or crown of sugarcane, after the old growth has been cut back.
- 2 Also known as TXD306.
- 3 In roughly 90 days, compared to 120 or more for traditional varieties.
- 4 Thobias Sijabaje, SRI Manager at KPL, personal communication 2013.
- 5 N. Mkula, National OG Coordinator, Sugar Board of Tanzania, personal communication, 2012.
- 6 M. Mgogo, Tanzanian Sugar Board Zonal Coordinator for sugar farming, personal communication, 2012.
- 7 Unpublished records of participants in SRI and loan training activities; participatory observation in loan trainings, key informant discussions with estate personnel, extension officers and farmer interviews.
- 8 Under the period of state socialism in Tanzania referred to in Kiswahili as *Ujamaa*.

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## National and Local Perspectives on Adaptation Strategies in Tanzania's Agricultural Sector

Asbjørn Aaheim, Jennifer West, Anton Orlov.

### Abstract

*This chapter explores how information provided by different research perspectives about climate change impacts and adaptation matter to recommendations for adaptation strategies in Tanzania's agricultural sector. Conclusions from a macroeconomic model, a microeconomic sector model, and mixed methods research in a village in Morogoro Region are compared. The macroeconomic perspective enables policy-makers to evaluate climate impacts on national development pathways. However, a perspective based on aggregated information may underestimate the challenges to adaptation that poor farmers face if the impacts of climate change on household food security are not considered. In fact, the resulting welfare losses are hidden behind the macroeconomic aggregates. A sector perspective suggests that poor people need access to stable off-farm sources of income to limit the effects of climate change on rural food security and livelihoods. However, the local case study shows that poorer households cultivating less land, tend to engage in less reliable and less remunerative seasonal work, potentially making poor farmers even more vulnerable to the impacts of climate change than indicated by the models. Consequently, poverty is not only a barrier to climate adaptation, climate change is a barrier to mitigation of poverty.*

## 1.0 Introduction

Many smallholders in Tanzania rely on agriculture as well as utilising forest services to meet their daily needs. REDD+ projects will affect their livelihoods, but it is difficult to tell whether it represents a notable change to them or to the communities in which they live, and whether the perceived consequences suggest a general change in the evaluation of REDD+ initiatives in Tanzania. In undertaking this evaluation, national authorities will have to consider many factors on a rather general basis. When considering REDD+, it is vital to know how it may affect the adaptive capacity of smallholders, who also need to relate to climatic changes in the context of wider livelihood priorities and constraints. The perspectives of smallholders and communities need to be adequately represented and combined with the national perspectives in a transparent and consistent manner in order to do so. This is one reason why macroeconomic models are used for planning purposes.

The models project national economic indicators derived from statistical information with reference to a theory of economic behaviour of individuals. Such models thereby support national authorities in developing strategies to the benefit of individuals. However, the models assume that everybody is fully integrated in markets, that they all have equal opportunities to take part, and that they are compensated by a monetary income for all the work that they do. This applies to most developed economies, but is far from reality in developing economies, such as Tanzania. Here, a share of the production on farms, where more than 80 percent of the population lives, is consumed by the household on the farm, and not sold. In addition, studies show that markets are the main source of food for the urban population and 60 percent of rural households (KI, 2011). Smallholder food security therefore depends on having access to agricultural land as well as income, which may include income from forest products and services. This implies that it matters for both poverty reduction and climate adaptation strategies where smallholders work, and what kind of work they undertake.

The chapter explores caveats in using a traditional macroeconomic model to assess the impacts of climate change on the Tanzanian economy, and to evaluate the vulnerability of the agricultural sector in order to develop adaptation strategies. Three approaches to address impacts and evaluate adaptation options are compared. First, we use a macroeconomic computable general equilibrium (CGE) model for Tanzania, to analyse the impacts on the national economy under a standardised scenario for global development and climate change, and discuss possible adaptation strategies on this macro level. Second, a sector model for Tanzanian smallholders, based on statistical data for Tanzania is used. The challenges that agricultural households face, given the changes described by the

macro model are explicitly explored. In the third approach, the conclusions from the sector model are compared to findings from a survey of 50 households in a village in Morogoro region. It is then asked what lacks from the statistical information that makes a difference to adaptation strategies among smallholders.

## **2.0 Global development, climate change and consequences for Tanzania**

Climate change, its impacts and the adaptive capacities of people in Tanzania depend heavily on future global development trajectories. This study employs the shared socio-economic pathways (SSPs) and the representative concentration pathways (RCPs), which are recommended by the Intergovernmental Panel on Climate Change (IPCC) for projections of climate and related studies of climate impacts, mitigation and adaptation. The SSPs provide assumptions about social and economic drivers of development, whereas the RCPs provide assumptions about emissions and resulting concentrations and radiative forcing. Here, we combine SSP5 (O'Neill *et al.*, 2014) and RCP8.5 (Riahi *et al.* 2011).

SSP5 describes an optimistic future with high economic growth, particularly in developing countries, and a moderate population growth. Global population increases to nearly 8.6 billion in 2055, but decreases thereafter to 7.4 billion in 2100. The population in Tanzania increases from the present 50 million to 90 million in 2080, and decreases slowly to 87 million in 2100. The global gross product doubles nearly four times from now to 2100. Economic growth is particularly high in developing countries, including Tanzania, where the Gross Domestic Product (GDP) doubles seven times from now to 2100. This is partly due to the higher population growth in Tanzania, but also GDP per capita grows much faster here than in the rest of the world (ROW). Income per capita is only 18 percent lower than the world average in 2100, compared to the 87 percent lower income per capita today.

The pathway thereby describes a future with success in making Tanzania transform from a developing country to a semi-developed country. This may imply that poverty is more or less eradicated in the course of this century, but this depends also on how the income is distributed in 2100. The economic growth implies tremendous structural changes, including in agriculture, and it will take time before everybody can enjoy it. The main economic growth takes place before 2050, when the income per capita is still much lower in Tanzania than in ROW. Income per capita is approaching the world average when economic growth rates in Tanzania and in ROW is 1/3 of the growth rates in the first half of this century.

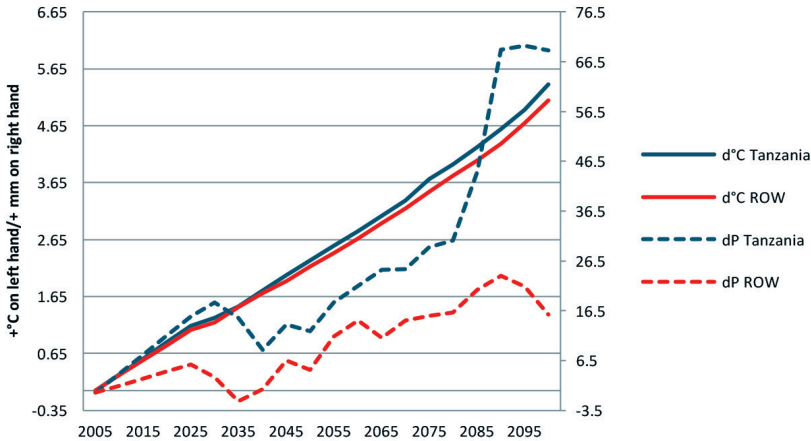


Figure 3.1: Changes in mean temperature and annual precipitation under RCP8.5 over crop land in Tanzania and in the rest of the world derived from global projections 2005 – 2100.

The transformation assumed here is far from a transformation to a low-carbon world. Instead, the high economic growth requires a major increase in energy use worldwide, which is based primarily on fossil fuels. Thus, global emissions grow steadily throughout the century, although at a steadily declining rate in the second half. In 2100, global CO<sub>2</sub>-emissions are 2.5 times the present emissions. Figure 3.1 shows the resulting changes in mean temperature and annual precipitation for Sub-Saharan Africa and ROW. The indicators were derived from projections by the MPI-ESM model (Giorgietta *et al.*, 2013). Note that further downscaling of these projections was not available, and the projections for Sub-Saharan Africa are, therefore, used as a reference to illustrate climatic changes in relation to the Tanzanian economy in this chapter. Temperatures then increase steadily by 5.4 °C in this century, which is more than 6 °C from preindustrial times. Precipitation increases both in Tanzania and in ROW, with an upward jump in Tanzania after 2080, amounting to 69 mm/year over the century. Variability will also have to be considered when addressing impacts on communities, and we will return to this below.

### 3.0 The national perspective: macroeconomic impacts and adaptation strategies

The national accounts are a system of social and economic statistics aimed at supporting national governments in monitoring structural changes and economic development. Data from national accounts can be used in macroeconomic models to assess the economic consequences of policy choices, and to project economic indicators with reference to assumptions about the development of the main socioeconomic drivers of economic growth. This is helpful to policy-makers in interpreting results, and facilitates a transparent communication of policy choices and their consequences.

We use a computable general equilibrium model, GRACE (Aaheim and Rive, 2005) to derive the economic consequences of the projections presented in the previous section. Computable general equilibrium models are rather extensive models of national accounts data, which aim to derive impacts on a broad range of economic indicators of changes in major drivers of economic development. Figure 3.2 shows a schematic overview of the GRACE model:

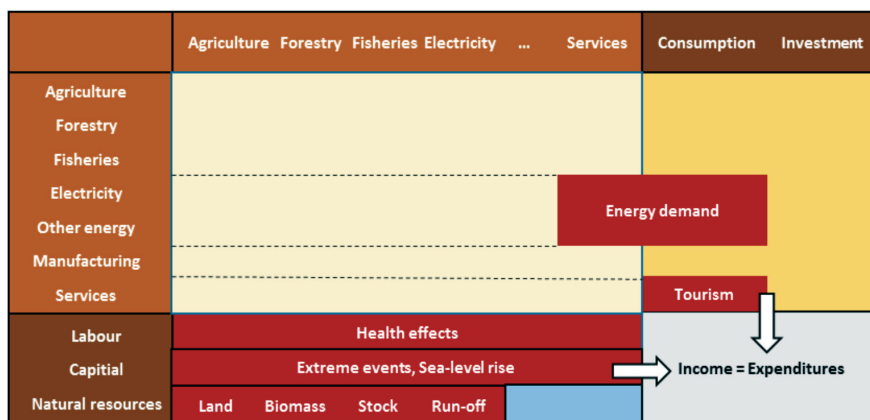


Figure 3.2: A schematic overview of sectors and climate impacts in the GRACE model.

The version of the model used here has 7 economic sectors listed in the first column. The same sectors are listed in the heading and data from national accounts are filled in each cell with the values (price x quantities) of deliveries *from* each sector (column) *to* all other sectors (row) in a base year. The last two columns give deliveries from each sector to end use, consumption and investments. Thus, the sum over rows gives the value of total production or the supply of goods and services from each sector. The columns show the value of input factors used in each sector, and the composite of goods to consumption and investments. The three last rows provide the input of the primary factors of production, i.e. labour, capital and natural resources. Columns thereby show the demand for various goods and services from each sector and for end use. Emissions are derived from the production and use of specific goods and services, for example, energy.

Remunerations to labour, capital and natural resources are income generated by work and ownership, and can be spent on consumption and investments. In the model, it is assumed that total income equals total expenditures every year. The model used here has two regions, Tanzania and ROW. The trade between Tanzania and ROW is determined by modelling of import shares of each demanded good and service. Foreign investments take place depending on differences in the remuneration to capital. Labour supply is based directly on the projections of population, and the supply of natural resources is estimated for each sector, based on the availability in the base year. A change in these

drivers or in policy, for example, through an increase in taxes, spurs a shift in supply or demand in the affected sectors, and propagates to other sectors by the resulting change in the demand for input. The model then generates a new set of prices to restore equilibrium.

Items that may be affected by climate change are shown by the dark red rectangles in Figure 3.2. Agriculture, forestry, fisheries and the electricity sector are impacted by sector specific impacts on their use of natural resources. Extreme events and sea-level rise affect the availability of capital, and health effects change the supply of labour to all sectors. Climate change also affects the demand for tourism with direct impacts on the service sector, and energy demand is sensitive to temperature in both energy sectors and households. The impacts affect supply and demand in the same way as changes in other drivers and policies propagate to other sectors with resulting price effects. In fact, the responses among economic agents can be associated with autonomous adaptation.

The impacts of climate change are represented by specific relationships between the value in each item and chosen climate indicators. It is important to note that this is highly uncertain information, however. The functional forms are based on surveys mainly from Europe (Aaheim *et al.*, 2012), and the parameterisations are based on relatively few available studies on the global impacts of climate change on national economic aggregates, and discussed in Aaheim *et al.* (2015). The results illustrate how climate change may impact specific sectors of the Tanzanian economy when the interactions with all other sectors are taken into account. The resulting information is relevant for building adaptation strategies at the national level with an eye on economic development.

Figure 3.3 shows the assumptions that are applied here on the percentage direct effect of climate change on each of the items in Figure 3.2 at +1.5 °C, +3.0 °C, and +4.5 °C in Tanzania. The effects become increasingly negative as the temperature increases, with agriculture and electricity supply being the most adversely affected. Tourism is assumed to be strongly affected, but the effect does not increase much as temperature increases. The effect on forests is slightly positive at +1.5 °C, but becomes negative at +3.0 °C and +4.5 °C. Health effects and extreme events increase significantly with increasing temperatures.

Note that the immediate costs of these effects on the Tanzanian economy depend on the relative economic influence of each item. The effects on agriculture and health give the strongest direct effect on GDP. Although losses from agriculture constitute steadily about 40 percent of total losses with increasing temperatures, contributions from losses due to health effects increase from 25 percent at 1.5 °C to 42 percent at 4.5 °C. Losses from extreme events increase from 6 percent of GDP at 1.5 °C to 10 percent at +4.5 °C. In total, losses constitute 3.3 percent of GDP at +1.5 °C, 9.3 percent at +3.0 °C, and 19.7 percent at +4.5 °C.



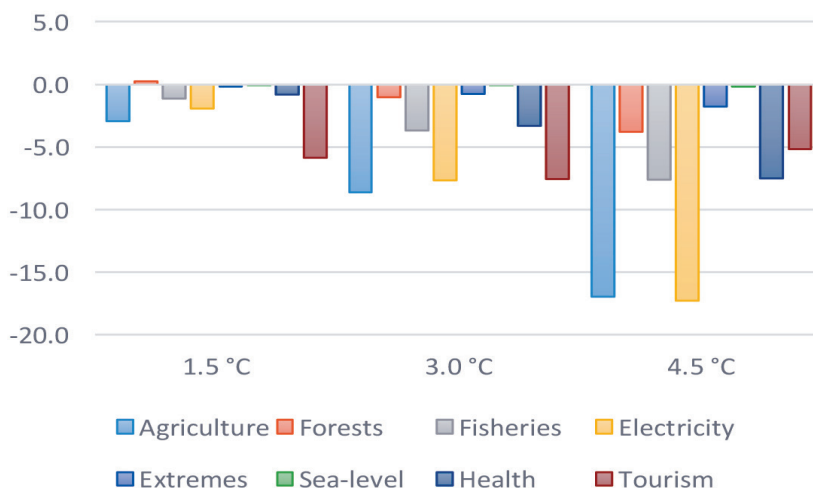


Figure 3.3: Direct effects of climate change on economic sectors in Tanzania at +1.5 °C, +3.0 °C and +4.5 °C in percent of value of production.

These losses can be interpreted as the direct economic impact of climate change. However, the change in climate will also induce adaptation, leading to market responses. Moreover, climate change affects also other countries, with trade effects on Tanzania. Using the projections of economic and population growth presented in Section 2 in combination with the impacts shown in Figure 3.2 in the GRACE model, we find that the GDP losses in Tanzania increase exponentially over the century, amounting to 1.8 percent in 2050, 4.9 percent in 2075 and 9.7 percent in 2100. This is nearly twice as strong as the total impacts in ROW. This can be explained partly by a more rapid economic growth in Tanzania, and partly by a strongly affected agricultural sector, which is assumed to continue to be an important sector throughout the century.

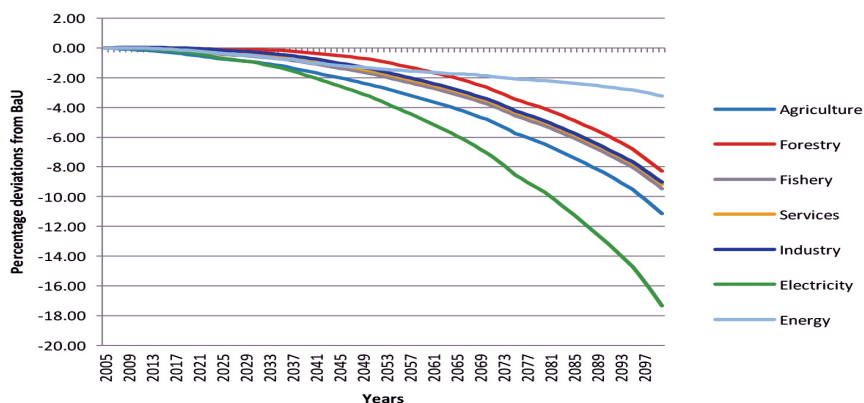


Figure 3.4: Impacts on value added in percentage by sector in Tanzania under RCP8.5 2005–2100.

Figure 3.4 shows how the value added by sector is affected over this century. The sum of value added across all sectors equals GDP. The impacts on four of the

sectors follow more or less the impacts on GDP, whereas electricity, energy and to some extent agriculture deviate. The energy sectors in the model comprise fossil fuels and hydro power, although biomass is the most important energy source in Tanzania. The fossil fuel sector is only slightly affected directly by climate change, and value added is reduced by only three percent in 2100. The reduction in electricity use is nearly 18 percent. This difference is due mainly to higher prices. Impacts of climate change worldwide reduce the demand for fossil energy without impacting supply. World-market prices, therefore, decrease. However, renewable energy in the electricity system is negatively affected by climate change. This dominates the price effect of fossil fuels, meaning that the price of electricity increases. As a result, there is a notable substitution from electricity to fossil fuels.

The message from these calculations is that climate change will have substantial impacts on the Tanzanian economy, and more so than in most other countries of the world, although it is likely that other Sub-Saharan African countries will be similarly affected. One reason is the high projected economic growth in Tanzania under SSP5. The scenario assumes that the economy will go through a substantial restructuring, which increases the vulnerability of the economy to climate change. The increasing limits to adaptation are illustrated by differences between the direct effects shown in Figure 3.3 and the impacts presented in Figure 4. In 2050, when the increase in temperature is slightly above +2 °C, autonomous adaptation contributes to a 67 percent reduction of the direct effects of climate change. In 2100, when temperature increase is above +5 °C, adaptation reduces the direct effect by 57 percent.

From a national policy perspective, projections such as these can be used to appraise policy strategies for economic development. Climate change will have major impacts on the economy of Tanzania if efforts to curb global emissions of greenhouse gases fail. On the other hand, the costs of a transformation to low-carbon economies worldwide may also be large, and exceed the negative impacts of climate change. The economic development in these projections may turn out to be more attractive, after all, than a low-carbon alternative. In that case, the projections suggest prioritising a strategy for adaptation within the agricultural sector. This sector contributes to 40 percent of the GDP throughout the century and suffers the largest losses from climate change, also in relative terms. The loss in productivity is compensated only by slightly higher prices (+2 percent in 2100). From a governmental perspective, an adaptation strategy should include the implementation of measures to motivate planned adaptation. This can be done by facilitating flexibility and resilience in farmers' choices of crops and livestock production technologies to enable them to take advantage of changing climatic and marketing conditions in the future. Measures may include providing farmers with enhanced agricultural extension information connected to climate information and services, improving access

to climate smart production technologies and inputs, supporting diversified production systems, encouraging precautionary investments, and developing road, telecommunications and marketing infrastructure to reduce transaction costs.

#### **4.0 The sector perspective: Impacts and adaptation among smallholders**

The macroeconomic model focuses entirely on economic transactions. It assumes that producers of goods and services achieve their goals only by considering the available technologies and market prices, although the choice of consumption of goods and services depends on the same prices adjusted for taxes, and constrained only by monetary income. It does not matter if this income is earned by paid work or by selling products or services.

Most smallholder Tanzanian farmers are in a different situation. A varying portion of labour provided on smallholder farms is unpaid labour that is undertaken by family members, and food is produced for own consumption, for sale, as well as for meeting social obligations. The share of food produced for own consumption depends, among other factors, on smallholders' access to land. Only a portion of smallholders' production is sold to generate income, and this portion varies over time according to the socio-economic position and needs of the household, and climatic and other conditions affecting farmers' yields. However, income can be earned from activities performed outside of the farm. This income is spent on food and other goods and services, which include consumption, re-investment in farming, and investments in improving the education and health of the household. Choices between production, income, investments and consumption are integrated, negotiated, appraised and undertaken in the context of wider livelihood strategies, and depend on access to land and other income opportunities, in addition to prices and transaction costs, and a range of social factors. Below, we ask how the evaluations in the previous section are affected if these factors are taken into account.

Figure 3.5 shows composites of income, production and consumption in the agricultural sector, when based on a combination of National Accounts data and the National Sample Census of Agriculture 2007/2008 (NSCA). Subsistence farming is estimated from a survey-based study by Ellis (2007). The left bar shows the contributions from the use of labour and from the availability of land to total agricultural output. The numbers indicate that more than half of the production is generated by land. Note, however, that this includes contributions from other non-human input factors, such as machinery. This contribution is substantial on large farms, but probably less important on small farms, which will be the focus here. The second bar shows how consumption is divided into food from farm, food bought in markets and other consumer goods. Food from own farm contributes to 60 percent of total consumption, and a little more

than 10 percent of the food is bought from markets. Consumption of other goods and services constitutes nearly 30 percent. The third bar shows that 80 percent of monetary earnings is generated from sales of agricultural produce, whereas 20 percent comes from activities outside the farm.

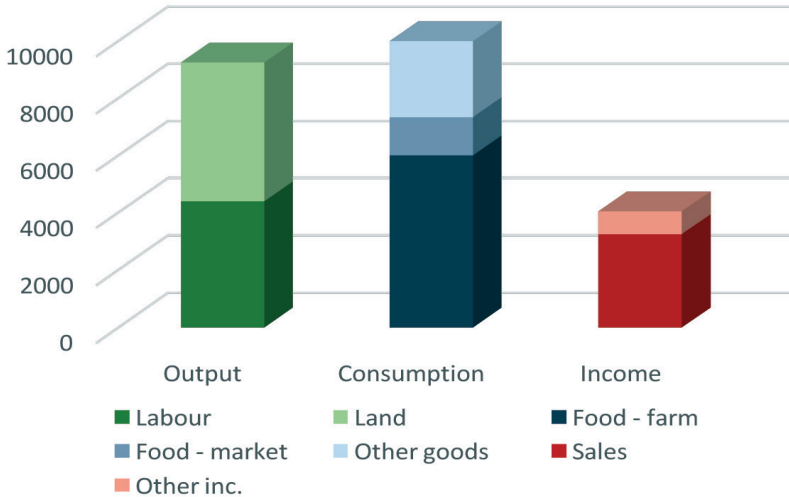


Figure 3.5: Estimated composites of production factors in agriculture (output), consumption and income in farming households in Tanzania. (Mill US\$.)

Macroeconomic models describe the economic behaviour of individuals whose choices correspond exactly to the aggregated data, so-called representative agents. The same is done here, meaning that the numbers in Figure 3.5 are interpreted as the composites of production, consumption and income in an average, or representative, Tanzanian farming household. What differs is the scale, which is adjusted by dividing these numbers by the 5.8 million Tanzanian farming households that existed in 2007/08, according to the NSCA. Further adjustments are made to estimate the labour force available in each household, using information on age distribution and corresponding activities from NSCA. Adjustment of the consumption in each household are made with reference to assumed relative consumption levels in different age groups, as compared to “full consumption” for adults aged between 15 and 64 years. Then, the average of 5.3 persons per household corresponds to 4.2 “adult consumer equivalents”. The micro model is similar to that in Aaheim and Garcia (2014), and presented in the appendix. Here, we confine ourselves to a verbal discussion on how the aforementioned characteristics are taken into account, in comparison to the modelling of farming in the macroeconomic model, with attention being paid to how consumption and income patterns change with access to land on single farms, which we refer to as “size of the farm”. The numbers in Figure 3.5 were used to calibrate the micro model for a typical farm of average size in Tanzania, which is approximately 2 ha.

In contrast to the macroeconomic model, a change of farm size may change the composite of consumption and the division of work in the micro model due to constraints that smallholders face, but which the macroeconomic model ignores. First, the budget constraint is confined to spending monetary income on food and other goods that are bought in markets. The consumption of food produced on the farm is constrained by the output. Finally, there is a lower limit to the consumption of food in a household, which can be associated with a nutrition constraint.

To examine the consequences of these constraints for the allocation of working time and consumption, the micro model was run for farms of different sizes. In correspondence with the three constraints, the farms are then divided into three groups: farms subject only to the budget constraint, farms subject to the budget constraint and the output constraint and farms subject to the budget, output and nutrition constraint. The latter group are left with few choices, however: They personally consume everything they produce on the farm. If they earn money from other work, they first have to buy food. If there is money left over, everything will be spent on other goods. This is called a “corner solution”. In analysing the impacts of climate change or policies, the question is how many farmers belong to this group.

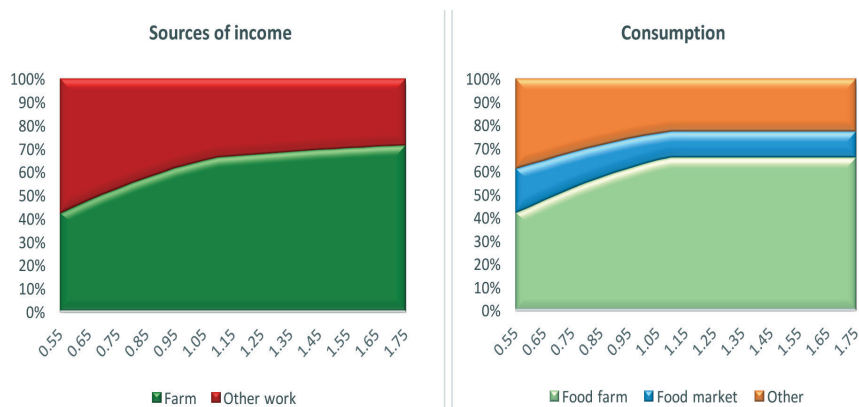


Figure 3.6: Percentage allocation of income sources and consumer goods by farm size. (Hectares)

Figure 3.6 shows the allocation of income and consumption for households with access to different farm sizes. Households on farms of less than 0.55 ha are subject to the nutrition constraint. The output constraint appears where the curves in the figure break at a farm size of 1.1 ha. For smaller farms, the assumption in the macroeconomic model on independency of scale is violated both for the sources of income and for the consumption pattern. The consumption pattern on large farms is unaffected by the farm size as the macroeconomic model assumes, whereas the income from the farm as a share of total income increases slightly with size also on larger farms.

The break of lines shows where the output constraint is encountered. The constraint imposes an implicit cost, or shadow price, of consuming food from own farm. This shadow price increases from 0 to 150 percent times the market price of food, as farm sizes are reduced from 1.1 ha to 0.55 ha. This is a result of lack of income needed to buy the food that the household would have consumed had they had a sufficiently large farm, and can be interpreted as a loss of welfare measured in food prices. The model assumes that these farmers manage to earn some income outside the farm, and the figure shows that the household's dependency on these sources increases as the farm size decreases. The contributions from the production on own farm to the consumption of food declines with declining farm size for households subject to the output constraint. Hence a slightly larger share comes from food bought from markets. The high shadow price of food implies that smaller farmers also substitute between consumption of food and other goods.

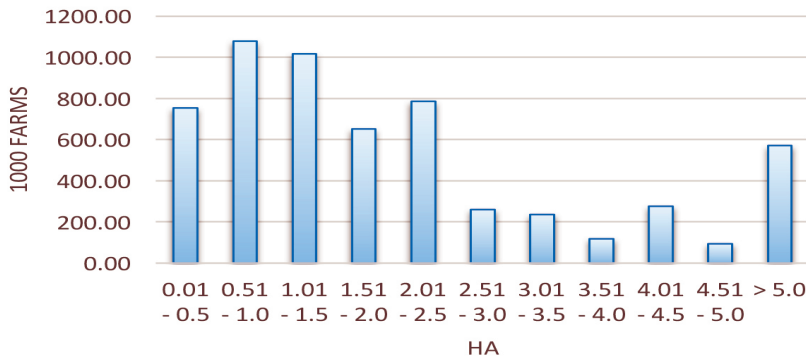


Figure 3.7: Distribution of farms sizes.

Source: National Sample Census of Agriculture 2007/2008

Consequences on a macro scale can be derived by using the size distribution of farms. The present distribution is shown in Figure 3.7, according to NSCA. An estimate of 850 000 farms are less than 0.55 ha, where the nutrition constraint set in these calculations is binding. About 1.1 million farms are less than 1.1 ha, and subject to the output constraint. There are more than 5 persons per household on average, meaning that the macroeconomic indicators fail to address climate impacts on livelihoods for 10 million people in farming households today. Note, however, that the nutrition constraint is set more or less arbitrarily in these calculations. We also assume that the size of a farm corresponds to the productivity of the land, which is clearly problematic (Chand *et al.*, 2011). These figures do not account for intensification of labour or other production factors that may increase yields on smaller farms. The point here is to show how and why the impacts on smallholders differ from the impacts on large-scale farmers, which the macro model addresses.

Reduction in the productivity of land caused by climate change was estimated at 22 percent. We examine the impacts on the different farm sizes in three steps.

First, we calculate the impacts on the productivity of land in isolation. Then, we add the corresponding impacts on prices from the macroeconomic projections, where food prices increase by two percent, prices of other goods by one percent, and wages are reduced by 3.6 percent. Finally, we consider consequences of a possible policy response, namely to reduce the difference between selling price and buyer price of food (transaction costs) by 20 percent.

Lower productivity of land increases the number of farms that encounter the nutrition constraint. With the present distribution of farms, this happens with households on between 270 and 300 thousand farms, but this number depends fully on how the income distribution develops over this century. Increasing prices and lower transaction costs have an insignificant impact on the number of farms subject to the nutrition constraint. There is also a significant increase in the number of farms that encounter the output constraint, but the combination of impacts matters to them. Households on nearly 400 thousand more farms become subject to the output constraint if only the productivity of land changes. This is reduced to 250 thousand if impacts on prices are included, and reduced further to 30 thousand if there is success in reducing transaction costs. Figure 3.8 displays the estimated impacts of the three different runs on the composite of consumption and work in a household with a 0.7 ha farm. A household of this size is subject to the output constraint in all alternatives but avoids the nutrition constraint in all of them. All numbers are converted to 1,000 US\$.

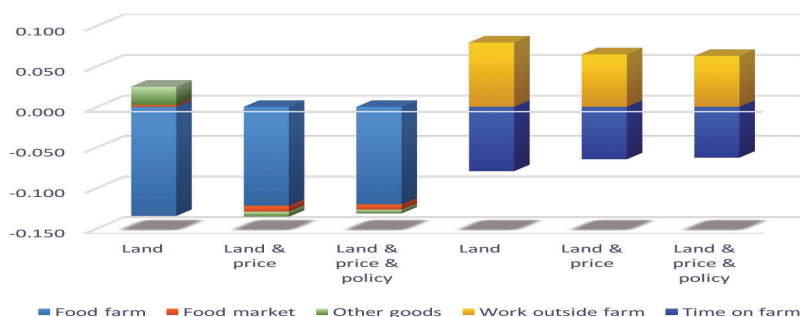


Figure 3.8: Impacts on consumption composites (the three bars to the left) and work (the three bars to the right) under three combinations of impacts projected in 2100. All figures converted to 1000 US\$.

The main consequences stem from the impacts on the productivity of land. The impacts on prices have moderate consequences, partly because these impacts are relatively small in climate projections. The policy alternative of reducing transaction costs has a negligible consequence for this household. Recall, however, that this policy matters a lot to the number of farmers that avoid the output constraint. The main impact of higher market prices and lower wages is a shift from work outside the farm to work on the farm. The consumption of food from own farm thereby increases, and the consumption of market goods

changes from an increase under constant prices to a decrease. Possible positive impacts of higher prices for agricultural products are neutralised partly by lower wages and partly by a higher dependency on subsistence.

The micro model adds vital information about the impacts of climate change on smallholders, when compared with the interpretation from the macroeconomic indicators. It reveals the necessity of distinguishing between the impacts of climate change on traditional economic indicators such as production, income and consumption, and the impacts on constraints that rural households live and farm under. These include a nutrition constraint and a constraint to the ability to supply agricultural products to the market and thereby enjoy the flexibility that monetary income provides. Moreover, the climate impacts on traditional economic indicators differ between households, depending on whether these constraints are binding or not. Households subject to an output constraint become increasingly dependent on income from sources outside the farm as the productivity of the land decreases. To account for the possibility that there is correspondence between human and natural resources, we have assumed that the maximum time a household can spend on work outside the farm decreases slightly as the farms become smaller. However, we have found no support for a numerical assessment of this sensitivity. Uncertainty related to the possibility of earning income from activities outside the farm may, therefore, further increase the vulnerability of poor households, and put people in households subject to the nutrition constraint in an even more difficult situation.

## **5.0 The local perspective: A village study from Morogoro Region**

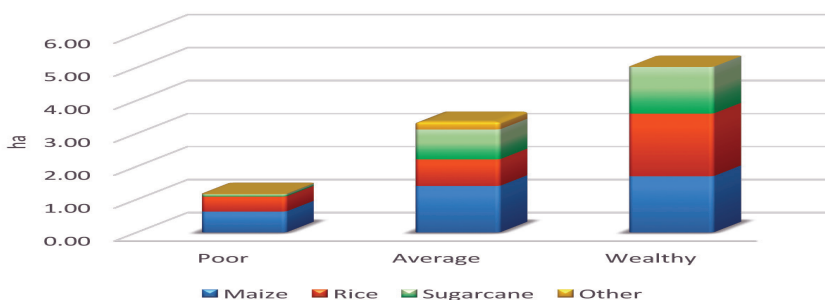
The analyses in the two previous sections are based on statistical information from Tanzania, and are confined to aggregated information. As with the interpretation of the results from the macroeconomic model, the micro model also addresses “representative agents”, but highlights logical consequences of the fact that people have access to farms of different sizes. This is to avoid inconsistent interpretations of how changes in macroeconomic indicators and general policies affect the population. The aggregated point of departure implies, however, that we cannot claim insight into how farmers with access to a certain area of land will be affected, because the variability in conditions that households must relate to in their daily life goes far beyond their access to land. Moreover, the micro model is based on approximations and assumptions that we have limited or no statistical information about. To better understand how macroeconomic drivers and national policy strategies may affect the livelihoods of smallholders, we need to examine the micro level more closely.

The assumptions underlying the micro model and the derived composites of consumption, production and work are, therefore, checked against information



from a case study of Lungo village in Mvomero District, Morogoro Region. The village is located adjacent to Mtibwa Sugar Estates in a flat area of approximately 350m above sea level, and has a population of about 1,000 people. It has a relatively high agricultural potential, with annual precipitation of between 850 and 1750 mm/year. This is close to the 1200 mm/year average for Tanzania, although precipitation patterns here, as elsewhere in Tanzania, differ considerably within and between years. Infrastructure is moderately developed, with travel time to the Morogoro-Dodoma tarmac highway of 1.5 – 3 hours, with longest time in the rainy season.

The study is based on semi-structured interviews conducted with 50 households. Knowledgeable local people helped to divide the 184 households in the village into wealthy, average and poor households, based on an evaluation of the households' ownership of land and livestock, access to off-farm sources of income, ability to produce enough food for the household, crops grown, education and quality of home. Nineteen poor, 24 average and seven wealthy households were then selected, who reflect the distribution of farming profiles, wealth, ethnicity and share of women-headed households in the community. Most of the households owned their own land, but some, most of them poor ones, borrowed or rented land. A typical poor household cultivated 1.17 ha, an average household cultivated 3.36 ha and a wealthy one cultivated 5.02 ha. This corresponds reasonably well with the distribution of farm plots in Tanzania.



*Figure 3.9: Average area of crops cultivated by households of different wealth categories in Lungo village (2011/2012).*

The main crops cultivated are maize, rice and sugarcane. Other crops include sunflower, cowpeas, soya and irrigated vegetables, the latter grown mainly by average and wealthy households. Maize and legumes are often intercropped. Most of the maize is consumed by the households as a food crop. Rice is a food crop too, but also a key cash crop. On the other hand, all sugarcane is sold to the nearby Mtibwa Sugar Estates. The usage of areas for cultivation of maize, rice and sugarcane among the different categories of households is as illustrated in Figure 3.9. Maize covers more than 50 percent of the cultivated area in poor farms, but less so in larger farms. Rice covers increasing areas as farms become

larger, and provides increasing opportunities to earn an income. Sugarcane covers only six percent of the cultivated area on the farms of poor households and between 25 and 30 percent on other farms.

Most of the households keep livestock. Whether they keep livestock or not seems to be rather independent of farm size, but the size matters to the kind and number of livestock that they keep. Stall-fed dairy production is prevalent only among average and wealthy households. Ownership of traditional cattle spans the range from poor to wealthy households, with wealthier households owning larger numbers of cattle compared to poor households. Poor households typically keep more small, than large, livestock such as sheep, goats and chicken<sup>5</sup>. The village study shows an increasing share of cash crops being cultivated by households of increasing wealth, which conforms to the result in the micro model that the degree of subsistence decreases with increasing farm size. Although the model simplifies the output to one product, the correspondence between subsistence and production for the market can be read from the composite of crops in the study. This illustrates an aspect of adaptation implicit in economic models, where agents change behaviour along with changes in input factors. In this case, composites of crops and livestock differ depending on the farm size, which is consistent with the assumption that farmers maximise utility. However, the model ends up with extreme solutions, such as producing only for own consumption as soon as the output constraint is binding. In reality, seasonal variations and individual variability in needs and farming conditions across households make these shifts less rigorous.

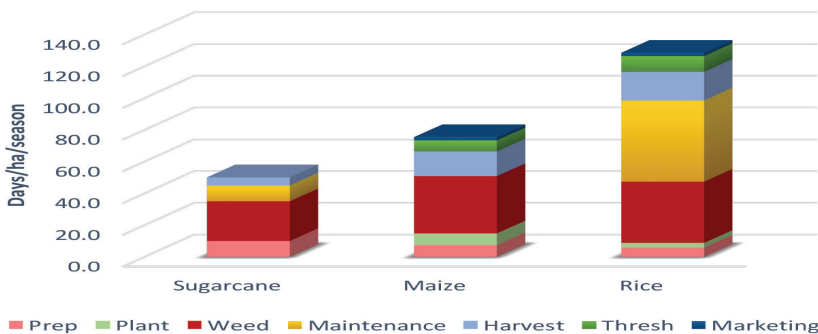


Figure 3.10: Allocation of working days on farm by crop. Days per hectare, per season.

The working time spent on the farm depends on the crops cultivated, as shown in Figure 3.10, where the number of days spent per season per hectare is divided into different activities. Sugarcane is the least labour intensive crop, according to these figures. Most of the work undertaken by farmers for sugarcane relates to land preparation, weeding and field clearing, as the crop is perennial, and harvesting is mechanised and organised by the outgrower associations to which all cane farmers belong. Maize is more labour intensive than sugarcane, and also involves more activities. Rice is clearly the most labour intensive, primarily

because of the need for weeding, and time-consuming harvesting and bird scaring activities. One explanation for the differences is that sugarcane production is a more mechanised process than the production of maize and rice.

In some cases, the use of labour is hired from outside the farm, at varying costs, depending on the activity and season. For example, the estimated cost of weeding land planted to maize is between 45 and 55 thousand TSH/ha (2012 prices), and the crop normally requires two weedings per season. Hiring labour to weed a rice field costs between 125 and 370 thousand TSH/ha, and hiring labour for bird-scaring ranges from 50 to 125 thousand TSH/ha. No time is spent on marketing sugarcane directly, as Mtibwa Sugar Estates is the only buyer and a fixed price is negotiated with the two out-grower associations that serve smallholder cane growers in surrounding communities ahead of the harvesting. However, there are supervision costs involved in preparing and guarding cane that has been harvested for transport, and overseeing the cane loading process. The time available to farming households to earn an income from off-farm sources depends, therefore, on the crops cultivated on the farm, which is closely related to the farm size, as well as to the availability of labour, and to the season in which crops are cultivated.

The pattern is that farmers on the smallest farms concentrate on cultivating food crops for their own consumption, mainly during the *long rains* (MAM) season. As farms become larger, more emphasis can be placed on producing cash crops, including sugarcane and irrigated vegetables, which are produced/harvested in the short rains season and after the main and rice crops have been harvested, respectively. In addition, rice provides a nice flexibility in being both a food and a cash crop (West, 2015). Variations in time needed to produce what is possible means that households with small farms have, in general, more time available to earn an income by activities outside the farm, although this depends also on many other factors. The findings from the village study that households who are more oriented towards cash income also have larger farms, implies that the farming activities of wealthier households correlate better with the activities within the agricultural sector presumed in the macroeconomic model. The micro model projects that more time to do other things implies that the income from activities outside the farm increases, but the model does not consider variations in income opportunities.

The village study reveals a broad range of alternative income opportunities, which vary considerably regarding both permanency and remuneration. In general, the most predictable income is earned by having a permanent source of off-farm income, such as working as a teacher, as a permanent employee at Mtibwa Sugar Estates, or engaging in a trade. Sale of products from the farm or from forest-related activities, such as production of charcoal and honey, offer seasonal sources of income, as do wages from casual work on other people's

farms or on the Mtibwa Sugar Estates. The most uncertain income is derived from petty trading, where the daily income in most cases varies more than the average income. The income opportunities utilised by the people in the village are in most cases reached within a distance of 20km, meaning that people access local markets in most cases, but with moderate transaction costs.

Against this background, the reality of the underlying assumption about income earned from activities outside the farm in the micro model can be checked against information from the findings related to households' engagement in permanent employment outside the farm. The data show that 57 percent of wealthy households are engaged in this kind of employment, whereas only eight percent of the average households and none of the poor households are. In fact, households on smaller farms depend to a larger extent on variable income from selling farm produce or variable or even highly uncertain income from activities outside the farm; meaning that earnings from one day spent on activities outside the farm most likely decrease notably with farm size.

The village study does not, though, provide sufficient details for assessing a relationship between monetary income opportunities and farm size that can be implemented in the micro model. And yet, it more than suggests that the micro model is too optimistic about households' sensitivities to variations in the productivity of land. For example, poor farmers are not that flexible when it comes to substitution between consumption of food from own farm and food from markets, if the productivity of their land changes. Consequently, households that encounter the nutrition constraint and the output constraint at a change in productivity under climate change, are likely to be more sensitive to changes in the productivity of land than the modelling indicates.

The increased dependency on increasingly uncertain off-farm sources of income enhances smallholder's vulnerability to changes in the productivity of land, when compared with the interpretation of models based on statistical information at the national level. This applies, in particular, to interpretations of the macroeconomic model. But also the micro model fails to address this challenge, as it assumes that those who are subject to the output constraint can easily earn an income outside the farm and buy food instead. This seems to be far from reality in practice, meaning that consumption is more sensitive to the farm size and to changes in the productivity of land than the models indicate. Indeed, it is more difficult to tell how this uncertainty affects responses to changes in wage and price levels, and how this uncertainty may affect smallholder's vulnerability to climate change impacts.

## 6.0 Conclusions

The potential benefits of REDD+, which are related to preserving biodiversity and mitigating climate change, may impose losses on the local users of the forests, who depend on both agriculture and forest products to meet their

income and other needs. The foregone benefits are difficult to measure, however, there is increasing recognition of the need to take a landscape approach and to incorporate wider livelihood concerns and non-economic values associated with forest use, when assessing potential benefits and losses of REDD+. This chapter discusses smallholder vulnerability to climate change in Tanzania, with attention being paid to the role of both access to land and off-farm sources of income, including utilisation of forests, in securing their food and other consumption needs. We compare assessments based on three different perspectives. First, we take a general national economic perspective using a macroeconomic model. Second, we pay attention to smallholders by means of a sector model. Third, we compare conclusions from the models with conclusions derived from field research in Morogoro Region.

The macroeconomic projections assume high economic growth under a temperature increase of more than 5 °C throughout this century. The economic impacts are large, and particularly large in the agricultural sector. Agriculture will nevertheless continue to dominate economic activity, and contribute steadily more than 40 percent of the GDP. The productivity is affected considerably by climate change, but with moderate impacts on prices. There is a huge uncertainty about predictions of both climate impacts and societal development trajectories. However, climatic variabilities and differences in underlying socio-economic conditions imply that certain regions and sectors will become more vulnerable than others. This is highlighted by the finding that moderations of impacts due to autonomous adaptation decline as the climatic changes become larger. Proactive adaptation strategies are, therefore, needed. From a macroeconomic perspective, attention should be paid to enhancing the resilience of crop, livestock and farming systems, stimulating flexible production systems and technologies, and making precautionary investments that reduce transaction costs.

The macroeconomic model ignores vital adaptation constraints that smallholders face. With structural transformation of the Tanzanian economy, the number of smallholders will most certainly decrease, but the model gives no indications of the magnitude. Approximately 10 million Tanzanians live on small farms, on which they rely for their food security. In addition, many rural households rely on purchasing food in the market to supplement production on their own farms. This number will probably remain significant for a long time, and climate variability implies that the climatic changes projected in 2100 will affect many smallholders long before that. The micro model indicates that if the climatic changes in 2100 occurred today, the impacts on agricultural productivity would result in food consumption of nearly 1.5 million more people falling below the minimum supply of food, and more than two million additional people would depend entirely on the food that they can produce themselves. Price effects in the wake of climate change may reduce this number to 1.2 million and further to 150 thousand if policies succeed in encouraging adaptation and

reducing transaction costs. Households that manage to stay above the nutrition constraint before and after the projected climatic changes will have to reduce their food consumption, and the price effects worsen their situation slightly, whereas lower transaction costs have no impact. The analysis of smallholders thereby suggests that although the estimates of autonomous adaptation derived from the macroeconomic model are useful, they may be of limited relevance to smallholders. Their challenges in adapting to climate change are related both to the worsened conditions for farming and to an increasing need to gain income from off-farm activities. Major investments to generate jobs that provide alternative and complementary sources of income for rural households are therefore needed.

The village study from Morogoro Region confirms the production and consumption patterns described by the micro model. Poorer farmers, who cultivate smaller farms, plant a larger share of their land to maize, which is the staple food crop. Rice, which can be used both as food and cash crop, comprises a greater share of cultivated acreage among households of average and above-average wealth; whereas sugarcane, which is exclusively a cash crop, is generally cultivated by average and wealthy farmers, who also have more land at their disposal. It is, therefore, likely that a greater share of poorer households' agricultural production goes to meeting their food needs, compared to wealthier households, whose farms are larger than those of poor households. In the micro model, lower productivity of land due to climate changes encourages work outside the farm, meaning that the dependency on income from other sources increases among poorer households who have smaller farms. In the village case presented in this chapter, this represents a serious constraint to the livelihoods of poor smallholders, because only a small proportion of smallholders are engaged in reliable and remunerative employment, and these tend to be wealthier households, with larger farms and more education. Poorer households cultivating smaller farms have to rely on unpredictable income from casual work and petty trading. Removal of sources of off-farm income, including from forest products such as charcoal, in the case of a REDD+ project, will further increase dependency on farm products, making poorer smallholders more vulnerable to the impacts of climate change than what is estimated by the micro model. Climate change thereby represents a barrier to mitigation of poverty, which is more challenging than indicated by analyses of the statistical data.

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## Appendix

### A micro model for smallholder farming

The micro model addresses consequences of constraints that smallholders have to relate to, which do not apply to the farmers described by the macroeconomic model. One is a nutrition constraint, meaning that there is a lower limit to the food consumption. There is also an output constraint, meaning that smallholders cannot consume more food from their own farm than the size of their farm allows them to produce. The limited farm size also limits the time they can spend on farming in a useful way. Additional time may be spent to earn an income from other activities.

The aggregated output from the agricultural sector in the macroeconomic model,  $Y$ , is replaced with a sum of farm-specific output  $y_i$ ,  $i = 1, \dots, N$  from  $N$  farms. Output is a function of time spent to work on the farm,  $n_i^f$ , and the size of the farm  $r_i$ :

$$Y = \sum_{i=1}^N y_i = \sum_{i=1}^N f(n_i^f, r_i) \quad (1)$$

As in the macroeconomic model, the output at a given combination of input is independent on scale.

Consumption is divided into three categories. Food is split into consumption from own farm,  $x_i^f$ , and consumption bought in the market,  $x_i^m$  at price  $p$ , while all other consumption is grouped into one aggregate,  $z$  at price  $q$ . If sold, the price they get for the output is  $(p - t)$ , where  $t$  is the transaction cost. If the total time they have available for work, exceeds the time on farm, they can work elsewhere with expected payment  $w$  per unit of work. Then, the monetary budget constraint to a single household is:

$$(p - t)(f(n_i^f, r_i) - x_i^f) + w(\bar{n} - n_i^f) = px_i^m + qz_i \quad (2)$$

The nutrition constraint requires that

$$\bar{x} \leq x_i^f + x_i^m \quad (3)$$

As in the macroeconomic model, the households maximise utility,  $V = V(x_i^f, x_i^m, z_i)$ . However, the allocation of working time cannot be taken independently of the consumption composite, as

$$y_i \geq x_i^f \quad (4)$$

Welfare maximisation under the constraints (2) – (4) gives the following first-order conditions for the consumption composite:

$$\frac{V'_{x^f} - \lambda^N - \lambda^O}{p_x - t_x} = \frac{V'_{x^m} - \lambda^O}{p_x} = \frac{V'_z}{q} \quad (5)$$

$\lambda^N$  and  $\lambda^O$  are the shadow prices imposed by the nutrition constraint (3) and the output constraint (4), respectively. If both  $\lambda^N$  and  $\lambda^O$  apply, we have a corner solution: Time is spent on the farm to produce as much as possible for own consumption. Extra consumption of food needed to meet (3) has to be bought in the market. This creates a relative shortage of other goods, which the remaining income, if any, is spent on. For the division of work, the first order condition is

$$(\lambda^B(p_x - t_x) - \lambda^O)f'_n = w \quad (6)$$

Here,  $\lambda^B$  is the shadow price of the budget constraint, or marginal utility of money. Equation (5) gives rise to ordinary demand functions for consumption goods and corresponds to the demand functions in the macroeconomic model. We assume constant elasticity of substitution (CES), where endogenous shadow prices of the constraints are included; (6) is parallel to the demand function for labour by sector in the macroeconomic model, but applies here to the time spent on the farm and the time spent on paid activities outside the farm. These are also based on CES functions.

The model combines a physical measure for consumption of food,  $x^f$ , and a value of food consumption,  $px^m$ . When all goods are measured in monetary terms, we have the marginal utility of money,  $\lambda^B = 1$ . To keep  $\lambda^B = 1$  valid, we consider a separable welfare function which is optimised in two stages. First, the composite of  $x_i^f$  and  $x_i^m$  is determined by maximisation of the utility of a given consumption of food  $x_i = x_i^f + x_i^m$ . In the second step, market consumption is optimised given the disposable amount of money. The welfare function can then be written as

$$V(x_i^f, x_i^m, z_i) = v(x_i^f | x_i) + u(x_i^m, z_i) \quad (7)$$

## Appendix 1. Interview Guides, Mkangawalo and Lungo villages



Interview Guide – Mkangawalo

Date: \_\_\_\_\_ Subvillage: \_\_\_\_\_ SRI farmer/Non-SRI M/F

Details of interview setting: \_\_\_\_\_

Name: \_\_\_\_\_ Age: \_\_\_\_\_ Marital status: \_\_\_\_\_

Tribe: \_\_\_\_\_ Religion: \_\_\_\_\_ Education: \_\_\_\_\_

HH members (total): \_\_\_\_\_ Children \_\_\_\_\_ < 5: \_\_\_\_\_ Born in Mkangawalo/Moved \_\_\_\_\_

Details of move (when, from where, why):

HH income comes from: a) Farming only b) Farming + Fishing c) Farming + other business

Details: \_\_\_\_\_

Livestock keeping (Types/number of livestock): \_\_\_\_\_

Land ownership: Owns land? Rents land? Owns and rents land?

**Details of farm plots:**

	PLOT 1	PLOT 2	PLOT 3
Crops and varieties grown			
Size of plot			
Location (eg. bondeni)			
How acquired (bought, inherited, cleared)			
Planting details (no. of seasons, broadcast, etc)			
Method of land preparation			
Inputs used (fertilizer, herbicide) and app. rates			
Avg. yield per/acre (indicate if broadcast, transplanted)			
Started/finished planting this season (early/late?)			
Expected harvest date			

**Total acreage (all plots):**

**Number of separate plots:**

## Interview Guide – Mkangawalo

- 1) Most important crops for the household (discuss the importance of rice as a cash versus food crop)
- 2) SARO (do you grow it, if so for how long, why, where did you get seed from. If not, why not)
- 3) Crop marketing for rice:

- *Amounts sold/consumed*
- *Sold at farm gate as mpunga or milled and sold as mchele?*

- 4) Seed selection/storage details for major crops (rice, maize)

- *If selected on farm, is selection done before or after harvest?*
- *How is the seed stored?*

- 5) Changes in farming practices the last 10 years and reasons for changes

- 6) Climate changes observed and how affecting crop production?

*Probe for whether and how farming was impacted by 2010/2011 drought/flooding and early rains this year*

- 7) Other changes affecting crop production (pests/diseases, soil fertility, other)

- 8) Changes you would like to make to farming practices?

- 9) SRI *Have you heard about it? What do you hear? Do you think SRI would work on your farm?*

- 10) Life now compared to 10 years ago?

### Questions for SRI farmers

- 1) Are you receiving training for the first time this year?

- 2) If you received training in previous years, do you use SRI methods (e.g. spacing) to plant other varieties than SARO and if so what is your experience?

- 3) What do you think about the SRI training? Are some elements more useful than others?

- 4) How many acres are you planting to SARO? Direct seed or transplant?

- 5) General experiences, challenges, other

- 6) SRI shamba darasa - how is the group working?

- 7) Are you taking a loan from Yosefu? Details Experiences so far

## Household Interview Guide – Lungo Village

Date/sub-village

Wealth category 1 2 3

### 1. Respondent background:

-Name            - Gender            -Age            - Tribe            -Schooling            -Religion

- Relationship of respondent to HH head; indicate if single-headed household
- Household size (number of family members living at the home; children under 5 years; adults over 55)
- Number of years living in Lungo; where migrated from, and why

### 2. Economic activities of the household

- *What main economic activities does the household engage in*
- Farming details (crops sown for food and cash, crop and varietal preferences for rice and maize, inputs used, yields obtained, marketing and seed sourcing issues)
- Livestock keeping (stall-fed or grazed, type and number of animals, consumption and sales of milk and meat)
- Off-farm income

### 3. Land issues

- Farmland (number, size and location of plots owned/rented in or out/borrowed, crops grown on the different plots in particular seasons)
- Grazing areas used in the wet/dry seasons
- Local land conflicts, if any
- Experiences of acquiring land in the village (renting/buying/inheriting)

### 4. Sugarcane production (where relevant)

- Number and size of farm plots; how they were acquired; performance this year, and any changes to sugarcane farming practices over time
- Outgrower association membership and views on OG association performance
- Views on relationship between OG farmers and Mtibwa

### 5. Climate and environmental change in Lungo

- changes observed in the weather/climate. How do they impact the household and farming/livestock keeping activities and how is the household responding?

- Changes observed in the natural environment /forests, river, over time and reasons for the changes. How are you (household/village/government) dealing with the changes?

#### **6. Welfare and general living standard of the household**

- Discuss welfare of the household now in relation to 10 years ago: is it better, the same or worse, and why?

- HH membership in village associations, village government, or self-help groups

- General livelihood challenges not already discussed

#### **7. Farming/livestock keeping challenges and/or opportunities**

- What do you think of the future for farming and livestock keeping in this area?

- Would you want your children to continue farming/livestock keeping?

#### **8. Questions about other issues that arise during the interview or from other interviews**

- Add to, nuance and cross-check information cumulatively



Interview Guide – Hilary 2014

*Checklist of topics to discuss with SRI households in Kidete, Ilole and Mgudeni*

- 1) How is your rice doing this season? (all rice) – is it a good/bad season? Why?
- 2) Are you doing SRI also this year?
- 3) If yes, which SRI methods do you apply?

Yes/No	Unatumia mbegu ya SARO	Unakusafisha mbegu kabla ya kupanda?	Unaweka mbolea? (ya kupalia/kupandia au kukuzia)	Unatumia umbali 25 X 25 cm, au tofauti	Unatumia weeder kwenye palizi?

4) Do you apply SRI methods (spacing or other) to your mpunga ya kawaida? Please explain

5) Mikopo – do you get credit from Yosefu or KPL? Are you happy with it, au vipi unaona?

- credit rate (amount)

- repayment conditions

6) Unapata mikopo ya mbegu, au pesa, au mbolea ? Kama ndiyo, unapata wapi?

Mbegu \_\_\_\_\_ Pesa \_\_\_\_\_ Mbolea \_\_\_\_\_ Madawa \_\_\_\_\_

7) How did the contract and price negotiations go with KPL mwaka huu kuliko mwaka jana?

8) Price negotiations with KPL – vipi inaendeleaje?

9) Soko la mpunga ya kawaida kuliko ya SARO? Bei hiko juu au chini mwaka huu?

10) Utafanya mabadiliko ya shamba ya mpunga mwaka kesho? Mabadiliko gani?

11) Ni wakulima gani wananufaika na SRI?

12) Other comments – anything else you would like to say?

Kitongoji \_\_\_\_\_ Jina la kaya \_\_\_\_\_ Tarehe \_\_\_\_\_

	Umepanda na <i>umevuna</i> ekari ngapi?		Umepanda vipi (kumwaga, kupandikiza, au kupanda mbegu)	Umepanda mbegu ya mpunga aina gani? (SARO, Faya, etc)	Umeanza na umemaliza kupanda lini?	Umepata gunia ngapi (ya debe ngapi)	Umeuza gunia ngapi na bei
SRI shamba la mwaka huu (2013/2014)	<i>Kupanda</i>	<i>Kuvuna</i>					
Shamba la kawaida la mpunga la mwaka huu							

1. Ulipanda mara ngapi mwaka huu: i)shamba la SRI \_\_\_\_ ii)shamba la kawaida \_\_\_\_\_

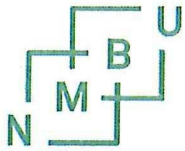
2.Kama umepanda mara mbili au ziadi, kwa nini?

3. Kama umevuna eneo ndogo kuliko ulilopanda, kwanini?

i) shamba la SRI

ii)Shamba la kawaida

## Appendix 2. Approved Errata



20.04.2017

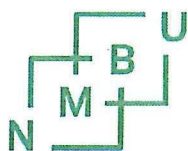
## FORM 4.7 Errata

Correcting formal errors in the PhD thesis (cf. section 15.3-2 in the PhD regulations)

The PhD candidate may after submitting the thesis apply to correct formal errors in the thesis. An application to correct formal errors must be submitted no less than four (4) weeks before the disputation. Such an application can be made only once.

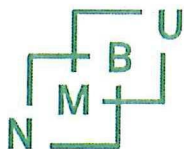
Thesis title:	Agricultural investments for development in Tanzania: reconciling actors, strategies and logics?
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Page number	Paragraph	Change from	Change to (changes emphasized in bold)
None	None	Extra title page	Remove extra title page
None	None	None	Add "Acknowledgements" section
ii	None	None	Update "Table of contents" to include "Acknowledgements" as needed
iii	Part II: Compilation of papers	Paper I. ... DOI: 10.1080/09614524.2017.1307324	DOI: 10.1080/09614524.2017.1307324.
iii	Part II (as above)	Paper V. Aaheim, A. J. West and A. Orlov. 2016....	Paper V. Aaheim, A., <b>West, J.</b> and A. Orlov. 2016....
iii	List of tables	Table 2. Characteristics interviewed households in Lungo and Mkangawalo villages	Table 2. Characteristics <b>of</b> interviewed households in Lungo and Mkangawalo villages
iv	Summary	The thesis comprises five separate, but interrelated papers that....	The thesis comprises five separate, but <b>interrelated, papers</b> that....
1	1	...depend(URT/MAFC 2014).	...depend [ <b>space</b> ] (URT/MAFC 2014).
4	1	...between small- and large-scale farmers, as having 'win-win' potential...	...between small- and large-scale <b>farmers as</b> having 'win-win' potential...
5	3	How do governance and political economy factors shape...and their viability as a development strategy?	How do governance and political economy factors shape...and <b>affect</b> their viability as a development strategy?
7	2	'the good life'(Kothari 2005).	'the good life' [ <b>space</b> ] (Kothari 2005).
10	Indented quotation,	...only by increasing our production of these things can we get more food and more money for every Tanzanian	....only by increasing our production of these things can we get more food and more money for every <b>Tanzanian.</b>



20.04.2017

	bottom of page		
12	2	...have become increasingly central to agricultural and investment and development debates...	...have become increasingly central to <b>agricultural investment</b> and development debates...
13	1	...existing patterns of land and water use, are likely to shape...	...existing patterns of land and water <b>use are</b> likely to shape...
13	2	...farmers and livestock keepers may have moved into and settled onto the land	...farmers and livestock keepers may have moved into and settled <b>on</b> the land
13	2	(Benjaminsen et al., 2009, HAKIARDHI 2009).Agricultural investments therefore have implications for climate adaptation, as well as mitigation efforts.	(Benjaminsen et al., 2009, HAKIARDHI 2009). [ <b>space</b> ] Agricultural investments therefore have implications for climate adaptation, as well as <b>mitigation</b> , efforts.
14	2	According to this perspective, agricultural production relations vary according to whether the contracted commodity is a 'traditional' export crop such as tea and or sugar,	According to this perspective, agricultural production relations vary according to whether the contracted commodity is a 'traditional' export crop such as tea <b>and</b> sugar,
18	1	Given the wide reported variation in outcomes of CF and OG schemes, attention has been focused on...	Given the wide reported variation in outcomes of CF and OG schemes, attention <b>has focused on</b> ...
22-23	Starting with paragraph 3 on page 22	The thesis examines the development implications of selected OG schemes on a number of fronts, including for... smallholders' and communities' adaptive capacities to climate change (Paper 3), large estate and smallholder risk management strategies (Papers 2 and 3), and in relation to the debates that surround the SAGCOT initiative (paper 3) and national assessments of climate change vulnerability, impacts, and adaptation (Paper 5).	The thesis examines the development implications of selected OG schemes on a number of fronts, including for smallholders' and communities' adaptive capacities to climate change ( <b>Paper 4</b> ), large estate and smallholder risk management strategies ( <b>Papers 3 and 4</b> ), and in relation to the debates that surround the SAGCOT initiative ( <b>Paper 1</b> ) and national assessments of climate change vulnerability, impacts, and adaptation (Paper 5).
23	2	Climate and market variability, dependence on rain-fed agriculture and high pest and disease pressure on crops and livestock combines with	Climate and market variability, dependence on rain-fed agriculture and high pest and disease pressure on crops and livestock <b>combine</b> with
25	2	(Brown and Westaway 2011).Vulnerability	(Brown and Westaway 2011). [ <b>space</b> ] Vulnerability
26	1	...whereas viewing vulnerability as a starting point draws instead attention to...	...whereas viewing vulnerability as a starting point <b>draws attention to</b> ...



20.04.2017

32	1	...qualitative research. (Creswell 2009).	Qualitative research (Creswell 2009).
32	3	...socially situated and embedded .	...socially situated and <b>embedded</b> .
33	1	These include the crop genetic resources in question, the dynamic agro-ecosystems...	These include the crop genetic resources in question <b>and</b> the dynamic agro-ecosystems...
33	2	...tension that characterize debates...	... <b>tensions</b> that characterize debates...
34	2	...the trend in both regions is towards increasing rainfall...during the Long Rains, or Vuli (OND), season.	...the trend in both regions is towards increasing rainfall during the <b>Short</b> Rains, or Vuli (OND), season.
35	Table 1; column 2; row 7	...cheap sugar import	...cheap sugar <b>imports</b>
35	Footnotes	Footnotes 4, 6 and 7	Add periods as these are full sentences.
38	1	...competitor processors/factories.(Mmari 2012).	...competitor processors/factories <b>[space]</b> (Mmari 2012).
59	2	...does not resonate with the dynamism and diversity of smallholder livelihoods	... <b>do</b> not resonate with the dynamism and diversity of smallholder livelihoods
60	3	CF/OF scheme literature	CF/ <b>OG</b> scheme literature

This form will be signed by the PhD candidate and the main supervisor and must be sent to the faculty for approval. The approved errata must be archived in the PhD candidate's doctoral archive and must be attached to the final thesis print version as the last page of the thesis.

**Date and signature:**

PhD candidate (Author):	02.06.2017	
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Errata approved by the faculty: Yes  No

For the faculty:	
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