

Competing Discourses of Sustainability in African Agriculture: A Case Study of the Sustainable
Agriculture Discourse of the Alliance for a Green Revolution in Africa

A Thesis Submitted to the

College of Graduate and Postdoctoral Studies

In Partial Fulfillment of the Requirements

For the Degree of Master of Arts

In the Department of Sociology

University of Saskatchewan

Saskatoon

By

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ABSTRACT

Despite wide acceptance of the importance and desirability of “agricultural sustainability,” the concept remains slippery and contested. While research has focused on links between sustainable practices and productivity, and the reasons why farmers do or do not adopt recommended measures, less is known about how the notions and expectations of sustainable agriculture are shaped and evolve over time. This study addresses this gap by investigating how a well-resourced organisation, the Alliance for a Green Revolution in Africa (AGRA), frames sustainable agriculture and promotes it to stakeholders in African agriculture. The research seeks answers to three interrelated questions: 1) How does AGRA conceptualise sustainable agriculture? 2) How has AGRA’s framing of sustainable agriculture evolved? 3) How does AGRA communicate and promote its notion of sustainable agriculture to farmers and other stakeholders? The study draws on political ecology theory and employs sociological discourse analysis to investigate these questions using evidence from the annual reports of AGRA from 2008–2018. The findings reveal that AGRA’s definition of sustainable agriculture generally prioritises the use of industrial inputs to increase production on a targeted land base. This framing has its beginning as the promotion of “improved” seeds and synthetic fertilisers, enhanced market access and credit and financing for farmers, to advocacy for national policies that are favorable to these forms of intensification and market integration. AGRA promotes this framing to farmers through universities and other research institutions, government agencies, extension professionals, and farmer organisations. While this study’s primary focus is deconstructing the evolving discourse of agricultural sustainability in key public documents of AGRA, it also considers how the organisation has elaborated campaigns that appear to connect with broader concerns of agricultural sustainability but ignore the implications and complications of their own roles in promoting a particular agenda. The study contributes to the larger discussion of how discourses of ‘sustainability,’ climate change, hunger, and poverty, are deployed in the production and the reproduction of farming systems compatible with the development agendas of key commercial interests.

ACKNOWLEDGEMENTS

First, I would like to thank my committee members, Dr. Michael Gertler and Dr. Laura Wright who provided many useful comments and suggestions throughout the process of this thesis. Any arguments and or shortfalls in this thesis remain my responsibility.

I would also like to thank Professor JoAnn Jaffe of the Department of Sociology and Social Studies, University of Regina, for providing suggestions at important points in this process.

And, I would like to thank the College of Graduate and Postdoctoral Studies and Department of Sociology for providing me with the Dean's Scholarship to support my studies. I would not have been able to complete my studies without this funding. I especially want to thank Barb Wotherspoon and Kristen Harms for their wonderful support throughout my stay in the programme. To all my colleagues at the University of Saskatchewan, I say thank you.

Finally, I would like to thank the Gertler-Jaffe family for providing me with a home away from home. I especially enjoyed the delicious meals provided by Professor Jaffe. I will be forever grateful.

DEDICATION

This thesis is dedicated to my lovely son, Suglo.

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LIST OF ABBREVIATIONS AND ACRONYMS

AfDB – African Development Bank

AGRA – Alliance for a Green Revolution in Africa

AU – African Union

BMZ – German Federal Ministry for Economic Cooperation and Development

CAADP – Comprehensive Africa Agriculture Development Programme

FAO – United Nations Food and Agriculture Organization

GMO – Genetically Modified Organism

GR – Green Revolution

HYV-Seeds – High Yielding Variety Seeds

IAASTD – International Assessment of Agricultural Knowledge, Science and Technology for Development

IPCC – Intergovernmental Panel on Climate Change

MDGs – Millennium Development Goals,

NEPAD – New Partnership for Africa's Development

NGO – Non-Governmental Organisation

SDGs – Sustainable Development Goals

SSA – Sub-Saharan Africa

TNCs – Transnational Corporation

UNCTAD – United Nations Conference on Trade and Development

USAID – United States Agency for International Development

CHAPTER ONE: INTRODUCTION

1.1 Background

Although the issue of sustainability has been a concern for generations, worries about the sustainability of industrial agriculture came to the fore with the 1987 publication of *Our Common Future* (also known as the Brundtland Report), as part of a more generally rising concern for sustainability and sustainable development (Velten, Leventon, Jager, and Newig 2015). Since the publication of that report, the term “sustainability” has become more contentious as competing actors and interests manoeuvre to put their stamp on the concept, and to gain legitimisation and endorsement for their claims of sustainability (Buttel 2006; Constance 2010; Scoones 2016). With the 2015 adoption by United Nations of *The 2030 Agenda for Sustainable Development*, which is encapsulated in the 17 Sustainable Development Goals (SDGs), there is a renewed global focus on achieving food security and ending hunger around the world while preventing natural resource degradation. Goal 2 of the SDGs aims at ending hunger, achieving food security, improving nutrition and supporting sustainable agriculture. Goals 6, 7, 8, 10, 12, 13, 14, and 15, are likewise closely interconnected with agriculture in that they deal with providing clean drinking water and protecting aquatic environments, promoting renewable energy sources and sustainable energy use, providing safe and secure working environments, reducing inequalities, promoting sustainable production and consumption, reducing climate impacts, and protecting terrestrial ecosystems, including grasslands and forests, combating desertification, and stopping biodiversity losses.

The Sub-Saharan African region is characterised as representing a prolonged development crisis in much international development literature (Collier 2007; Moyo 2009; Sachs 2005; Stiglitz 2007). It has been argued that Sub-Saharan Africa faces substantial challenges with respect to achieving food security in a manner that is both sustainable and equitable (African Union 2014; NEPAD 2009). Although the continent is characterised by significant regional differences, the Intergovernmental Panel on Climate Change (IPCC 2014) showed that the region is increasingly vulnerable to the impacts of climate change, which are manifested in the form of fluctuating temperatures and irregular rainfall patterns. These vulnerabilities are predicted to reduce crop productivity and adversely affect food production, particularly in areas that are seasonally dry (IPCC 2014:1202). This is especially concerning given that the continent already

has the highest prevalence of undernourishment globally, estimated at 23% of its population (FAO 2015:12).

Numerous development agencies and initiatives have focused on achieving food security and promoting sustainable agriculture in Africa. These initiatives include the Global Food Security Strategy of the United States Agency for International Development (USAID), the ‘One World, No Hunger’ programme by the German Federal Ministry for Economic Cooperation and Development (BMZ), the British Government’s Foresight Projects, ‘Feed the Future’ programme, the African Development Bank (AfDB), High Five ‘Feed Africa’ initiatives, and the Alliance for a Green a Revolution in Africa (AGRA). African leaders have also committed to investing in agriculture under the African Union’s Agenda 2063 and the Comprehensive Africa Agriculture Development Programme (CAADP). These initiatives at the global, regional, and national levels suggest a broad consensus on the need to increase food production (Godfray et al. 2010; World Bank 2008) and to reduce any negative environmental and social impacts of agriculture (Tilman, Balzer, Hill, and Befort 2011; Zimmerer, Carney, and Vanek 2015).

Despite numerous initiatives and commitments by a wide range of organisations, and notwithstanding almost universal acceptance of the importance and desirability of sustainability, the concept remains slippery and contested (Constance 2014; Konefal 2018; Barr and Cary 1992). The goal of sustainable agriculture and what it entails is unclear to many actors. This leaves room for innovation and local autonomy in elaborating suitable practice but also invites some abuse and short-cuts because it is not rigorously defined (Hayati, Ranjbar, and Karami 2010). While some actors argue for continued technological advancement and intensive production systems that make more optimal use of inputs through adoption of so-called sustainable intensification practices, others push for a paradigm shift to a more holistic and fundamental version of agroecology. Conflicting ideas about what a safe and sustainable food system might look like are evident in debates over organic food standards, genetic modification, food labeling, chemical safety guidelines, agricultural research priorities, deforestation, food safety standards, quality assurance processes, property rights, pesticide regulation, and appropriate levels of public investment in agrifood system (Buttel 2006; Constance 2014; Gertler, Jaffe, and Beckie 2018).

While much research has focused on competing sustainable agricultural practices and their potential, and on factors predicting farmers' adoption and implementation of such practices, less is known about how ideas and conceptions of sustainable agriculture are shaped, and how these ideas have evolved, developed, or been altered over time. This thesis aims to address this gap by investigating how an influential and well-resourced organisation, the Alliance for a Green Revolution in Africa (AGRA), frames sustainable agriculture for African farmers and other stakeholders. This study extends the literature on agricultural and environmental discourses by asking how notions and expectations of sustainability are shaped, how and in what ways these notions have changed over time, as well as how these ideas and concepts are promoted to farmers and other important actors in the African agrifood system.

The study uses annual reports from AGRA as a point of entry to analyse how key organisations in the African agrifood system frame sustainable agriculture, and how these conceptions have evolved over the years in the context of other social and economic changes in and around African agriculture. This study adopts a discourse analysis approach in order to systematically scrutinise the use of language and the deployment of concepts in reports posted on AGRA's website. Specifically, the study employs a version of sociological discourse analysis proposed by Ruiz (2009). A methodology grounded in empirical analysis of the sustainability discourse of a dominant organisation allows for a sociological investigation of the production, shaping, and ideological repositioning of knowledge (Dant 2012). Through this approach, it is possible to make explicit what is normally assumed and taken for granted. As a tool for deconstructing discourses and discursive strategies, it also facilitates investigation of whose interests are being protected and advanced. This analysis can also be used as a starting point for considering possible implications for the design and redesign of production systems, and for the management of agricultural resources and landscapes. In addition to a sociological discourse analysis of key terms and conceptual framings in AGRA's annual reports, the thesis considers contextual factors and historical influences such as earlier versions of the Green Revolution (GR) that were pioneered on other continents, the imposition of Structural Adjustment policies in Africa, the United Nations Millennium Development Goals, the 2007-2008 World Food Crisis, and the Sustainable Development Goals adopted by the United Nations General Assembly in 2015.

1.2 Research Questions

The present study seeks to answer three interconnected questions:

- 1) How does AGRA conceptualise sustainable agriculture?
- 2) How has AGRA's framing of sustainable agriculture evolved over time?
- 3) How does AGRA communicate and promote its notion of sustainability to farmers and other stakeholders?

1.3 Significance of the Study

With an analysis of the ways that an influential non-governmental organisation discursively frames key terms and orientations for agricultural development, this study contributes in novel ways to the growing body of critical research on social and political dimensions of agrifood systems. Investigating how key organisations in the agrifood system define sustainability is central to enhancing adaptive capacities and strategies that are practical and durable, and to understanding the power relations involved when various versions of sustainable agriculture are being promoted.

This study contributes to the literature on sustainable agricultural development in three ways: First, the study analyses the evolution of dominant discourses in agricultural sustainability through a discourse analytic approach. While previous studies take the concept of sustainability for granted, this study goes back and asks how AGRA defines agricultural sustainability, and how their definitions have evolved. Second, the study combines insights from political ecology and discourse analysis to focus on agricultural sustainability, which has not been extensively studied in the literature. The combination of these two frameworks allows for the analysis of how power, politics, and economic motivations help to determine what is recognised and promoted as sustainable agriculture. By demonstrating the applicability of discourse analysis to such questions, the study provides a methodological basis for future comparative research across national boundaries in Africa, and for exploring how different political, historical, and socio-economic circumstances can affect farming practices and conceptualisations of sustainability. It contributes especially to knowledge and understanding of the skewed power relations within the African agrifood systems. Moreover, the study adopts a historical perspective to understand the evolution of agricultural sustainability discourses, a matter that has not been given much attention in the agricultural sustainability literature. While previous research has studied

agricultural sustainability using interviews and other data sources that focused on a given moment, this study also considers how the discourse has evolved over time.

Agricultural sustainability and food security issues have gained greater prominence in the wake of the 2007/2008 global food crisis, the land-grabbing activities of international and regional investors, intensified efforts to introduce commercial-industrial models of farming, the impacts of changing climatic conditions, and increasing population in African countries. Understanding how the sustainability problem is framed and perceived is important to determining what solutions and strategies are needed to sustain the agrifood system in Africa. Through systematic analysis of sustainability discourses, this work contributes to an enhanced understanding of the interests and projects of various agrifood system stakeholders. African agriculture is under significant pressure to implement a range of practices that are claimed to be important for increasing food production to meet the needs of growing populations, for adaptation and mitigation with respect to climate change, and for socially responsible development. A consideration of how sustainability is conceptualised by key stakeholders in the agricultural sector is now more important than ever.

While this study focuses on an analysis of public documents of AGRA, it contributes to the larger question of how dominant discourses are engaged in the production and the reproduction of farming systems—especially those that are compatible with a capitalist conception of agricultural development. It opens up the topic and contributes to our understanding of how discourses of sustainability figure in the production and reproduction of power differentials and inequalities in African agrifood systems. Awareness of how discourses are deployed is crucial for understanding social change and what is shaping social imaginations, motivations, and debates around development, sustainability and agrifood futures.

1.4 Framing Sustainable Agriculture

Agriculture is exposed to multiple, simultaneous, and interconnected ecological, economic and social pressures (O'Brien and Leichenko 2000). Increased economic interconnections in a globalised world create unpredictable dynamics and conditions of price volatility, which can affect agricultural incomes and livelihoods. Moreover, agricultural systems are subject to pressures from competition among different land uses (Smith et al. 2010; Cassidy et al. 2013), global shifts in consumption patterns towards more dairy and meat-based diets (Popkin 2001),

increasingly erratic weather patterns, and the need to diversify rural livelihoods (Reardon, Barrett, Berdegue and Swinnen 2009). Adaptation of agricultural systems to meet such challenges is frequently argued to be an urgent need.

Agricultural activities themselves are major contributors to a range of environmental concerns, including greenhouse gas emissions, biodiversity loss, deforestation, water and soil pollution, and soil erosion (IPCC 2014). Contemporary food systems are said to be collectively responsible for 60% of global terrestrial biodiversity losses and about 24% of global greenhouse gas emissions. They are also responsible for the overfishing of 29% of commercial fish populations and the overexploitation of 20% of the world's aquifers. In the face of increasingly significant challenges of producing food while preserving the environment, a sustainable and fair global food system will require new approaches to food production, distribution, and consumption (Horlings and Marsden 2011).

Various meanings of the concept of sustainable agriculture have been advanced in the academic literature. Some scholars have attempted to create typologies of the various approaches found in the scientific literature (Beus and Dunlap 1994; Buttel 1996; Constance 2014; Konefal 2018; Konnefel and Hatanaka 2018; Jordan and Constance 2008). The lack of consensus in defining and the absence of a common conceptual framework reflect not only the complexity of the topic and the various disciplines involved, but also the ways that diverse interests have reinterpreted the idea in a manner that legitimise their own values and causes (Thompson 2010). Gertler, Jaffe, and Beckie (2018:179) have suggested that the way that sustainability is conceptualised has significance for “regional ecologies, scientific practices, development trajectories, markets, and the moral high ground in terms of food security and sustainability.” Thus, sustainability is socially constructed differently in different contexts by different social groups based on different understandings, expectations, and intentions (Gertler, Jaffe, and Beckie 2018). The wide range of organisations and observers interested in the sustainability of agriculture is a sign that the contemporary agrifood systems are indeed unsustainable (Buttel 2006). However, there is no consensus with respect to cause or solutions. Sustainability is neither an unproblematic nor uncontested goal; researchers from all disciplines need to maintain a healthy level of skepticism and interrogate the meanings and practices of agricultural sustainability no matter who is championing it (Hinrich 2014).

1.5 African Agriculture and the Green Revolution

In the context of sustainability concepts and realities, and with all the complex interlinking between ecosystems and social systems, how can Africa's natural resources best be managed to advance the development of the continent? How can Africa's governance regimes, institutional frameworks, and policies be strengthened to respond to the emerging and re-emerging challenges facing the continent and its people? Within mainstream development circles, many have called for African countries to embrace a "new Green Revolution" in order to promote food security (McMichael 2011). This updated GR is promoted by an international assemblage of actors that includes governments and non-governmental organisations, agribusiness firms, international aid agencies, foundations, and international and national agricultural research centres.

AGRA emerged at the turn of the millennium as a purportedly philanthropic initiative led primarily by the Rockefeller Foundation and the Bill and Melinda Gates Foundation. Its stated purpose is to stimulate production through the introduction of improved technologies and to foster the development of dynamic agricultural markets that will benefit smallholder farmers (DeVries and Toenniessen 2001; Rockefeller Foundation 2006). Key components of this initiative to modernise African agriculture include the promotion and adoption of genetically modified (GM) seeds, agrochemicals, and irrigation, and linking smallholder farmers more regularly and reliably to agricultural markets (Toenniessen, Adesina, and DeVries 2008). The work advocated and executed by AGRA and its allies is intended to address perceived flaws in African farming systems and, particularly, to promote increased yields and productivity in terms of output per acre and per man-hour of labour.

An important aspect of AGRA's activities in Sub-Saharan Africa is their conscious and intentional role in shaping the discourse of food security and sustainable agriculture (Rockefeller Foundation 2006; Toenniessen, Adesina, and DeVries 2008). Their public rationale for engaging with farmers in the sub-region is to improve food security and sustain agriculture in one of the most food insecure regions in the world (FAO 2015). It is assumed that "modern", commercial-industrial practices such as the use of farm machines, fertilisers, "improved seeds" and agrochemicals are the best means of increasing productivity and sustaining small-scale farmers. Advocates of the new 'Green Revolution for Africa' argue that the models of agricultural intensification based on greater use of industrial inputs will increase yields and increase the

ability of smallholders to benefit from national and international agricultural markets (World Bank 2008). It is argued that this will, at the same time, improve the economic, social, and environmental sustainability of farming systems. More traditional farming practices such as the use of hoe and cutlass are seen as unsustainable and, thus discouraged.

Despite these ambitious goals and claims, little is known about how AGRA defines and perceives sustainable agriculture, how they distinguish sustainable farmers and practices from those who are not deemed sustainable, and how they communicate and instantiate their notions of sustainability—with farmers or with other actors in the agrifood sector. Rather than engaging headlong in the sometimes acrimonious debates about the pros and cons of the GR approaches to agricultural sustainability, I have elected to study the ways in which its advocates define and promote their preferred version of sustainability, including the factors that shape the definition and the ways the definition has evolved in responses to changes in sustainability issues and debates around the world.

1.6 Structure of the Thesis

The thesis is organised into five chapters. Following this introductory chapter, chapter two presents a review of literature on sustainable agriculture and the theoretical framework that is drawn upon in the analysis. It also includes an overview of the activities of the Alliance for a Green Revolution in Africa and some of the critiques that have been levelled against it. Chapter three introduces the methodology that is adopted to carry out the analysis. Accordingly, the research design and the research strategy, sources of data for the study, and methods of data analysis are presented. Chapter four presents the data analysis, including the methodological steps of sociological discourse analysis. It also presents a discussion of the findings in light of the research questions, the theoretical framework, and relevant literatures. Finally, chapter five presents a summary of the findings and the contributions of the research, discusses limitations of this study, and offers some suggestions for future research. It also includes some theoretical reflections, and concluding observations and reflections.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter is divided into three sections. The first section presents a review of pertinent literature on sustainable agriculture and the contestation between food security and food sovereignty discourses with respect to sustainability. The second section presents the theoretical framework deployed to analyse the data collected from AGRA's annual reports from 2008-2018. The last section presents an overview of the first Green Revolution of the 1960s and the New Green Revolution spearheaded by the Alliance for a Green Revolution in Africa, together with some critiques of both.

2.2 Review of Sustainable Agriculture

This section provides a review of literature on the concept of sustainable agriculture and explores the dimensions of sustainable agriculture. The section also examines the divergent and competing ideologies within food security and food sovereignty discourses.

2.2.1 Sustainable Agriculture: A Contested Concept

In the context of a continuously growing demand for food, constraints on increasing agricultural productivity, whether agronomic, economic, social, or environmental, have become more and more important (Feher and Beke 2013). A lot of land is converted for agricultural purposes and agricultural land is overtaking forests, wetlands and grasslands. About 37% of the Earth's land surface other than Antarctica is dedicated to growing food: 12% is cropland and 25% is grazing land. Most current changes in land-use involve forests, wetlands and grasslands being converted into farms and pastures. For example, between 2000 and 2010, agriculture was responsible for about 80% of the deforestation that impacted tropical forests (Reytar et al. 2014).

The concept of sustainable agriculture evolved as a response to some of the negative impacts of conventional farming (Buttel 2006). Since the publication of the Brundtland Report in 1987, the idea of "sustainable agriculture" has gained prominence along with the broader concept of "sustainable development" (Velten et al. 2015). Sustainability in agricultural systems is widely discussed and is viewed in international fora as essential for any transition to global sustainable development (Binder et al. 2010; Scoones 2016). Despite a general consensus as to its relevance, there has been significant variation in terms of how sustainability in agriculture is defined and

how it is actually pursued via policies and programmes (Binder et al. 2010). Different authors and organisations around the world have advanced their own definitions of sustainable agriculture. This is partly because it has come to the fore as a derivative or offshoot of a range of “alternative” agricultures such as organic, regenerative, low-input, and ecological agriculture (Buttel 2006; Constance 2010; Scoones 2016; Dunlap et al. 1992; Caradonna 2010). It also reflects the fact that competing stakeholders tend to define sustainability in ways that serve their particular interests (Dunlap et al. 1992). Perhaps this is not altogether a problem. Some have argued that the concept is characterised by ‘constructive ambiguity’ (Robinson 2004). This means that it can more readily gather various societal actors behind the same broad objectives. Many interpretations can co-exist. Moreover, any attempt to achieve a precise, authoritative definition would trend to exclude those whose views and interests are not adequately captured or reflected in such a definition (Robinson 2004).

Some authors consider sustainable agriculture to be a set of management strategies designed to address key societal concerns over environmental degradation (Altieri 1989). Others focus on the ability of agricultural systems to maintain crop productivity over the long term (Ikerd 1993). Such proponents of the concept tend to see sustainable agriculture as a long-term goal and not as a defined set of agricultural practices (Ikerd et al. 1997). Ikerd (1993) argues that this long-term goal serves as a path toward achieving sustainability for the present and future benefit of farmers and society. Altieri (1989), a widely cited agroecologist, has defined sustainable agriculture as a system that aims to maintain production in the long run without degrading the resource base. It achieves this through diversifying production, using low-input technologies that improve soil fertility, maximizing nutrient recycling, and enhancing biological pest control. Furthermore, he has suggested that a sustainable farming system is one that maintains the resource base on which it depends, relies on minimum of synthetic industrial inputs, manages pests and diseases through internal regulating processes, and can recover from the human disturbance caused by agricultural practices including cultivation and harvest (Altieri 1995). Farmers can improve the biological stability and resilience of their farming systems by choosing suitable crops, rotating them, growing mixed stands (e.g. intercropping), and mulching and manuring the land (Altieri 1995).

Similarly, for Pretty (2008), sustainable agriculture is any system of food or fibre production that systematically seeks and promotes nutrient cycling, nitrogen fixation, and cultural or biological

management of pest/predator relationships; and, reduces the use of off-farm, external, and non-renewable inputs. In addition to promoting profitable and efficient production, it seeks long-term sustainability of production through emphasis on integrated farm management and the conservation of soil, water, energy and biological resources. Beyond these agronomic concerns, it facilitates self-reliance of farmers and other rural people, equitable access to productive resources and opportunities, and progress towards socially just forms of agriculture. Beus and Dunlap (1994) identified practices such as the systematic use of organic materials and maintenance of diversity as key features of sustainable agriculture. Hayati et al. (2010) suggest that, for sustainable agriculture, a major criterion is sustainable management of land and water resources. Thus, agricultural practices that erode or degrade soil, destroy the habitats of beneficial insects, and cut trees without replacing them are considered unsustainable.

Webster (1999) and Hayati et al. (2010) have argued that the concept of sustainability is a “social construct” and that it had yet to be made fully operational. Precise measurement of sustainability has been difficult because it is a dynamic concept and site-specific, and because what is defined as “sustainable” depends to some extent on the perspectives of the analysts (Webster 1999). A lack of consensus on the definition has led some researchers such as Hansen (1996) to question the usefulness of the concept of “agricultural sustainability” (Binder et al. 2010), and its malleability/fluidity has allowed various vested interests to twist or bend the concept to suit their own purposes (Constance 2009; Velten et al. 2015). It has been suggested that, instead of referring to a defined set of practices, the concept of sustainable agriculture can most usefully be thought of as a challenge to farmers to think holistically about the consequences of agricultural practices, as well as the functioning and interactions of agricultural systems (Horrigan, Lawrence, and Walker 2002).

2.2.2 Dimensions of Sustainable Agriculture

Sustainable agriculture is frequently defined in ways that include three main aims: environmental health, economic profitability, and social and economic equity (Horrigan, Lawrence, and Walker 2002:452). The economic component focuses first and foremost on the economic viability of the farm and the farmer (Ikerd et al. 1997; Norman et al. 1997). While not narrowly ‘productivist’ in orientation, it does not ignore the need for output, and it envisions producers operating within a framework of sound business planning and pursuing integrated and proactive approaches to

marketing. Sustainable agriculture must be profitable in order to allow farmers to continue farming. However, environmental and social sustainability must be achieved at the same time (Ikerd et al. 1997).

The environmental component refers to the promotion of environmental stewardship, including but not limited to the protecting and improving soil quality, reducing dependence on non-renewable resources, and minimizing adverse impacts on farmers' and farmworkers' safety, wildlife, and water quality (Scoones 2016). Environmental soundness requires producers to conserve and restore resources by creating and sustaining complex, diverse, and biologically balanced farming systems. Where animals are part of the farming system—given the ecological advantages of mixed farming, they often will be—animal welfare and wellbeing considerations are included as sustainability criteria. Animals should be allowed to engage in the natural behaviours that are important to their wellbeing. If harvested for their meat, they are to be handled in ways that minimise stress to the animals as well as to the environment.

In short, sustainable agriculture improves rather than degrades the environment and natural resources upon which agriculture and other essential human activities depend. Sustainable agriculture advances ecological sustainability by emphasizing the efficient use of on-farm resources, minimises the use of non-renewable resources (industrial inputs), and depends on the careful consideration and integration of biological cycles rather than using synthetic inputs (Norman et al. 1997; Ikerd 1993). Lockeretz (1988:174) sets out the following physical and biological parameters for sustainable agriculture:

diversity of crop species; selection of crops and livestock that are adapted to a particular environment; preference for farm-generated resources rather than purchased inputs; tightening of nutrient cycles to minimize nutrient losses; livestock housed and grazed at low densities; optimum storage of nutrients in the soil; maintenance of protective cover on the soil; crop rotations that include deep-rooted crops and help control of weeds; avoiding the use of soluble, inorganic fertilizers; and, enhancement of conditions for controlling or suppressing weeds, insect pests and diseases with synthetic insecticides and herbicides used, if at all, only as a last resort....”

The social aspect of sustainable agriculture points to the need for farmers and their employees to receive fair and reasonable compensation, and to work in a safe and respectful environment. Altieri (1989) suggests that the promotion of stable, prosperous farm families and communities, the preservation or enhancement of quality life for farmers and society as a whole through supplying human food and fiber needs are the primary social goals of sustainable agriculture.

Ikerd et al. (1997) explain that “quality life” also refers to increasing income and employment opportunities in agricultural communities—particularly self-employment opportunities. Sustainable agriculture must provide people with the opportunity to have a productive and successful life. Thus, in some formulations, sustainable agriculture is also about allowing people to have access to land and to farming as an occupation; in this perspective, it should support maintenance or even an increase in the number of small- and mid-size farm operations. For Norman et al. (1997:4) it also implies a reduction of the “frantic work schedules of many farm families.”

In order to put the concept of sustainability into practice, it must be understood holistically. The economic, environmental and social dimensions are relevant to sustainability in most agricultural systems, but they will vary with respect to different societies, different periods of development in a given locale, and even within communities—allowing for diversity in terms of ecological conditions, farming styles, and cultural preferences. Certain principles may be broadly valid for most communities and societies, for example the integration of crop and animal production. Sustainable agricultural development that is economically-viable, ecologically-sound, and socially-just cannot, however, be based on selective application of a few of the principles. Moreover, there is a need for more sensitive and nuanced approaches to evaluating what advances are required for small-holder food security, and for agricultural sustainability (IAASTD 2008), and what various approaches can offer with respect to achieving these goals.

Some authors argue that sustainable agriculture is time- and place-specific, and thus represents a dynamic concept (Norman et al. 1997; Horrigan, Lawrence, and Walker 2002). What constitutes sustainable farming systems will vary across regions, and between locations within regions. In other words, sustainable agriculture will necessarily involve adaption to local and enterprise contexts and conditions. Norman et al. (1997:9) further explain the necessary flexibility and dynamism of the concept by arguing that: “what may be sustainable today may not work as the system changes; [sustainable agriculture] requires close observation and skills that can adapt to change.” Sustainable agricultural technologies and practices must be continuously adapted to changed conditions and possibilities.

Because of its vagueness and widespread use, sustainable agriculture can be understood as a development “buzzword.” Cornwall (2007:472) suggests these are “terms that combine general

agreement on the notion that they represent with endless disagreement about what they might mean in practice. Buzzwords like sustainable agriculture gain popularity because of their “vague and euphemistic qualities, their capacity to embrace a multitude of possible meanings, and their normative resonance” (Cornwall 2007:472). Various definitions and applications of the concept can provide useful insights, but most commentators opt to limit their discussion almost exclusively to farming system properties at the enterprise and local economy levels. Political and economic issues, which often go beyond the local and even regional spheres, as well as concerns over power relations that shape and deform food systems, go largely unaddressed. Governance mechanisms actively shape what and how food is grown and distributed, and what ends up or does not end up in the mouths of consumers (Lang and Heasman 2015). There is a need for definitions of agricultural sustainability that substantively engage with policy, including its effects on the social, economic, and environmental dimensions of sustainability.

2.2.3 Food Security and Food Sovereignty Discourses

Discourses of sustainability are often contextualised by making reference to the prediction that by the year 2050 the world population will be nine billion people, who will need to be fed without much expanding the agricultural land base, and while also reducing negative environmental impacts such as greenhouse gas emissions, waterlogging, and chemical contamination (Levidow 2015). Broadly speaking, two competing visions of agriculture have emerged as proposed approaches for addressing this challenge: food security through sustainable intensification and food sovereignty through agro-ecology (Constance et al. 2014; Levidow 2015). These two paths are the outcome of historically competing visions and contested discourses regarding progress and preferred development models for agrifood systems (Thompson 2010; McMichael 2014; Holt-Giménez and Shattuck 2011; Constance et al. 2014).

2.2.3.1 Food Security Discourse of Sustainable Agriculture

According to the United Nations Food and Agriculture Organization, “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 1996:1). The food security path is most often linked to proposals for sustainable intensification, typically involving neo-productivist, high-tech solutions including corporate-controlled intellectual property, as the only hope for feeding the world with (Marsden 2013; McMichael 2014). Food

security proceeds from a land commodification perspective, which assumes that the problem of food supply can be resolved through a high-tech repackaging of the adoption and diffusion approaches of the neo-productivist paradigm. The dominant framing is that to prevent hunger, global food supply needs to increase to meet increasing food demand (Jarosz 2014; Lee 2013; Godfray et al. 2010). Its adherents argue that agricultural sustainability will be achieved through increasing production and by funding agricultural research into agricultural biotechnologies that will meet the growing demand for animal products and keep food prices low (Jarosz 2014). Hunger is implicitly linked to financial limitations of producers, and boosting productivity is seen as improving food security by increasing world food supply and by growing farmers' incomes.

This discourse is typically embedded in technocratic, neoliberal, development discourses (Holt-Giménez and Shattuck 2011; Lee 2013; Jarosz 2014). Historically, a version of this discourse was also part of the promotion of the first GR (Jarosz 2014). Today, in response to the environmental and social damage caused by the first GR (for an overview of this damage, see section 2.4 of this chapter), the productivist food security discourse often invokes a “new Green Revolution” that mitigates the social and environmental externalities of industrial agriculture and aims for market-led sustainability (Holt-Giménez and Shattuck 2011:115; Jarosz 2014). Most mainstream sustainable agriculture scholarship aligns with this productivist, neoliberal discourse (Bogdanski 2012; Neufeldt et al. 2013; FAO 2013). In practice, this discourse embraces increasing productivity through intensification—producing more food through advances in the adoption and utilisation of industrial inputs, and without increasing the total land area farmed (for examples see Branca, McCarthy, Lipper, and Jolejole 2011; Campbell et al. 2014; Harvey et al. 2014). This discourse is embedded in technological advancements, comparative advantage and free trade positions (Struik, Kuyper, Brussaard, and Leeuwis 2014; Petersen and Snapp 2015).

2.2.3.2 The Food Sovereignty Path to Sustainability

A food sovereignty discourse, in contrast, “conceptualizes hunger and poverty as emerging from the globalisation of food and agriculture” (Jarosz 2014:174) and was developed to counter the dominant food security narrative (Jarosz 2014; Lee 2013). According to the 2007 Declaration of Nyéléni, food sovereignty encompasses:

The right of peoples, communities, and countries to define their own agricultural, labour, fishing, food and land policies which are ecologically, socially, economically and culturally appropriate to their unique circumstances. It includes the true right to food and to produce food, which means that all people have the right to safe, nutritious and culturally appropriate food and to food-producing resources and the ability to sustain themselves and their societies. Food sovereignty means the primacy of people's and community's rights to food and food production, over trade concerns (La Vía Campesina 2007:9).

The food sovereignty movement posits a counter-frame to food security approaches. Espoused foremost by La Vía Campesina, this view challenges and questions the validity of the food security's framework based on free trade and corporate rights. Instead, La Vía Campesina seeks to build coalitions to create agrifood self-sufficiency through land reform, indigenous knowledge, and the regionalisation of agrifood systems based on agro-ecological principles (Desmarais, Qualman, Magnan, and Wiebe 2015; Fairbairn 2012; Rosset and Martinez-Torrez 2014). These ideas include the assumption that moderate- and smaller-scale agro-ecological farming, situated and adapted in a particular place, is more resilient to climate shocks than industrial agriculture as well as the idea that domestic agrifood production is a surer path to agrifood sustainability than reliance on global commodity chains (de Schutter 2011). The discourse focuses on honouring indigenous cultures and appropriate technologies that support a decentralised agrifood system aligned with concepts of ecological resilience, food sovereignty, fair trade and social justice (IAASTD 2008; Fernandez, Goodall, Olson, and Méndez 2013).

Agroecology calls for transforming the current food system to ensure that those who produce food have equitable access to, and control over, land, water, seeds, and fisheries as well as ensure agricultural biodiversity (Holt-Giménez and Shattuck 2011; Constance et al. 2014). Central tenets of the food sovereignty discourse include structural change in the food system to increase national sovereignty around food and agriculture, as opposed to adherence to rules imposed under international trade regimes (Jarosz 2014). It also involves a rejection of biotechnology and industrial agriculture "in favour of localised food production and the protection of rural livelihoods" (Lee 2013:217), as well as agro-ecological systems of sustainable agricultural production (Holt-Giménez and Shattuck 2011). In practice, food sovereignty scholars prescribe agrarian reform, democratizing food systems, abolishing unfair international trade regimes, and promoting small-scale agro-ecology. In contrast to the food security framework, food sovereignty views land through a multifunctional lens, employing a full-cost accounting

approach. It embraces a rights-based rather than market-centred framework where rights are defined in collective rather than individual terms (McMichael 2014). In the face of ongoing enclosures and regimes of accumulation based on dispossession, the food sovereignty approach proposes reoccupation and repossession of the land. Food sovereignty is thus strongly linked to broader questions of social justice and the rights of farmers and indigenous communities to control their futures and make their own decisions. The battle between La Vía Campesina and TNCs over seed sovereignty is a key example of the contest between these conflicting paradigms (Kloppenburg 2010).

At their core, these contrasting perspectives represent alternative conceptions of modernity (McMichael 2014). The food security discourse separates the social and physical sciences and casts traditional agriculturalists as primitive laggards whereas the food sovereignty framework values interdisciplinary approaches, honors indigenous knowledge, and foregrounds the pursuit of social justice—the latter being a critical fault line in agrifood studies (Rivera-Ferre 2012). While food sovereignty emphasises local control and self-sufficiency, food security tends to emphasise reliance on the global economy based on liberalised agricultural markets. Thus, while food security is more of a technical concept, and the right to food more of a legal one, food sovereignty is essentially a political concept (Windfuhr and Jonsén 2005).

Scholars emphasise that there are variations within these discourses, and blurred lines between them depending on the particular actors and scales (Jarosz 2014; Lee 2013). The two discourses may have “irreconcilable” policy implications at the national and international scale (Lee 2013:218), but practices at the local or farm scale may fall somewhere between (Jarosz 2014). Jarosz (2014) offers a case study of urban agriculture in Cameroon that blurs the line between the two discourses because it enables individuals or households to control their own food production, which has mitigated social unrest while leaving power relations intact.

The language one has at one’s disposal limits a person’s ability to articulate and know their world. Problem framing and concept definition are fundamentally political processes, and there are often winners and losers (Cheyns 2011). Who gets to dominate the discussion with respect to sustainability, how this is decided, and what forms of knowledge count, are all elements that can be influenced by the language and concepts deployed by different actors. The dominance or subordination of competing sustainability perspectives have an enormous influence on the ways

in which individuals and organisations understand what is happening in the world, identify the root causes of social problems, and champion particular courses of action. In sum, there is more than one way to understand the problem of sustainable agriculture, and different discourses affect how various actors prescribe solutions. Given that the definition of sustainable agriculture is contested and encompasses multiple dimensions, different organisations will selectively adopt different aspects and versions of sustainable agriculture. How they come to choose these different approaches and dimensions has not been fully explored. Although the agro-ecology and food sovereignty paths are fairly well recognised in recent literature (Claeys 2015; Constance et al. 2014; Jarosz 2014; Kloppenburg 2010; Lee 2013; Marsden 2013; McMichael 2014; Neufeldt et al. 2013), existing works neither systematically document the discourses behind these paths, nor document the political-economic contestations that may arise as each path advances its agenda as the solution to feeding the world in a sustainable manner. The present research illuminates the contested terrain of sustainability in African agriculture, especially with reference to approaches promoted by stakeholders leaning towards the food security via industrial agriculture model.

2.3 Theoretical Framework

In this section, I discuss the theoretical frameworks that are employed to help make sense of the research question. The thesis draws on theories and concepts from political ecology, environmental sociology, and the sociology of food and agriculture. The theories considered here include the theory of planned behavior, the theory of informational influence, the treadmill of production, and political ecology theory.

2.3.1 The Theory of Planned Behaviour

The Theory of Planned Behaviour (ToPB) is one of the most influential and widely cited social-psychological frameworks for the prediction of human behaviour/action and has been applied to an array of problems (Ajzen 2011). The theory suggests that the likelihood of an individual performing a particular behaviour is based on the individual's intention to perform that behaviour. By including perceived behavioral control, Ajzen proposed the theory as improvement to the predictive power of the theory of reasoned action. The theory states that, together, attitude towards a behaviour, subjective norms, and perceived behavioural control, shape an individual's behavioural intentions and the performance of that behaviours. In general,

the more favourable the attitude and the greater the perceived control, the stronger the intention and the likelihood to perform a given behaviour would be (Ajzen 1991).

Although widely applied to the analysis of farmer behaviour when purchasing farm inputs (Menozzi and Mora 2012; Menozzi, Fioravanzi, and Donati 2015), to predict entrepreneurial behaviour such as starting a business (Kautonen, Van Gelderen, and Tornikoski 2013), or to test the determinants of farmers' strategic behaviour (Bergevoet et al. 2004), critics argue that the ToPB works on the assumption that actors have complete knowledge and will make economically rational choices. Also, Charng, Piliavin, and Callero (1988) argue that such models of intentionality have worked relatively well for one-off types of behaviour such as voting; however, they are inadequate as a predictive tool for repeated behaviours or practices like farming. This is because farming requires the human capacity to carry out the behaviour for the long term and often goes beyond self-seeking, individualistic behavior to include broader—even societal—political and economic goals. Nigbur, Lyons, and Uzzell (2010) also maintain that a shortcoming of the theory of planned behavior is that it is based on a simplified individualistic view of human behaviour that does not explicitly incorporate the role of identities in complicating motives and actions. The theory frames behaviours as guided by narrow self-interest in pursuit of rewards and to avoid punishments.

2.3.2 Theory of Informational Influence

The theory of Informational Influence (Deutsch and Gerard 1955) argues that normative influence comes into play when individuals accept information from others as accurate and valid, particularly in cases of uncertainty (Kaplan and Miller 1987) or where a decision has a potentially large impact (Baron, Vandello and Brunzman 1996). In the absence of certainty or complete information, individuals are more likely to rely on information provided by others and to conform to the normative expectations of others. The relative importance of the tasks and decisions at hand is also crucial to understanding informational influence. Baron and colleagues (1996:915) conceptualise task importance as “the extent to which making correct or accurate judgments mediates important rewards and punishments.” In “high-stakes” situations where there is much to gain or lose, individuals are more susceptible to informational influence (Kaplan and Miller 1987).

In the USA, the theory has been successfully applied to studying farmer decisions to apply nitrogen fertiliser (Robertson and Vitousek 2009) and also the influence of information linked to seed corn contracts on farming practices (Schewe and Stuart 2016). However, critics argue that it tends to simplistically reduce decisions by farmers to a matter of information availability while neglecting broader institutional and social factors that influence the farming decisions.

2.3.3 Treadmill of Production Theory

Treadmill of Production Theory (Gould, Pellow, and Schnaiberg 2004; Schnaiberg 1980; Schnaiberg and Gould 2000) offers a Marxian structural perspective, highlighting how a competitive capitalist system leads to an unavoidable ramping-up and expansion of production along with associated social and environmental costs. Firms (in this case, farms) compete to increase production and lower costs, through technology adoption or labour exploitation, in order to capture a larger portion of the market and reduce unit cost. This relentless pursuit of growth is a defining feature of capitalist systems (Schnaiberg and Gould 2000).

With respect to agriculture, treadmill of technology theory (Cochrane 1958; Levins and Cochrane 1996) makes a similar argument highlighting structural pressures on farmers operating within capitalist systems to continuously increase production. Cochrane and colleagues (Cochrane 1958; Levins and Cochrane 1996) emphasise that increasing production, primarily through adoption of technology, is the primary way for farmers to increase income. However, investment in technology also increases debt burdens, and industry-wide production increases suppress commodity prices, placing farmers under further pressure to increase production (hence, the treadmill analogy). The treadmill of production and related treadmill of technology theory highlight the ways in which individual farmers are constrained by the larger capitalist political economy that creates structural demands for increasing production.

Along with agricultural economists, rural sociologists have analysed the treadmill of production, highlighting how the structure of political and economic systems promotes continuously increasing production (Buttel, Gillespie, and Larson 1990; Buttel 2001; Schewe and Stuart 2016; Wilson 2001). However, critics argue that the theory appears to be a theory of linear change and precludes the possibility for individual actors to change their actions. Some research has shown that farmers' choices with respect to farming practices may change in responses to changes to their individual situations; they are not just shaped by the dominant commercial logic of the

social and economic context in which they and their neighbours operate. However, the theory is useful to understanding the logic behind AGRA's sustainable agriculture agenda and the ways in which it is being promoted to farmers.

While research building on these theories has helped us to understand the pressures that help to shape farmer attitudes and practices with respect to sustainable agriculture, they have not been able to fully explore the ideological underpinnings that form the foundation for those behaviors and attitudes. They also neglect farmer sensitivity to the social relations and practices that constitute different societies (or local and regional cultures). The most important limitation of these studies is that they exaggerate the extent to which rational choice drives what farmers choose to do and underestimates the extent to which farming is embedded in the complex web of ever-changing political, economic, social, and ecological influences. Farmers' farming patterns take shape in relation to other people, as they respond to issues and activities that take place in family groups, at the local level, and in the larger community—including national and international contexts. Farming does not involve isolated, privatised choices but, rather, choices that are conditioned by the totality of influences emanating from the contexts in which they are made. For this reason, in addition to the theories elucidated above, political ecology theory is also deployed to study the research questions.

2.3.4 Political Ecology Theory

Political Ecology emerged in the 1970s and early 1980s in the context of radical critiques of cultural and systems ecology. Critics argued that to explain environmental degradation one has to situate resource management practices, including those of smallholders in the developing world, within the broader political economy (Watts 1983; Blaikie 1985). This fusion of political economic and cultural ecological perspectives became known as political ecology (Blaikie and Brookfield 1987; Bassett 1988). Political ecology in fact refers to a diversity of theoretical and methodological approaches to socioecological relations that is interested in questions related to the politics of natural resource management, access, and control, and environmental knowledge, and their interactive effects on livelihoods (Bassett, and Peimer 2015). Political ecology is concerned with how environmental, political, and economic processes are shaping human-environment relations (Robbins 2012). The theory argues that political, social, and economic differences account for uneven distribution of costs and benefits, and that changes in the

environment do not impact everybody in a homogenous way. It attempts to provide critiques and alternatives in relation to the interplay of environmental with political, economic, and social factors (Robbins 2012). It is a theoretical framework that opens up more politically incisive inquiry, not just with respect to the complex, dialectic relationship between society and nature, but also about the deep roots of power relations, neoliberal metabolic processes, uneven socio-ecological development, and patterns of winners and losers embedded in the (re)production of ecological issues (Taylor 2015).

The political ecological critique, initially influenced by Marxist agrarian studies, gave rise to a succession of conceptualisations of nature-society interactions. According to some scholars, three frameworks have guided political ecology analysis: environmental/social dialectic, environmental constructivist, and co-production of socationature (Robbins 2012; Castree 2014).

Political ecology approaches rooted in the environmental/social dialectic, argue that environmental degradation occurs as a result of combined political, economic, and ecological processes. Degraded soils, in turn, contribute to the process of impoverishment as a result of declining yields. While the classic mainstream approach to land degradation blames land users for being backward and irrational and points to overpopulation as the main causes of environmental degradation (Blaikie 1985), scholars drawing on the environmental/social dialectic perspective view smallholder behavior as quite rational under adverse political-economic conditions. Research in the environmental/social dialectic tradition combines existing scientific studies of land degradation with household surveys of farming systems and household budgets. The focus of analysis is on pressures that drive smallholders to overwork their land. Explanations typically emphasise processes that link resource users to broader political economies through “chains of explanation” and exploitation (Blaikie and Brookfield, 1987). These multi-scale analyses place emphasis on the social relations of production and exchange within households and communities, and the role of the state and other actors in perpetuating underdevelopment.

Another concern of political ecology, which draws on an environmental constructivist perspective, builds upon post-structural framings of environment-society relations. This approach argues that accounts of environmental change legitimise knowledge claims about socioecological relations that simultaneously legitimise power relations in society (Fairhead and

Leach, 1996). These accounts, Forsyth and Walker (2008) argue, simplify complex cause and effect relationships, serve to stabilise uncertain biophysical processes and assign blame. In this rendering, environmental narratives tend to reinforce authority and contribute to entrenching existing inequalities. Foucault (1980) and Hajer (1995) draw on discourse analysis to show how environmental knowledge and social order are co-produced. Forsyth and Walker (2008) further advanced the environmental constructivist approach in their work on the politics of environmental knowledge among the people of northern Thailand. They confront environmental crisis discourses and their framings by questioning the scientific validity of representations of environmental change with respect to upland deforestation, downstream flooding and water shortages.

Drawing on Hajer (1995), Forsyth and Walker (2008) show that scientific knowledge and the framing of environmental problems are tightly intertwined through the process of “problem closure” and demonstrate that this process of environmental framing usually excludes local knowledge of biophysical processes. They further reveal that dominant environmental narratives often depend on simplified characterisations of ecological systems that are far more complex and uncertain than assumed. States and aid donors are attracted to nature-society simplifications because they (the simplifications) provide for relatively easy responses (Turner 1993).

Unfortunately, such (mis)representations of environmental knowledge legitimate state and aid donor interventions on the grounds that only they (states and aid donors) have the authority and expertise to manage environment-society problems. In this manner, Forsyth and Walker (2008) argue, the state (and aid donors) (re)produce themselves in the process of policymaking, and implementation. Forsyth and Walker argue that researchers need interrogate how environmental narratives simplify and “stabilize complex and uncertain processes of environmental change; reflect, and reinforce different social orders by being based on particular valuations or experiences; notions of expertise; and particular sets of ideas about which social groups should carry the burden of blame and responsibility” (2008:18).

The goals of environmental constructivist approaches are not simply to deconstruct narratives and to propose counter narratives. The objectives are to advance scientific understanding of biophysical changes and to open up this analytical process to actors such as smallholders whose experience and understanding have historically been undervalued, especially under the aegis of

GR coalitions. To achieve these research goals, there is a need to understand and reconcile conflicting interpretations and for “reading accounts both ‘in’ and ‘out’ of their contexts” (Fairhead and Leach 1996:16).

The co-production of socionature is the third approach within the overarching political ecology theory. The foundation of this approach builds upon two multi-disciplinary research traditions: Science and Technology Studies (STS) and Actor-Network Theory (ANT). This approach has three interrelated assumptions: (1) scientific knowledge is a form of social and cultural practice (Pickering 1992); (2) the goals and conduct of scientists and political actors shape and are shaped by one another (Braun 2000; Jasanoff 2004); and, (3) nonhumans and biophysical processes actively participate in socioecological relationships (Latour 2005). An important similarity among the three frameworks of political ecology is the idea that scientific knowledge is a socially, economically, and politically mediated representation of the material world (Pickering 1992; Jasanoff 2004). That is, the same social, political, and economic forces that set the conditions for the environmental issues that researchers study also shape the conditions of production of the environmental knowledge that plays a crucial role in those studies (Lave 2012).

With these framings, political ecology theory explicitly seeks to break down ontological distinctions between science and society. From this perspective, scientific knowledge is not independent of society; rather, it is produced within specific socio-cultural contexts and at the same time influences societal goals. This not only emphasises the ways that scientific knowledge legitimates the political agendas of the powerful; it also interrogates scientific practices themselves or how scientific knowledge influences government policy (Robbins 2012; Davis 2007). An important implication of this insight is that: “the production, circulation and application of science are deeply interconnected, so too should our analyses be” (Lave 2012:366).

Political ecologists, specifically those who study natural resource management, draw attention to the ways that the biophysical properties of resources “resist,” “assist,” or “redirect” political economic prerogatives (Bakker and Bridge 2006). A recurring theme of these studies is the importance of “being open” to the influences that the material world can have on social action. In his classic text, *Lawn People: How Grasses, Weeds, and Chemicals Make Us Who We Are*, Robbins (2007) shows how, in the process of making lawns, humans and nonhumans interact in

ways that coproduce one another. The lawn people plant turf grass, which in turn subjects them to ceaseless mowing and chemical applications. Robbins conceptualises the lawn as a “sociotechnical system, which produces a political and economic turf grass subject—that sort of urban/suburban person whose identity is shaped by the high-input lawn, and whose life is disciplined by the material demands of the landscapes they inherit, create, and maintain” (Robbins 2007:xviii). This study reveals apprehension among suburban lawn owners who, as a result of pressures from their community, neighbors, lawn chemical companies, and turf grass itself, attend to the needs of their lawns and, turn themselves into “lawn people.” Similarly, in his study of urban forests, Perkins (2007) combines Marxist political economy with ANT to elucidate the social and non-social labour required to produce urban forests. The research highlights that in the capitalist labour process, “the ontological priority resides with social relations of production (including nature) that govern the interaction between humans and objects within a capitalist political economy” (2007:1153).

Power relations at multiple scales figure importantly in all three socioecological perspectives discussed above. In the environmental/social dialectic, land degradation is most often associated with the precarious status of smallholder farmers. Their (in)ability to negotiate higher prices for cash crops or to secure greater access to productive resources is linked in part to their limited political power. Differential power relations also explain the dominance of certain environmental narratives and the inability of counter narratives to gain traction. The co-production framework is more cautious about the location of power (Robbins 2012) indicating that given the importance of the dialectical relationships shaping socioecological relations, the issue of power remains a question rather than a deduction. In the environmental constructivist approach explanations of ecological change are rooted in the social relations of production of discourses and expertise (Robbins 2012).

As indicated in this brief review, issues surrounding the sustainability of agriculture are not straightforward given the array of institutions that influence the discourses and the practices that are considered sustainable or not in the agrifood system. Technical choices made at the farm level are inspired by national and international policies that may reflect concerns related to national security, climate change, food production, water access, trade, monetary exchange rates, interest rates, migration, labour mobility, and wildlife habitat conservation. In addition to this,

transboundary institutions with different levels of authority mediate how vulnerability is addressed and external assistance is channeled to smallholder farming communities (Adger 2000). For example, where NGOs influence the implementation of climate-smart agricultural practices, government may control the distribution of key livelihood assets while donors determine the amount of climate-related financing through their direct and indirect influence on aid programmes. By viewing the complex socio-ecological relations that surround debates on correct approaches to enhancing the sustainability of the food system, political ecology can help researchers to reframe the debate from a purely technical debate to one that also seeks to address how power at different levels influences the vulnerability of marginalised groups and the distribution of agricultural resources.

Applying political ecology theories to the sustainability of the African agrifood system opens up a deeper set of questions about the discursive nature of what counts as sustainable farming. Political ecology can help explain how inequality, power structures, and social injustice feature within the sustainable agriculture discourse by critically evaluating the ethical dimension of issues relevant to smallholder farming communities (e.g. climate justice, land tenure, and the distribution of access/use rights). As theory, political ecology provides an important lens through which we can understand the origins, root causes, and characteristics of marginalisation within smallholder communities.

Political ecology can help us to derive more nuanced understandings of the broader contexts that help to drive environmental issues, while also attending to 'local' power dynamics. This has been the case for studies of land-based projects (Fairhead, Leach, and Scoones 2012; Le Billon and Sommerville 2017; Li 2013; Bebbington and Bury 2014; Perreault 2013), especially for those involving internationally traded commodities, trans-scalar power networks, and local livelihood disruptions. Political ecology does not only question when and where environmental issues are taking place, but also at what scales debates unfold. By recognising the multi-scalar character of many environmental and resource-related debates, political ecology helps expose the structural dimensions at play and the hidden processes that contribute to more visible expressions of problems. Political ecology approaches also allow us to recognise an expanded set of relations and actors involved in the processes of defining and explaining environmental issues.

The focus on environmental processes in political ecology research helps to highlight the discursive dimensions of ecological processes and resource sectors, notably the ‘regimes of truth’ that sustain and seek to legitimate capitalist accumulation in the form of enclosures of the commons and other assertions of exclusive rights of access (Robbins 2012). Political ecology provides a framework for understanding the sustainable agriculture discourse of AGRA precisely because it encourages locally specific, detailed investigations while also interrogating power structures that may extend beyond the local. It deepens our understanding of contemporary problems and offers opportunities to theorise possibilities for changes that reconstruct and enhance the discursive and material interpretation of environmental issues.

While sustainable agriculture debates leave room for a diversity of discourses, its implementation at local levels are influenced by structural and political debates at higher levels. In this context, politics does not simply refer to a set of policies and institutions, but rather to a competition in which there are winners and losers (Symons 2014). Understanding sustainable agriculture from the perspective of political ecology enables us to study how key development terms (here, ‘sustainable agriculture’) serve as discursive tools that mask ideological and programmatic differences.

Vague and fuzzy terms such as sustainable agriculture warrant further interrogation. It is important to investigate the discourses that the concept propels and invokes, and to note the beneficiaries and losers that may emerge in specific contexts. The literature reviewed above agrees on one thing: different organisations define sustainable agriculture differently. However, little is known about how they come to define sustainable agriculture, or about the ways in which those conceptualisations have evolved and have been promoted to farmers and other stakeholders in the agrifood system. This study aims to partially address this gap through a case study of the Alliance for a Green Revolution in Africa of which the next section provides a brief history of its history and its programming in Africa. This historical overview provides the background information needed to critically examine the social relations of production and illuminate how the concept of sustainable agriculture is produced and reproduced by AGRA with particular attention on how AGRA’s activities intertwine with other political and economic processes to limit or promote different types of farming.

2.4 Overview and Critique of the Green Revolution and the Alliance for a Green Revolution in Africa

In this thesis, the term Green Revolution refers to the particular historical events, social and political conditions, and technical changes that led to the development and large-scale adoption of high-yielding maize, rice, and wheat varieties—mainly in Mexico, India, and the Philippines (Conway 1997; Perkins 1997). The origins of the original GR lay in a particular combination of business interests (that is, agrichemical companies), philanthropic organisations, science, and politics that originated primarily in the United States (Kloppenborg 2004; Perkins 1997). It consisted of a set of research technology transfer initiatives occurring between 1950 and the late 1960s. These initiatives resulted in the adoption of new technologies, including high-yielding varieties (HYVs) of cereals (especially dwarf wheat and rice) in association with chemical fertilisers and agro-chemicals. Frequently, the use of new cultivars and more agrichemicals was complemented by steps to control water supply (usually via irrigation) and by new methods of cultivation, often involving more mechanisation. All of these together were seen as a ‘package of practices’ to supersede ‘traditional’ technology and to be adopted as a whole (Toenniessen, Adesina, and DeVries 2008). The Ford Foundation and the Rockefeller Foundation were heavily involved. One key leader was the plant breeder Norman Borlaug, the “Father of the Green Revolution”, who received the Nobel Peace Prize in 1970. He is credited by some with saving over a billion people from starvation (Conway 1999). The basic approach was the development of high-yielding varieties of cereal grains, expansion of irrigation infrastructure, modernisation of management techniques, and expediting the distribution and adoption of hybridized seeds, synthetic fertilisers, and pesticides.

In terms of institutional and organisational developments, the GR involved building a network of research organizations—the Consultative Group on International Agricultural Research (CGIAR)—that was funded by governments and philanthropic institutions, and conducting research in collaboration with national governments. The CGIAR was the scientific and technical backbone of the GR in Asia (Bouis, Graham, and Welch 2000). Political and economic interests had significant influence with respect to plant breeding priorities and the kinds of high-input farming systems that were promoted (Kloppenborg 2004; Perkins 1997). Governments and development planners typically encouraged farmers to use a ‘package’ of inputs, including high-

yielding commercial seeds, fertilisers, and pesticides, that were especially productive when used under irrigated or high rainfall conditions (Conway 1997; Gupta 1998).

The Alliance for a Green Revolution for Africa (AGRA) is a leading organisation now promoting similar approaches in Africa. Calls for a GR in Africa by the Gates Foundation and others have included promises to eliminate hunger and malnutrition by investing in the development and promotion of biotechnologies (especially genetically modified seeds), synthetic fertilisers, crop- and livestock-protection products (pesticides and veterinary pharmaceuticals), and irrigation. These initiatives are based on the argument that the first GR, which largely bypassed Africa, led to an increase in food production in areas where those technologies were heavily adopted. The Alliance for a Green Revolution in Africa (AGRA), funded mainly by the Bill and Melinda Gates Foundation, has pledged to contribute US\$3.2 billion to address hunger in Africa. Similar to the original GR, much of this funding is directed at plant breeding, typically through genetic engineering, and other intensive technological solutions. Another area of focus is the support of private agro-input dealers throughout Africa, to promote greater use of commercial fertilisers and other agroindustrial inputs.

Proponents of the first GR argue that the development of high yielding varieties of the world's major food staples has led to an increase in food production, and a subsequent decrease in food prices, which has had a positive effect on food security (Conway 1997). Certainly, there is ample evidence that agricultural yields increased for certain staple cereal crops (especially maize, wheat, and rice) in many parts of the world following the initiation of the GR. Although access to financing and subsidies of various kinds were also important, much of this increase has been credited to new varietal types, increased fertiliser use, and irrigation (Conway 1997). However, issues such as the increasing reliance on external (energy-intensive) inputs, environmental pollution and health consequences, loss of seed biodiversity, loss of farming knowledge, perpetuation of inequalities, rising land concentration, increasing food insecurity and malnutrition, and increasing gender inequality have been identified as consequences of the first GR and of more recent initiatives by AGRA and its partners in Africa (Bezner Kerr 2012; Patel, Bezner Kerr, Shumba, and Dakishoni 2015; Patel 2013; Weis 2007; Van Weezel 2016).

2.4.1 Hunger and Malnutrition

A good number of studies have examined the effect of commercialisation of agricultural systems (using GR technologies) on income and on nutrition status (Patel, Bezner Kerr, Shumba, and Dakishoni 2015; Bezner Kerr 2012; von Braun, Johm and Puetz 1994). In many cases the new agricultural technologies were found to have increased incomes and, to a smaller extent, caloric consumption for some members of target communities or regions. However, to what degree increased grain production has led to improvements in food consumption, particularly for the poor, is a subject of intense debate. Proponents point to average per capita increases in food consumption globally and regionally (except in sub-Saharan Africa and South Asia) (Collier and Dercon 2009; Conway 1997). Critics, however, argue that food consumption figures are inflated by excessive consumption in the North, including feed for livestock production (which is also linked to human health problems such as obesity). Moreover, although total food production per capita has risen, the number of hungry people has not been substantially reduced in many regions of the world, particularly in South Asia and sub-Saharan Africa (Kataki 2002; Patel 2013; Weis 2007).

Drawing from the original GR, a major assumption of AGRA (and its allies) is that market integration and economies of scale will increase profitability and farm household wellbeing (AGRA 2017). However, this also implies that local agrarian systems will shift from a focus on auto-subsistence¹ to being more focused on commodity markets. Crops grown for local consumption are to be replaced by market-oriented production of commodities destined for regional and international markets (Patel 2013).

While there were initial improvements in nutrition linked to increased yields for those deploying original GR technologies in Asia and Latin America, the increased yields did not prove to be applicable in all locales (Bezner Kerr 2012). Although, the GR technologies led to increased yields under some conditions, benefits in terms of consumption and nutrition were limited due to the requirement for additional non-food expenditures by farming households (for commercial seeds, fertilisers, pesticides, machinery, and fuel for machines). This indicates that the green revolution certainly did not ameliorate the problems of entitlement and access to food and productive assets (McMichael 2014). Van Weezel (2016) reported that the total number of

¹ Self-provisioning, non-monetarised exchange in local kin and mutual aid networks, and local trading.

undernourished people continued to increase with an estimated 217.8 million in 2014–2016 compared to 175.7 million in 1990–1992. Globally, over 850 million people suffer from chronic hunger, two billion people suffer from malnutrition, and about six million of the 10 million deaths of children under five in developing countries relates to micro-nutrient deficiency (Bezner Kerr 2012). Around two-thirds of the undernourished people live in Asia, the continent where the first Green Revolution claims its greatest successes in terms of increased yields.

2.4.2 Gender Disparities

During the Green Revolution, social dislocation of women happened in many places as the new technologies were mostly targeted to and used by relatively privileged men (Bezner Kerr 2012). Moreover, in some places, the outmigration of men (due to displacement of farm labourers by machines, among other reasons) resulted in a significant additional burden on the remaining women (Nyantakyi-Frimpong and Bezner Kerr 2015). By systematically excluding gender from discussions of the GR, women were rendered ‘invisible farmers’ (Satyavathi, Ch Bharadwaj, and Brahmanand 2010). In the past, women have also been more aware of the environmental and health impacts, and thus have sometimes been more active in attempts to protect the environment (Agarwal 1992). After GR technologies were implemented, Sobha (2007) details the extent to which, as a result of the Green Revolution in India, women have borne a disproportionate burden related to the associated changes. Deforestation means longer trips to gather firewood, or using fuels that burn less cleanly, resulting in higher rates of respiratory disease. Agricultural runoff matters to women, who are often the ones primarily responsible for fetching water and for feeding their families, activities that can lead to chemical exposure by multiple pathways (Bezner Kerr 2012).

Women’s agricultural knowledge has also been discounted and devalued (Stone and Glover 2017) in the context of agricultural technology promotion. The International Assessment on Knowledge, Science, and Technology for Development points to the importance of such knowledge in the creation of sustainable food systems (IAASTD 2008). Purely instrumental evaluation of the loss suggests that it maybe be harder to develop and maintain a sustainable food system without this knowledge. Moreover, knowledge about and control over seed have traditionally given women some power in African farming systems. This is undermined by a switch to purchased, commercial seed. Their knowledge and skills tend to appear unnecessary or

worthless as reliance on purchased inputs increases. Land grabbing by local and outside actors further widens the gap between men and women who already have differential access to agricultural resources including land, labour, and capital (McMichael 2014).

2.4.3 Labour Displacement

One of the major predicted results of the GR was a fall in prices of staple foods due to an increase in production (Conway 1997). Patel (2013) argues that any financial benefits have been largely captured by employers, who have depressed real wages as food prices have been reduced. In addition, he suggests that the expected increase in employment opportunities due to an increase in yields has been offset mainly by labour-displacing technologies, such as herbicides and agricultural machinery. Under the impetus of GR technologies and production models, herbicide use, and mechanisation generally has increased in the Global South (Conway 1997). Although mechanisation does not have to be an automatic corollary to the adoption of higher-yielding commercial cultivars, because of the strong linkages between tractorisation, access to credit, scaling up of farm sizes, and the political strength of larger landholders, it often is in practice (Yapa 2002). The application of Green Revolution technologies does not necessarily enhance labour demand despite higher volumes of grain produced. On the contrary, higher yields and larger-scale production often promote mechanisation, which tends to reduce the need for a rural labour force (Bezner Kerr 2012). Also, wages have remained low, hovering at or below early 1990s levels in most Latin American and Asian countries (UNCTAD 2008).

2.4.4 Reduction of Crop and Genetic Diversity

Another critique of the GR is that, although the prices of certain staple crops have come down in some locales, the prices of other food crops, pulses for example, have risen as these crops have become scarcer (Bezner Kerr 2012). While the GR has increased grain production, a reduction in area devoted to pulses and vegetables often means reduced dietary diversity and micronutrient intake, both of which are key aspects of healthy diets and improved nutrition (Patel 2013). One consequence has been poorer nutrition resulting from the reduced consumption of high-vitamin foods, leading to stunted mental and physical development in many parts of the Global South (Bezner Kerr 2013). In South Asia, production of pulses declined by approximately 20 percent in the last three decades of the Twentieth Century, leading some to suggest that the decline may be a major cause of an increase in iron deficiency in the region during the same period (Kataki

2002). Although rice prices declined, the real prices of pulses, vegetables, and animal products increased (Bouis et al. 2000). A study in India by Katakai, (2002) found that rice and wheat growing areas had seen declines in legume production and that, while severe child malnutrition had declined throughout India, levels of mild to moderate malnutrition had increased due to micronutrient deficiencies.

A related issue is that associated specialisation and mono-cropping (at the field, farm, and regional level), reduces farmer ability to spread risk over a variety of plots and crops (Ansoms 2010). This is particularly the case for poorer farmers with limited landholdings, who might otherwise opt for mixed stands and intercropping as a risk-management strategy. This problem is most pronounced in areas where there is a long dry season followed by intense and unpredictable rains (Ignatova 2017). The GR has had some perverse consequences such as undermining human nutrition through displacement of nutritionally rich food crops with standardised commodity crops. There are implications for food knowledge and skills as well. As a result of regional specialisation and export-oriented production, once-rich culinary traditions have withered and left many people not knowing what to do with formerly common vegetables and fruits even when they can find them in markets (Bezner Kerr 2012).

2.4.5 Land Grabbing and Perpetuation of Inequality

While it pushes to dismantle some forms of state support for agricultural development promotes the fuller commodification of inputs and outputs, AGRA's model has largely failed to improve the livelihoods of African smallholders. There is a fairly broad consensus that the implementation of Green Revolution policies has tended to leave certain categories of farmers behind because some farmers are able to adopt its modalities more readily, completely, and successfully than others (Patel 2013; Thompson 2014; McMichael 2014). Achieving increased output, it turns out, was considered to be most reliably assured through the consolidation of land holdings (McMichael 2014). This has led to a reconfiguration in land ownership and use, favoring larger landowners by pushing smallholders to lease out or sell their plots. The increase in production provided advantages to medium-sized and larger farmers who are capable of profitably adopting capital-intensive technologies and techniques, but it curtailed choices and opportunities for the poorest producers (Patel 2013). This is today evidenced by the prevalence of food insecurity in many rural communities in Africa and by the inability of the poorest

farmers to successfully access and use commercial inputs. These communities are caught up in ongoing and rapid transformations, and their residents have been differentially affected by fuller integration into volatile regional and global markets. Rising food prices have created opportunities for some and liabilities for others (Jaffe and Kaler 2016). Moreover, a focus on commodity production for commercial markets is a risky undertaking for poorer farmers, as they lack access to the technical inputs needed for expanded production. Small volumes block them from realizing any market-economies of size when purchasing inputs or selling their crops. Accessing local markets is time-consuming and prices are likely to be unfavourable when dealing with local traders or other buyers.

2.4.6 Increasing Dependence on External Inputs

Although GR advocates argue that it increases the productive potential of farmers and can contribute to poverty reduction, concerns have been raised about problems associated with high input use. For the enhancement of the productivity and efficiency of smallholder/peasant enterprises, GR promoters have generally called for expanded use of petrochemicals. Higher yielding varieties and specialised GMO seeds are expensive, and generally assume/presume the use of petrochemical-based fertilisers, herbicides, and insecticides, which are part of the GR technological package; farmers are thereby pressured to engage in more capital-intensive, agro-industrial production (Moseley, Schnurr and Bezner Kerr 2015). GR cultivars can achieve expected yields only if all prescribed inputs are purchased and applied in correct quantities and at prescribed times—and with the vital addition of adequate, timely watering (Thompson 2012). In this situation, the farmer becomes a retail consumer like other retail consumers who find that they must buy several items that come packaged together.

Where chemical companies could not convince all farmers that high-priced fertilisers and pesticides were worth the associated health, environmental, agronomic, and economic risks, they moved to merge and consolidate, taking control over the seed sector as a way to control and link agrichemicals and seeds (Schnurr 2015). Thus, these technologies are packaged together so farmers are unable to freely choose which inputs to use. Apart from the difficulty in accessing these inputs, critics call into question the validity of claims linking expanded input use, increased agricultural output, and improved living conditions for smallholder farmers. The use of such inputs tends to be expensive, which reduces access for resource-poor farmers (Vanhaute 2011).

State subsidies might mitigate this problem, but such subsidy schemes tend to be temporary and may also tend to marginalise certain groups.

2.4.7 Environmental and Health Consequences

Another criticism focuses on the environmental and health issues associated with the use of GR technologies, both in terms of the conservation of natural ecosystems and biodiversity, and with respect to the long-term productive potential of such farming systems. Especially in combination with irrigation, heavier use of fertilisers, has led to excessive nutrient loading in surface and subsurface waters, and other negative environmental impacts. A host of environmental consequences of GR technologies have been widely documented, all of which have direct implications for agricultural sustainability. There is strong evidence that the widespread adoption of near-monoculture cropping systems raises the stress on water and soil resources (Patel 2013) and helps to set in motion or speed up the “technological treadmill” (Gould, Pellow, and Schnaiberg 2004). According to Weis (2010), environmental externalities not only represent the ‘hidden costs’ of capitalist industrial farming, but they also undermine the ‘operative logic’ of these farming models as they “mask the deterioration of the very biophysical foundations of agriculture” (316). As a result, fertiliser use becomes indispensable given that without it, nutrient losses in the soil (and changes in soil biology) would make it impossible to achieve the expected yields (Nyantakyi-Frimpong and Bezner Kerr 2015). Furthermore, the intensive use of chemical fertilisers aggravates soil and water salinisation, the loss of biodiversity, including beneficial insects that provide crucial “ecosystem services”—a process that also risks affecting neighbouring ‘traditionally’ farmed plots (Weis 2010). In addition, a focus on yield and ‘modern farming’ in many cases has encouraged farmers to abandon other cropping practices such as intercropping, crop rotation, and manuring that help to maintain good soil structure, increase organic matter, and control pests.

Many of the crop varieties developed during the GR were bred to be more efficient in nutrient uptake and to convert more nutrients to grain, as opposed to stalks or leaves. As a result, nutrient depletion of the soil has increased. Shiva pointed to the thirst of GR crops, some three times higher than conventional systems, leading to water tables dropping by one to three metres per year (Shiva 1991). Also, Otero and Pechlaner (2008) found that while global fertiliser consumption increased by 4.1% per year between 1961 and 1998, close to a quarter (24%) of all

irrigated lands suffered from salinisation by 1992. Fertilisers had also entered streams leading to eutrophication and resulting in the death of aquatic plants and animals (Pimentel and Pimentel 1990).

One critical environmental effect of the industrial model of agriculture that resulted from the GR is the increased use of fossil fuels, as well petroleum as a feedstock for nitrogen fertilisers and other agrichemicals. The application of commercial nitrogen fertilisers such as anhydrous ammonia and ammonium nitrate also result in the volatilisation of nitrous oxide, a potent greenhouse gas (Weis 2007). Tractors, farm implements, and irrigation equipment all require gasoline or diesel fuel, and likewise require a great deal of petroleum in their manufacture and transport. Water is another element affected by the GR approach to agriculture. Increased irrigation in the Punjab area, for example, led to land and water degradation, making agriculture less productive over time (Murgai, Ali and Byerlee 2001). Hence, Agarwal (1997) maintained that there has been a considerable degradation of the environment, particularly as experienced by the poor, while Weis (2007) noted that the environmental consequences for this model of agriculture are very significant on a global scale.

Also, not only is our food supply becoming more vulnerable to resistant pests and to pathogens that build up under regimes of monoculture, it is also being contaminated with these chemicals (Patel 2013). Exposure to these pesticides is not healthy, but the actual risks for those who manufacture, transport, or apply the products, consume the crops, or simply live downwind or downstream, are not fully or systematically assessed (Bezner Kerr 2012). Farmers exposed to pesticides have suffered from hypothyroidism, while leukaemia in children and Parkinson's disease have also been linked to pesticide exposure (Sobha 2007). Furthermore, there is evidence that pregnant women can pass on certain agrichemical toxins to their children in utero, resulting in lower birth weights and smaller head sizes (Behrman, Meinzen-Dick, and Quisumbing 2012).

2.4.8 Loss of Seed Diversity

Another important issue that emerged from the literature review is the loss of biodiversity due to the GR's emphasis on mono-cropping. Thompson (2014) sees the development and distribution of hybrid seeds in Africa by entities such as AGRA as theft of African genetic biodiversity, without benefit-sharing nor recognition to those who developed the landrace cultivars over centuries that are now being used to breed proprietary commercial varieties.

In the guise of poverty alleviation and improving food security in Africa, agribusiness giants such as Monsanto and Cargill have introduced GMO crops and infiltrated the African farming system with their agrichemicals and patented seeds (Glover 2010). Farmers are at risk of becoming dependent on agribusiness firms when they purchase hybrid seeds and other agricultural inputs (Thompson 2014). The decreasing availability of traditional seeds and growing dependence on hybrid seeds or GMOs contribute to further losses of biodiversity and undermines sovereignty for farmers (Scoones, Ian and Thompson 2011). Therefore, AGRA is accused by some critics of pursuing a “neocolonial plan” (Thompson 2014). Farmers also become more dependent on credit to purchase the hybrid seeds and take on the risks associated with borrowing operating capital. Many of the critics of the GR have pointed to broader trends of increased concentration of power in a few large agribusiness firms (Weis 2007). The industrial model promoted as part of the GR has been linked to the consolidation and concentration of farms, and of seed, farm machinery, agro-chemical, and food processing and marketing corporations around the world (Patel 2012).

2.4.9 Deskillling - Loss of Farming Knowledge

Connected to issue of loss of biodiversity is the loss of agri-cultural diversity because GR approaches are often treated as the only relevant body of agricultural knowledge at the expense of traditional and alternative knowledge and practices (Thompson 2012; McMichael 2014). AGRA follows an overall top-down approach as research programmes and technology development are carried out without the participation of smallholder farmers, and without paying attention to their knowledge and skills (Thompson 2014). Smallholder farmers have been asked to participate in the development of the second GR, but it seems as if they are asked to do so in ways that conform to an agenda that has already been written (Patel 2013). Their voices matter, but only when they say what they ought. This top-down approach privileging expert, specialist, and formal scientific knowledge, has led to what amounts to a forced introduction of certain industrial technologies and techniques, thus consolidating the power of states and corporations while annihilating pre-existing forms of ecological stewardship and agricultural production (Thompson 2012).

From its original proponents to its contemporary champions, the Green Revolution discourse has been framed in the language of modernisation and development, and has been antithetical to

‘tradition,’ a term associated with devalued local knowledge and practices. Dawson, Martin, and Sikor (2016) highlight how the GR debates represent a battleground between the bureaucratic, standardised knowledge produced and administrated by scientific and industrial organisations on one hand, and the ‘tacit knowledge’ (in the sense of the more informal, less codified and recognised), context-specific, experience-engendered corpus of knowledge accumulated by farmers. The Green Revolution pushes farmers to ‘trade local knowledge for increased output’ (Scoones and Thompson 2011). Farmers surrender control over knowledge generation and decision making to the purveyors of agricultural technologies. In fact, the exclusive attention of policy makers and public and private organisations on ‘scientific’ agricultural practices, results in the neglect of relevant indigenous or alternative knowledge (Dawson, Martin and Sikor 2016). Despite being regarded as backward and static, local knowledge can be rich in context-relevant information and wisdom on how to deal cost-effectively and sustainably with cyclical adverse agro-ecological conditions (Patel 2013).

Despite such (mostly unacknowledged) limitations, however, the Green Revolution is widely viewed by members of the development establishment, and by agricultural scientists, as a success. According to Patel (2013), the Green Revolution, as a story about technological triumph over hunger, to a large extent, forgets the support of the state, ignores the creation of newly landless and therefore poorer people, and avoids detailed inquiry as to whether increased yields led to reduced hunger. Social inequalities persisted and were often exacerbated by the GR. The long-term environmental impacts, including water pollution, groundwater depletion, and carbon emissions from fertiliser production, are costs that will be widely shared even as the profits are captured and privatised (Patel 2013).

Overall, these criticisms call into question the production-enhancing and poverty-reduction potential of Green Revolution technologies. However, a critical component still lacking from these critiques is the political nature of the discourses surrounding sustainable agriculture and the related control over discursive knowledge that can influence priorities and outcomes. The question that this study seeks to address is how does AGRA maintain a degree of hegemonic control over research and development agendas despite the mixed and contradictory outcomes of its activities and those of its antecedents?

2.5 Chapter Summary

This chapter presented a review of the contested concept of ‘sustainable agriculture,’ theoretical frameworks relevant to the present inquiry, and an overview of the Green Revolution and critiques that have been levelled at its inflated claims of success. The review focused on sustainable agriculture indicates that it encompasses several dimensions, and that different organisations have focused to a greater or lesser degree on several of these dimensions. The theoretical framework deployed in this thesis combines theories and concepts from the sociology of food and agriculture, environmental sociology, sociology of knowledge, and political economy. The review of literature on AGRA and on the original (first) GR indicates that although it led to increases in crop yields in some locales and for some farmers, it had also led to increased inequalities (including gender inequalities), sometimes to increased hunger, to labour displacement, land grabbing, increased dependence on agrichemicals, and to displacement of ‘tacit’ agricultural knowledge. Despite such critiques, AGRA’s influence and activities in African agriculture have increased. This thesis integrates social dimensions and social theory to foster new thinking about how contemporary proponents of the GR in Africa define and promote sustainable agriculture to agrifood system stakeholders. In the next chapter, I discuss the methodology that is adopted to carry out this study.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter presents the methodology adopted for this research; explains the choice and accessing of data that were used, and how data were analysed through discourse analysis. Various versions of discourse analysis are presented, and their utility for the study of agricultural sustainability discussed. Sociological discourse analysis is the analytical approach primarily adopted for this study. The chapter concludes with discussion and reflections on research ethics and study limitations.

3.2 Research Design: Case Study

While several studies have found that the GR activities have had mixed (and sometimes deleterious) consequences for the livelihoods of farmers (as detailed in Chapter two), little is known as to how AGRA advances and maintains its hegemonic position in terms of African agricultural development. Therefore, a study of how it defines sustainable agriculture and how it promotes its vision of sustainability to farmers and other stakeholders is overdue and relevant. I adopted a discourse analytic technique and used the annual reports of the organisation as the main source of data. A case study approach was chosen because it allows the study to conduct an in-depth analysis of the important case at hand, and then to contextualise the case within a wider discussion of African farming and the history of agricultural development initiatives. Denzin and Lincoln (2018) argue that when research questions require an intensive and in-depth analysis of a social phenomenon, a case study design is relevant because it allows investigators to retain the holistic and meaningful characteristics of real-life events. Similarly, for Yin (2013), a case study is an appropriate and preferred strategy when “how” or “why” questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon. With a case study approach, the researcher can capture nuances, patterns, and more latent elements that other approaches might miss (Denzin and Lincoln 2018). Moreover, since the study draws from political ecology as the main theoretical approach, a case study seems appropriate. Political ecologists tend to favor case studies because they make it possible to draw links between global environmental issues and the lives of groups of people in the developing world and elsewhere (Robbins 2012).

This thesis holds that social actors actively produce knowledge about sustainable agriculture and argues that powerful actors (e.g. international consortia and networks) produce social phenomena (e.g. competing visions or regimes of sustainability) through elaboration and advancement of dominant discourses. Research along these lines problematizes the discursive and institutional structures that limit the way people think and act. It illuminates the social forces at work to either enhance or limit an individual's ability to act. It is centrally concerned with language, social structure, change and equity.

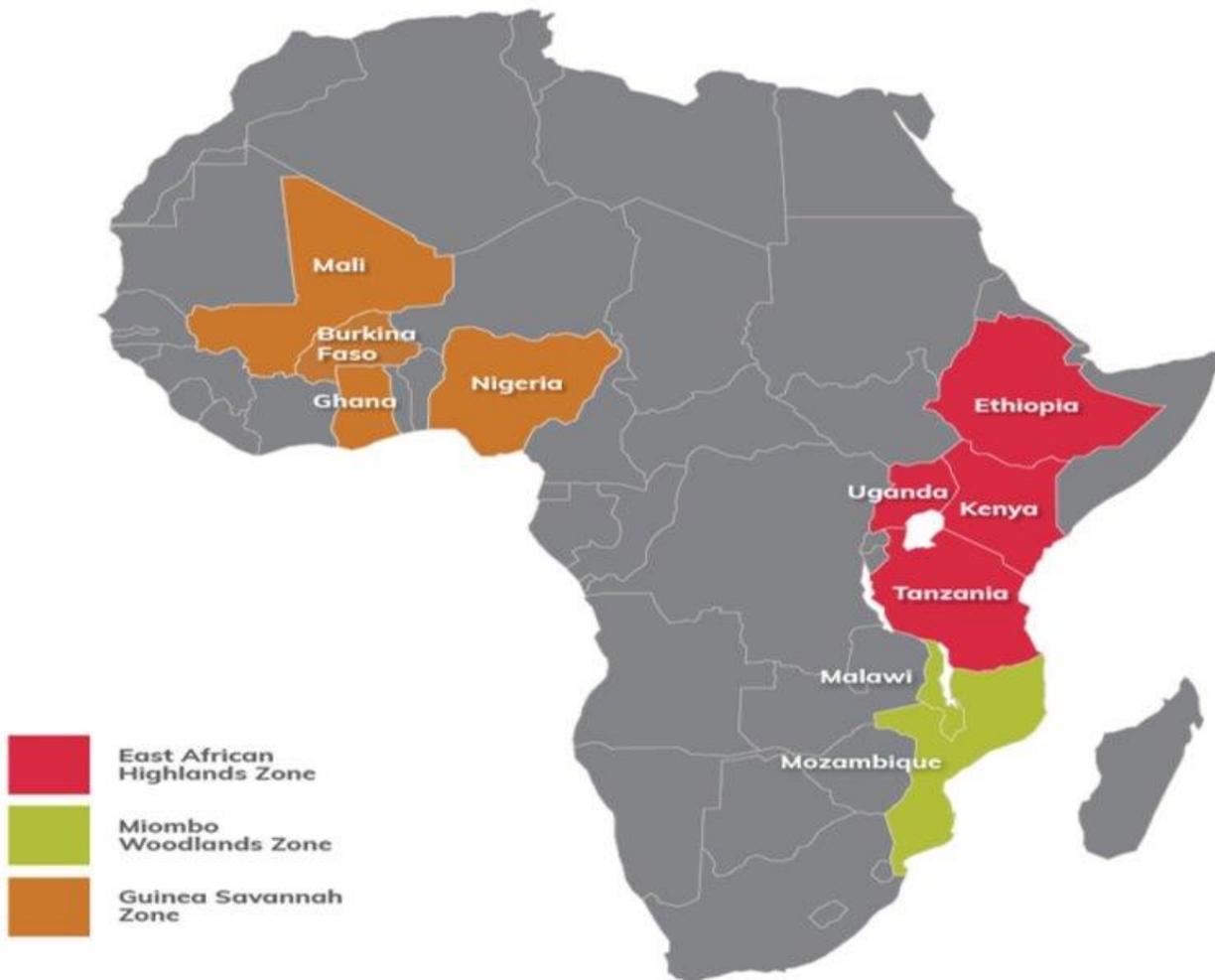
3.3 AGRA as an Appropriate Case

The choice of AGRA as a case for this study was based on the significant influence that it has exerted on the African agrifood system. AGRA operates in partnership with governments, agricultural research institutions, the private sector, non-governmental organisations, and farmers' organisations. It was established in 2006 by the Bill and Melinda Gates Foundation and the Rockefeller Foundation with the aim to facilitate "a uniquely African Green Revolution, one that fundamentally improves the productivity, sustainability and profitability of Africa's smallholder farmers" (AGRA 2008:ix).

AGRA takes a broad and multi-pronged approach to African agriculture, working with farmers, extension agents, researchers, and governments. The organisation funds graduate student research to develop new crop varieties; supports seed and agro-chemical dealers; trains farmers and extension agents in "Integrated Soil Fertility Management;" promotes and supports the adoption of new technologies and techniques; and helps to develop new options for post-harvest production and marketing (AGRA 2015). Its strategy is based on a "market-led technology model," to "improve" African agriculture in three ways. First, to help farmers increase the yield potential of their fields by enhancing soil productivity through "innovative" farming practices that supply adequate plant nutrients, improve the land's water-holding capacity, and are labour saving. Second, to help farmers realise a higher proportion of their farms' potential yield by planting more resilient varieties of Africa's staple food crops that significantly reduce losses and increase the stability of yields while meeting human nutritional needs and consumer preferences. And finally, helping to build and make more accessible both the input markets that can deliver seeds, fertilisers, and other inputs to farmers, and the output markets that enable farmers to generate income from surplus cash crops and livestock (Toenniessen, Adesina, and DeVries

2008). These initiatives indicate the extent to which AGRA seeks to intervene in the development of agriculture on the African continent.

Figure 3.1: AGRA Focus Countries



Source: AGRA website (<https://agra.org/where-we-work/>)

AGRA operates in 11 African countries including Mali, Burkina Faso, Ghana, Nigeria, Ethiopia, Uganda, Kenya, Tanzania, Malawi, Rwanda, and Mozambique (See Figure 3.1). Although there might have been advantages in limiting the study geographically, this thesis has not focused on a particular country or subset of countries in which AGRA operates because the documents that were used in this study did not separate the countries for reporting. A focus on one country might have allowed some further drilling down on various details, but the primary focus of this study is on the sustainable agriculture discourse of the organisation.

As can be seen from its initiatives, AGRA has had a strong influence in African agriculture and had a significant portfolio of technologies and partnerships. As the name indicates, they are promoting GR technologies that have had mixed outcomes in the countries and regions where they have been implemented. While crop yields and incomes of some farmers have increased, at least in the short-term, there have also been long-term undesirable ecological, agronomic, social, structural, and health consequences. This makes AGRA an important case to study in discussions about sustainable agriculture in Africa.

3.4 Sources of Data

The data for the study were sourced from AGRA's website, mainly the content of its annual reports from 2008 to 2018 inclusive. These reports are freely downloadable from the organisation's website (www.agra.org). In all 11 reports (from 2008 to 2018) were collected and examined. They ranged from 36 to 90 pages in length, so that a total of 642 pages were included in the sample. These annual reports are written by AGRA administrators, scientists, and staff and are intended for a diverse audience of elected and unelected policymakers, scientists, partner organisations, other potential donors, government agencies, and other NGOs. They typically include information on funding, projects, and partnerships, and impact stories and messages from senior AGRA officials.

The annual reports were considered the most ideal data for the study because they are official, readily accessible information emanating directly from the organisation. Since these documents are designed in part for outreach and public relations purposes, they are an appropriate source of data for examining how AGRA creates and disseminates their discourses of sustainability. They are, to some degree, insider communications, designed for the eyes of interested parties who mostly can be expected to be onside in terms of receptivity to, and alignment with, key messages and initiatives. The research questions require the use of these "public relations" documents since they contain information that the organisation wants the public to see and through which the organisation shares and promotes its ideas.

The unobtrusive nature of data access is another key strength that makes the documents ideal for this study. The unobtrusive nature of the document analysis allows for the gathering of research data without inconveniencing anyone, without putting any person in danger, and without having to seek permissions or clearance. It also avoids the situation where respondents are being asked

to remember details about the organisation to which they may no longer have access—or never did have knowledge of. Also, since this research focuses on the activities of one organisation, there is a concern that it would not be possible to protect the anonymity of interview subjects. Compared to other methods of data gathering such as individual or group interviews, or direct observation, document analysis does not require interacting with participants, which helps to protect their anonymity.

As the study concerns the evolution of AGRA's sustainability discourse, these documents serve as a good source of data for the analysis of this process from the time of its founding to more recent years. Thus, the documents allow for an examination of changes over time without having to rely on first-hand accounts, which would be challenging due to changes in personnel over the period. The documents have a sort of institutional memory that individual people might not have. Also, due to the turnover of staff and mobility of administrators and top scientists, the documents are the best means of gathering data on periods of time that predate the tenure of current personnel. The analysis of these documents helps to examine information that can no longer be observed in the field and allows the tracking of changes and developments in the organisation in a way that other methods of data collection such as interviews would not necessarily have been able to provide. They provide contextualizing information on new developments and initiatives in the organisation as well as historical depth on its activities.

Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop knowledge. Analysing documents typically involves coding content into themes similar to how focus group or interview transcripts are analysed (Bowen 2009). A concern to keep in mind during the analysis is the potential presence of biases, both in the documents and in the mind of the researcher. O'Leary (2014) stated that it is important to thoroughly evaluate and investigate the subjectivity of documents and your own understanding of such data in order to preserve the credibility of your research. In the next section, I describe how the documents are analysed using a method known as sociological discourse analysis, and how this yielded the findings and conclusions that are presented.

3.5 Discourse Analysis

In this study, discourse analysis is adopted as an analytic method. Discourse analysis is a collective name for several methodologies for analysing how meaning is created and communicated through written, spoken, or sign/symbolic language (Fairclough 2003). It is used in many disciplines in the social sciences, each having different assumptions and approaches. Discourse analysis is defined as the study of language above the level of a sentence, of the ways in which sentences combine to create meaning, coherence, and accomplish purposes. It is the study of the meanings we give language and the actions we carry out when we use language in specific contexts (Gee 2010). Discourse analysis explores how the socially produced ideas and objects that populate the world have been created and are held in place. It not only embodies a set of techniques for conducting structured, qualitative investigations of texts, but also a set of assumptions concerning the constructive effects of language (Burman and Parker 1993).

Discourses help to produce a material reality through the practices that they invoke. Accordingly, a discourse is defined as a system of texts that brings objects into being (Parker 1992). From this perspective, social science becomes the study of the development of discourses that support the myriad of ideas that make social reality meaningful (Gee 2010). Exposure to particular discourses over time constructs views about what is right and wrong, normal or abnormal; discourses significantly shape ideology and how it is possible to think (Foucault 1980). By establishing limits on thought and creating meaning, discourses help to determine who is powerful, who is not, what is possible, and what is impossible. Discourses have a significant influence on how individuals construct their subjectivities, and how they enact power and agency (Gee 2010).

Different social understandings of the world lead to different social actions—hence, discourse actively constructs society (Jørgensen and Phillips 2002). The supposition is that there is a mutually constitutive relationship between discourse and action: the meanings of discourses are shared and social, and, at the same time, discourse gives meaning to actions (Phillips, Lawrence, and Hardy 2004). Discourses are a specific ensemble of ideas, concepts, and categorisations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities (Hajer 1995). A discourse entails more than a mere description of things: it does things. Discourse ‘rules in’ certain ways of talking about a

topic and defines acceptable behavior. It also ‘rules out,’ and limits or restricts other ways of talking, of conducting ourselves, and of constructing knowledge about a particular topic (Phillips, Lawrence, and Hardy 2004). From this perspective, discourse is not just a referential tool that describes the social world; it is a symbolic means that constructs social realities through processes of naming, describing, informing, and giving meaning to objects, situations, and people. Language is the building block of discourse, and the choice of language acts as a lens through which people, objects, and situations are constructed. This lens will foreground certain features while marginalizing others (Van Dijk 1995).

Since discourses are embodied in texts, discourse analysis involves the systematic study of texts to find evidence of their meaning and how this meaning translates into a social reality (Phillips, Lawrence, and Hardy 2004). It refers to the study of diverse bodies of knowledge, and to an approach to deconstructing the written or spoken language attached to a given type of social practice. According to Jørgensen and Phillips (2002:1), discourse analysis entails the analysis of the patterns that “people’s utterances follow when they take part in different domains of social life.” Phillips, Lawrence, and Hardy (2004) describe it as the examination of the relation between the discourse itself and the surrounding social practices. It ought to reveal something about the way social action is shaped through a discourse. In relation to this, media texts, and what they construct as discursive truths, may have a specific effect on a recipient’s perceptions and actions.

Discourse analysis aims to open up spaces for re-interpretations of taken for granted practices in society in ways that might have completely different consequences and yield completely different outcomes. While it has a concern with investigating the meaningfulness of social life, discourse analysis provides a more profound interrogation of the precarious status of meaning. Where other qualitative methodologies work to understand or interpret social reality as it exists, discourse analysis tries to uncover the way that reality is produced (Hardy 2001; Phillips, Lawrence, and Hardy 2004).

Discourse analysis also presupposes that it is impossible to strip discourse from its broader context (Fairclough 2003). Discourses have no inherent meaning in themselves and, to understand their constructive effects, researchers must locate them historically and socially. The meanings of any discourse are “created, supported, and contested through the production, dissemination, and consumption of texts; and emanate from interactions between the social

groups and the complex societal structures in which the discourse is embedded” (Hardy 2001:28). Discourse analysis involves studying language in the context of society, culture, history, institutions, identity formation, politics, power, and all the other things that language helps us to create and which, in turn, render language meaningful in specific ways and able to accomplish specific purposes.

Because of the political nature of agrarian development (Taylor 2015), it is worthwhile to take a discourse analytic approach to examining how sustainable agriculture is conceptualised and translated into policy priorities and projects on the ground, and how those priorities and projects fit into broader debates about development. This is a way to illuminate how discourses work within society to privilege particular social groups to act in particular ways, and to disempower others. In the African agrifood system, governmental policies are elaborated and defined based on expert language, concepts, rationalities, and research practices (Nyantakyi-Frimpong and Bezner Kerr 2015) that are, in turn, redefined and developed within different fields of knowledge. Discourses regarding sustainable agriculture frame how the problem of agriculture is understood and communicated, and help to decide which policies will be put forward and supported. Engaging in discursive analysis allows one to problematize what conventional policy analysts take for granted: the linguistic, identity, and knowledge basis of policymaking.

Discourse analysis is appropriate for this thesis because (i) the identification and characterisation of agricultural problems is at least partially the outcome of processes of social construction; (ii) struggles about concepts, knowledge, and meaning are integral to the elaboration of agricultural policies; (iii) agricultural discourses have material and power effects as well as being the product of material practices and power relations. Since the main aim of the study is to examine the ways that AGRA has articulated its sustainable agriculture agenda, and how this has evolved and promoted to farmers, discourse analysis is the most ideal method for answering the research questions.

Discourse analysis is not just one approach, but an array of interdisciplinary approaches that have been used to explore many different social domains in many different types of studies. Two leading forms of discourse analysis are Critical Discourse Analysis (Fairclough 2013; Van Dijk 2001) and Foucauldian Discourse Analysis.

3.5.1 Critical Discourse Analysis

Critical discourse analysis (CDA) is an interdisciplinary approach to the study of discourse that views language as a form of social practice. Scholars working in the tradition of CDA generally emphasise how discourses not only express meaning about social phenomena but actively produce knowledge, often presenting this knowledge as objective truths. Development of this CDA approach is often attributed to the linguist Norman Fairclough. Discussion of CDA typically emphasise the role of language as a power resource that is related to ideology and the promotion or blocking of socio-cultural change (Bryman 2008). It focuses on investigating how societal power relations are established and reinforced through language. Critical discourse analysis differs from the more narrowly focused linguistic analysis in that it gives particular attention to non-discursive elements that are part of and affect the discourse.

CDA does not understand itself as politically neutral, but as a critical approach that is committed to social change. In the name of emancipation, critical discourse practitioners take the side of oppressed social groups to harness the capabilities of critical discourse analysis to the struggle for radical social change (Jørgensen and Phillips 2002). In such an approach, researchers position themselves as being intrinsically linked to those being studied, and thus inseparable from their contexts (Fairclough 1992). In addition to speaking up on behalf of subjects, CDA also asks what could be done in order to disrupt power relationships and social inequalities (Van Dijk 2005). Using this approach, a researcher can uncover various nuances, patterns, and latent elements that other research approaches might overlook.

For critical discourse analysts, discourse is a form of social practice that both constitutes the social world and is constituted by other social practices. As a social practice, discourse does not just contribute to the shaping and reshaping of social structures, it also reflects them. Critical discourse analysis is ‘critical’ in the sense that it aims to reveal the role of discursive practice in the maintenance of the social world, including those social relations that involve unequal relations of power. It aims to contribute to social change along the lines of more equal power relations in communication processes and in society more generally.

3.5.2 Foucauldian Discourse Analysis

The French poststructural theorist, Michel Foucault, is credited with recognising the different ways that language constructs meaning as ‘discourse’ (Foucault 1980; 1982). Discourses shape

and limit how people can speak, think, and act, and through this, the social structures that are produced and reproduced. Foucauldian discourse analysis focuses on power relations in society as expressed through language and practices. Reworking Foucault's ideas, Kress (1985:67) stated that: "Discourses are systematically organised sets of statements which give expression to the meanings and values of an institution. Beyond that, they define, describe and delimit what it is possible to say and not possible to say (and, by extension, what it is possible to do or not to do) with respect to the area of concern of that institution." Thus, discourses help to enact a wide range of relationships between power, truth, subjectivity, knowledge, and resistance. Discourses are powerful because it is through discourses that meanings are attached to language. It follows that knowing the key practices of a particular discourse and having access to the discourses that are dominant in society, gives an individual power: it is in discourse that power and knowledge are joined together (Foucault 1981). Each discourse also enacts power by limiting which individuals can and cannot participate and by defining who or what is deemed powerful. Language has power beyond the meaning of individual words; rather, it is within discourse that particular words are made meaningful and powerful.

Foucauldian discourse analysis analyses how the social world, expressed through language, is affected by various sources of power. This approach stresses a genealogical understanding of discourse analysis to reveal how discourse is produced in order to govern social groups (Arribas-Ayllon and Walkerdine 2008). The genealogical understanding of discourse relates to accounting "for the constitution of knowledges, discourses, domains of objects, and so on, without having to make reference to a subject which is either transcendental in relation to the field of events or runs in its empty sameness throughout the course of history" (Foucault 2003:306). The genealogical understanding can also be used to investigate issues that researchers "tend to think that they (the issues they study) are without history" (Foucault 1980:139). The starting point is for genealogical understanding is a concern with the role of power and knowledge in society, identifying patterns of language, demonstrating how they constitute aspects of society, and establishing how and why the language available to us sets limits on what is (and is not) possible to think, say, and do (Arribas-Ayllon and Walkerdine 2008).

Genealogy deconstructs truths by arguing that all truths are questionable because more often than not, the discovery of truth is by chance and is backed by power, knowledge and or the

consideration of interest that a person has in it (Foucault 2003). By helping to account for the scope, breadth and totality of discourse, genealogical analysis helps researchers to look beyond the discourse in question to examine the social basis of its existence and changes, and the conditions of their possibility and not just documenting the changing discourses alone (Foucault 1981). This approach can make it possible to ‘deconstruct’ or unravel taken-for-granted assumptions, help us to understand what these assumptions might mean for individuals and for wider society, and allow us to explore possible alternatives to accepted ways of doing things.

3.6 Sociological Discourse Analysis

For this thesis, sociological discourse analysis as advanced by Ruiz (2009) is employed as the key analytical strategy. Sociological discourse analysis has been developed as a social scientific perspective that engages with analysis of discourse at all levels of social life; it does this by combining Foucauldian discourse analysis with critical discourse analysis. According to Ruiz (2009), discourses should be analysed for their basic textual meaning but also in relation to the contexts in which the relevant social actors are interacting with a given discourse. Attention should also be given to the effects that emanate from a discourse’s position within relations of power. How discourses work toward normalisation of certain practices is only revealed with analysis that is mindful of context, locality, and temporality. Only detailed, localised studies of events can allow for distinctions to be made between what aspects of discourse are enacted to normalise and what aspects are used to resist normalisation, and so create sites for potential change (Van Dijk 2005). Here, the subjective nature of research is brought to the fore, to enable engagement with the research findings, not as a statement of truth, but as an interpretation which enables others to continue this line of thinking or to be spurred on to alternate modes of thought.

The way language is used in discussing sustainable agriculture in different contexts has important consequences that are currently not being fully recognised. This form of analysis can facilitate insight into the complex nature of the interrelationships that exists in the discourses surrounding sustainable agricultural practices. The technique allows for the analysis of how AGRA’s discourse is located within, and dynamically interacting with, the larger discourse of sustainable agriculture. One goal is to unravel and discover the notions that are not obvious such as hidden motivations, unwritten rules, and possible conditions for change or development within the subject (Grbich 2013).

According to Ruiz (2009), scholars who engage in discourse analysis should be empathetic, seeking to understand the situations and perspectives of various subjects (especially those who are relatively lacking in power). And that those who engage in sociological discourse analysis must have a thorough understanding of the context of the discourse they are analysing—modes of production, class structure, and political formations—in order to situate their analysis and explain relationships. The approach goes beyond interrogating what kinds of decisions are made and by whom and asks why certain individuals and or groups are able to promote their understandings and interests more effectively than others. While acknowledged, unequal power structures are often taken for granted and considered static, rather than constantly negotiated, perpetuated, and acted upon. The goal of sociological discourse analysis is to uncover how a complex web of power structures and relations shape and are shaped by adaptive actions.

3.7 Data Analysis

Following a sociological discourse analytic framework, the analysis was conducted in three iterative phases: textual analysis, contextual analysis, and reflexive interpretations. The first phase, textual analysis, includes looking at the wording, metaphors, and other grammatical elements of a text. According to Ruiz (2009:5), textual analysis “involves characterizing or determining the composition and structure of the discourse” and involves an analysis of rhetorical figures, lexis, verb tenses, etc. The repetition of particular key terms (e.g. “sustainable,” “agriculture,” “environment”), and the use of passive language are examples of what is examined in this phase. Key themes and thematic areas that are included or excluded, presentation, layout, and headings/subheadings are among the structural components also analysed in this phase. Choice of words tells us a lot about their producer's views or ideas, the way these are associated and the meanings this creates, the social actors that are referred to, and finally about the dispositions showing through the texts, that is, the inclinations or stance of the speaker towards the object. According to Tonkiss (2012:413), “discourse analysis draws on more general approaches to handling and coding qualitative data.” Thematic coding is performed as the preliminary analytic process applied to the texts under study before subjecting them to a deeper discourse analysis. This coding is done as a means to “locate key categories, themes and terms to help better manage the data and systematise the analytic process” (Tonkiss 2012:413). In this step, the text is analysed to identify vision, strategy, means of implementation, and goals at the level of individual words and phrases, how the words and phrases relate to each other in

the text, and the priority given to different themes. This phase involves as well, an initial analysis of actors' arguments, positions, and ideas; the following two phases examine more closely the external conditions or context of these arguments.

Following textual analysis, the second phase in the analysis is contextual analysis. Contextual analysis involves interrogating the themes and categories identified in the first stage and relating them to the context of the material being analysed; including considerations of authorship, audience, and dissemination. It is a review of the time and space in which discourses emerge and gain their meaning (Ruiz 2009). This phase of analysis can involve frame analysis, which “holds that the local norms governing everyday interactions must be accounted for in order to understand and explain social action” (Ruiz 2009:8). Examining the contexts and discursive strategies that make some information more noticeable and meaningful is an important aspect of the analysis at this stage. At this stage of the analysis, as well, attention is paid to the effects of power, knowledge, and persuasion; taking notice of ‘rupture and resilience’—persistent inconsistencies within or across texts; and, silences—“silences as discourse and discourses that silence” (Waite 2010:220).

The third step of sociological discourse analysis involves reflective/reflexive analysis and sociological interpretation of the data. Unlike contextual analysis, this phase involves making connections between the discourses analysed and the social space in which they have emerged (Ruiz 2009) and relating them to the theoretical perspectives and the literature reviewed. Methods of structural analysis are also incorporated as part of this stage, which focuses on the order of discourse—the precondition for and constraint on textual action (Fairclough 2013). This involves what Fairclough (1992) refers to as intertextual analysis, which considers the range of discourses and narratives available to the producers and interpreters of a given text, based on particular times and social circumstances. This is a particularly important part of the analysis and provides the means for examining, for example, the connections between power relations and dominant normative assumptions. This phase of analysis involves the overall interpretation of discourse, though this takes place throughout the phases of textual and contextual analysis as well— “analysis is conducted in a constant and bidirectional manner among these three levels” (Ruiz 2009:10).

Although these steps were followed, the analysis was done in an iterative manner, moving back and forth between the different steps. Hajer (1995) argues that the contribution of discourse analysis is not only that it opens up “black boxes” but that it also promotes insights for developing reflexive institutional arrangements. The iterative reflexivity, which discourse analysis encourages, supports both rigorous research and exploring human subjects, without erasing them in the process (Robbins and Krueger 2000).

Reflection at all stages of the analysis helps to enhance rigour as it demands careful interrogation of the data and justification of the conclusions reached (Hajer 1995). Emerging interpretations are continually confirmed against the data as they are being formed, ensuring the data supports the insights being drawn (Ruiz 2009). Rigour is also enhanced by the analysis occurring over time, which allows ideas to settle and be re-examined afresh, as long as familiarity with the data is maintained. Objectivity is not the aim of discourse analysis, but rather the goal is a subjective, relevant, and contextualised interpretation justified by the data, the literature, and systematic methods of data collection and analysis (Grbich 2013; Ruiz 2009). In this spirit, the steps followed in this analysis are described in detail to increase attention to the flexible but careful and rigorous, multi-level and reflexive analysis involved, and to allow other scholars to replicate this study or, at least, to understand the analytical steps attempted.

Attending to these three interrelated aspects of discourse analysis is a way to avoid uprooting words and actions from the historical bodies of the individuals performing them or disconnecting the discourses and actions from the sociocultural context of their formation and realisation. It is important not to ignore the history of these actions and discourses, nor the individuals and situations involved. These three levels are in fact not static entities but processes in motion over time (Ruiz 2009). Sociological discourse analysis is apposite for the study because it helps one to identify implicit as well as explicit ideas present in the texts. Discourses unfold in time, and in social as well as geographical space. The sociological analysis of discourse starts with general sociological research interests and then addresses questions arising from micro-levels of discursive practices. It then proceeds to address more general and macro issues such as the discursive structuring of symbolic orders and wide-ranging reflections on relationships between the discourse, extra-discursive events, and social change.

Sociological discourse analysis offers useful insight into diverging and converging discourses. By analysing AGRA's documents in the larger context in which they are produced and shared, following the suggested modalities of discourse analysis, the study can interrogate the factors that influenced the organisation to define sustainable agriculture the way it has, and how and why those definitions have changed over time.

3.8 Triangulation

Triangulation is a means for studies to cross-check and to strengthen the validity and increase the reliability of research findings. According to Spicer (2012), the triangulation of methods is an approach to combining two or more methods in addressing a research question in order to cross-check results for consistency and to offset any bias of a single research method. It is convenient to conceive of triangulation as involving varieties of data, investigators, and theories, as well as methodologies. However, Seale (2004) explains triangulation as a metaphor derived from surveying and navigation to indicate the convergence of two or more viewpoints on a single position. This study acknowledges the value of triangulation, not so much for converging on an identifiable "truth," but for producing a strong, thorough account of the case(s) through the inclusion of varying perspectives and methods.

In this study, triangulation was made possible through "pushing the data against theories and existing literature to develop theoretical innovations through an iterative dialogue between data and theory" (Timmermans and Tavory 2012:179). As indicated in Chapter Two, a variety of theoretical works and diverse accounts supporting or critiquing the GR are consulted in order to understand how sustainability issues are defined and debated within agrifood sectors—including African agriculture. The analysis and ground checking also draw on firsthand knowledge and observations given my own history as a smallholder farmer in Northern Ghana, and given other opportunities I have had to learn from the field while employed there by an international NGO. This form of triangulation is suitable for this type of qualitative research, as the purpose is to develop new insights for understanding the phenomena being studied, and not to uncover facts or to develop comprehensive general theory.

3.9 Ethical Considerations

The textual (annual reports) data employed in this study is freely available on the public internet site of AGRA. As such, permission for further use and analysis is implied. However, the

ownership of the original data is acknowledged. It is assumed that these are documents/texts that the organisation wants the public to be able to access and that they do not present private, sensitive, or personal information. The use of these documents does not interfere with the day-to-day activities of the producers of these texts. Use of a complete set of annual reports can be helpful in limiting the impact of some known biases, such as selection bias and experimenter's bias. However, the use of texts has a disadvantage in that the researcher not able to probe for information, elaboration, and or clarification.

Reading and interpreting the documents that are the focus of the analysis, I acknowledge my positionality, which is relevant to the analysis and the conclusions reached. Coming to this research as a former farmer and employee in the NGO sector, and as a student with a background in development studies and the sociology of agriculture, my reading and interpretation of the data might be different from someone who approaches it from a purely academic perspective—or from a different social science discipline or tradition.

3.10 Limitations and Potential of the Study

No social research method is infallible (Bryman 2015), and discourse analysis is no exception. This study is limited for the most part to an analysis of the annual reports of AGRA. AGRA is a leader among organisations that emphasise market-led agricultural development to improve productivity and sustainability. The research did not compare its discourses with the discourses of other institutions that advocate for alternative approaches such as agroecology and food sovereignty. Also, the perspectives of farmers and other stakeholders in the agrifood system were not studied systematically or in any detail.

Perhaps the biggest limitation in conducting a discourse analysis is that it is a subjective method (Van Dijk 1995). This means that speech acts may be identified and interpreted differently depending on the researcher. Discourse analysis of this type is based on the researcher's subjective interpretation of the data albeit, enhanced by careful specification of research questions, concepts, and issues (Timmermans and Tavory 2012). Careful analysis of an appropriate data set can provide insights into discursive practices and provide evidence that can be compared with findings reported in relevant scholarly literature. It also provides an opportunity to test and refine the theoretical framework initially adopted.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings from the data analysis and discusses them in light of the research questions and the theoretical framework. As already indicated, data for this study were drawn mainly from AGRA's annual reports from 2008-2018. These documents contain information on the organisation's programmes, vision, funding, partnerships, and successes. They are written by AGRA staff and are intended primarily for policymakers, academics, funding partners, and other NGOs. These documents were chosen as the focus for this study because they are accessible, provide a longitudinal window on organisational thinking and discourses with respect to African agriculture, and because they represent what AGRA wants key publics to see.

The documents were coded and sorted with the help of NVivo qualitative data analysis software and further analysed in an iterative process utilizing insights from sociological discourse analysis. After importing the documents into the NVivo software, I read all of them and coded them to generate themes useful for answering the research questions. I identified potential themes by looking most closely at the programmes and partnerships reported in the documents. I also performed word search queries using words and such as 'sustainable,' 'agriculture,' 'smallholder,' 'farmer,' etc. to see how words and phrases used before and after the searched terms were related and to reveal the context in which they were used. After the documents were coded, the themes were analysed iteratively following the three phases of sociological discourse analysis that involves a combination of textual analysis, contextual analysis, and reflexive interpretation (Ruiz 2009:25). For the textual analysis, I look at the wording, metaphors, and other grammatical elements of the texts analysed, and how they are related to each other. The second step, contextual analysis, was done by analysing the themes in relation to authorship, audience, and mode dissemination. The third step was reflexive interpretation. This step "involves making connections between the discourses analyzed and the social space in which they have emerged" (Ruiz 2009:25). At this stage, the study incorporates pertinent literature, theory, and the social, cultural and historical context in Africa.

Analysing these themes by employing the second and third phases of sociological discourse analysis it is possible to map out and investigate the framing and reframing of sustainability. One

can also see how these ideas, assumptions, and worldviews have been promoted to farmers and other stakeholders. The following presentation of the key findings is organised around the three main research questions: 1) How does AGRA conceptualise sustainable agriculture? 2) How has AGRA's framing of sustainable agriculture evolved over time? and, 3) How does AGRA communicate and promote its notion of sustainability to farmers and other relevant stakeholders?

4.2 Defining Sustainable Agriculture

How does AGRA conceptualise sustainable agriculture?

Dominant discourses on agriculture sustainability in Sub-Saharan African over the last decade have focused on the necessity of increasing the productivity of land and labour in order for African countries to fill the African 'yield-gap' (Patel 2013). As sustainability is socially constructed in various ways, different social groups define it differently to suit their respective contexts, and understandings, expectations, and intentions (Gertler, Jaffe, and Beckie 2018). Although there is a consensus as to its relevance, there have been evident differences in terms of the practices that are deemed sustainable (or otherwise), which leaves room for significant variation and for further innovation on the part of practitioners (Hayati, Ranjbar, and Karami 2010). This section presents an analysis with respect to how sustainable agriculture has been defined by AGRA.

AGRA's definition of sustainable agriculture is largely focused on technical measures employed to increase crop yields (especially of cereals and pulses), particularly through the development and dissemination of 'improved' seed varieties. AGRA defines sustainable agriculture this way because it considers the fundamental problem in African agriculture to be low yields. It attributes the low yields achieved by African smallholder farmers to: i) lack of scientific knowledge and capacity, ii) lack of public and private investment in African agriculture, iii) poor and impoverished soils, iv) limited seed development systems that inhibit the introduction of new varieties, and, v) weak governance and regulatory systems. This view has also informed AGRA's programming and led it to invest substantial resources in development efforts and partnerships encompassing programmes on seeds, soils, markets, financing and improving government policies.

The central part of their effort to boost yields is through introduction of improved seeds, manufactured fertilisers, and credit for purchasing farm inputs and funding new businesses. This is vividly captured in the following passage from the 2017 annual report:

Our goal is to contribute to doubling the yields and incomes of 30 million smallholder households across the continent. That's a significant number in itself, but the indirect impact will be much larger. We hope that by demonstrating the possibilities of a smallholder farmer-centered, African-led, partnership-driven African agriculture, AGRA will help catalyze investments that reach hundreds of millions of people. (AGRA 2017b:10)

The need to double agricultural yields has been AGRA's preoccupation and signature refrain over many years. As both aspirational goal and thinly disguised boast, it has been a key plank of its sustainability discourse and development agenda with respect to the African agrifood system. In the 2009 annual report, the message from its board chair indicates that "such a revolution [the green revolution] can rapidly and sustainably increase the productivity and profitability of millions of smallholder farmers and the many small-to-medium sized agribusinesses that serve them" (AGRA 2009:ix)

Based on the identified need to increase yields, AGRA proposes increasing the use of synthetic fertilisers in association with hybrid and other HYV seeds. AGRA recognises that alternative, perhaps relatively low-input techniques (e.g. use of legumes for nitrogen-fixing, increasing organic content and protecting the soil through mulching and planting cover crops, and adoption of non-chemical, reduced tillage approaches to land preparation) can be important methods for increasing soil productivity. However, as captured in its 2007 Soil Health Proposal, such practices are not sponsored because of the longer time required for results, the unpredictability of outcomes, and lack of commercial tie-ins. The main message of the proposal is that "purely organic approaches to African soil fertility are not sufficient... and are not appropriate for poor farmers" (AGRA 2007:8).

The concern with low yields in African agriculture is also shown in the 2011 report, which has as its main theme, "*Investing in Sustainable Agricultural Growth*". AGRA indicates that it aims to "trigger a uniquely African Green Revolution that transforms African agriculture into a highly productive, efficient, competitive and sustainable system that assures food security, lifts millions out of poverty, and protects the environment." (AGRA 2011:11). The use of the words, trigger, transforms, highly productive, efficient, and competitive are coded communications that suggest

that African agriculture is backward and in a bad state, and in need of fixing (by AGRA and its allies) in order for it to be sustainable.

In AGRAs view, ‘low input’ farming systems are also fated to be ‘low-output’ systems. With this framing, the increased use of synthetic fertilisers becomes normalised (despite evidence that some African soils are richly endowed with nitrogen-fixing rhizobia that are likely to be suppressed by the application of synthetic nitrogen). Toenniessen, Adesina, and DeVries (2008) argue that the HYV seeds proposed by AGRA cannot produce the anticipated yields unless they are purchased and used as part of a technological bundle that includes fertilisers and pesticides. In this regard, the initial focus on increasing the use of synthetic fertilisers may also be part of a planned agenda to introduce and peddle other products. And again, alternatives such as agroecological intensification and updated organic production are discounted or ignored,

Using only the existing land based to produce more food also features in AGRA’s (explicit and implied) definition of sustainable agriculture and in related discursive framings. Close reading of its annual reports reveals that AGRA appears to define sustainable agriculture as one that relies on the existing land base (and possibly fewer farmers) to produce more through the use of improved seeds, fertilisers, and irrigation. It also focuses on linking farmers to commercial markets, giving farmers more access to credit, and support for the formulation and implementation of government policies that support these initiatives.

In other words, agricultural production is low among African countries because they do not use fertiliser and other potent technologies. The need to increase the use of fertilisers to increase yields is reiterated in the 2014 report, which states that AGRA “strives to establish or support institutions around the things that farmers need to be able to farm productively; be it better organization, input systems including seed and fertilizer businesses” (AGRA 2014:8).

The emphasis on ‘access’ to inputs is only one side of the story on the use of fertilisers; affordability is the other, perhaps more important, side. The availability of fertiliser does not mean that every farmer can purchase it and, if they did, it is not a guarantee that this would lead to increased productivity without other necessary conditions being met. Even if yields do increase through the increasing use of fertilisers, this does not automatically translate into smallholder profits. Patel (2013) argues that in areas where there have been increases in yields, there might not be commensurate (or any) increases in profitability when we factor in the cost of

inputs. It is not surprising that many farmers end up in debt that they cannot pay off. It leads to a circular system as described by treadmill of production theory where, in an effort to increase production in order to increase their incomes, farmers can easily end up in a debt trap (Levins and Cochrane 1996).

From the messages that run through the reports, it can be seen that AGRA considers the adoption of these technologies and the general commercialization of agricultural production as long-term goals. AGRA and its allies maintain that GR practices contribute to agricultural sustainability by way of reduced need for land clearing and deforestation, noting that without improvements in yields, Asian countries would have needed to farm twice as much land—an additional 1.1 billion hectares—to feed their people (Bell et al. 2008). In this discursive framing, it is argued that agriculture will become more sustainable because of a ‘land-saving’ technological intensification and, also through the development of crops with enhanced drought resistance and less need for water. AGRA also maintains that the introduction of crops that can grow in soils with high salinity, reducing soil erosion and greenhouse gas emissions, and improvements in the productivity of marginal cropland are ways to enhance the sustainability of the agricultural systems. The widespread application of these techniques is argued to promise a revolutionary impact on agricultural sustainability since such cropping systems allegedly produce higher yields while lowering unit costs (production costs per bushel or tonne). AGRA promotes research and development activities that support this line of argument as evidenced by the following passage from their 2010 annual report:

Our programmes for improved seed systems, healthier soils, more accessible markets, better policies and more effective partnerships, and innovative finance to make affordable credit available to smallholders, work together to transform subsistence farming into a sustainable, viable commercial activity (AGRA 2010:10).

Advocates of the AGRA approach argue that models of agricultural intensification based on using industrial inputs such as improved seeds and chemical fertilisers will strengthen smallholders’ ability to increase yields and participate in national and international agricultural markets.

Another interesting point in AGRA’s sustainable agriculture discourse is the need for agriculture to have easier access to inputs and to markets to sell products. To that end, and consistent with this discourse and vision, AGRA has suggested three tipping points that are outlined in the 2017-

2021 strategy document for the sustainability of the African agrifood system. First, AGRA envisions that farmers will be sustainable when they are able to make profits from their crop production and reinvest those profits in ways that increase yields. This tipping point at the level of farm enterprises will occur when yields and market access have improved enough to generate a profit that can be reinvested. AGRA's discourse put great emphasis on facilitating integration between agribusinesses and smallholders. Integrating the latter into international commercial value-chains, both on the input and output side of production, is, according to AGRA, the high road to building sustainable agricultural systems. For, sustainable agriculture depends on "well-functioning markets that provide reliable outlets for produce, while also serving as dependable sources of affordable food" (AGRA 2010:20). At this tipping point, the farmer is no longer a subsistence farmer but rather a businessperson. To AGRA, "this point varies by crop and region, but a yield of three metric tons per MT/hectare² [sic] in maize, for example, is enough to create a self-sustaining farm that invests in inputs year after year" (AGRA 2017b:21). Once farmers reach this yield, they should be able to operate a profitable business without subsidies. This conception of progress puts emphasis on the role of private profit and the private sector, thus equating farming to a form of business instead of a way of life as it is for many smallholder farmers in Africa.

Second, AGRA's idea a sustainable agriculture also centres on the further development of the market system. It is argued that the agri-food system will be sustainable when farmers are able to purchase the technology necessary for increasing yields without depending on subsidies and at the same time find markets to sell their production at higher prices. Thus, for AGRA, agricultural sustainability occurs "when there are enough farmers in a given area with enough income to buy improved seeds and fertilizer, enough surplus to require postharvest storage, and enough interest in accessing credit, then there is also a market strong enough for entrepreneurs to thrive without subsidy." (AGRA 2017b:21).

AGRA predicts that the first two tipping points can be achieved or nearly achieved in several of its target countries during a five-year period (presumably from 2017- 2021), as they are relatively straight forward and are seen to happen fairly automatically once yields can be

² Metric tonnes per hectare

increased. For this to happen, the key requirement is to introduce farmers to more productive technologies and to provide them with the means to adopt them.

The third tipping point is projected to happen at the national or regional level in about 10-20 years. It arrives when:

...productivity is high enough, and market opportunities ample enough, that some farmers start leaving primary production for other businesses related to food processing—and, eventually, businesses completely separate from agriculture—to serve the expanding needs of an increasingly prosperous population (AGRA 2017b:21).

This final tipping point is both important and difficult to achieve as it requires a fairly wholesale transformation of the rural (and urban) economy. This is the development strategy that most of the developed countries in the world have followed to develop their economies, but it is not automatic and faces many barriers in the real world of the Global South. Nevertheless, to AGRA, “at this point, agriculture becomes the key to broader economic development, as nearly every developed country has shown in its path to improving its citizens’ lives” (AGRA 2017b:21).

AGRA’s Sustainability Discourse in Context

By contextualising AGRA’s discourse, what is clear from the analyses is that its sustainable agricultural development agenda aligns with the neo-productivity, neoliberal discourses (Bogdanski 2012; Neufeldt et al. 2013) that focus on increasing yields through ‘sustainable intensification’—producing more food without increasing (or by decreasing) land area farmed. Thus, the problem of agricultural development is construed as a lack of yield and market integration that can be solved by boosting production and making markets more accessible, thereby increasing food supply and farmer incomes. AGRA presents this overarching line of argument thusly: “...today, more than ever, we need a uniquely African Green Revolution, one that fundamentally improves the productivity, sustainability and profitability of Africa’s smallholder farmers” (AGRA 2008:ix). AGRA appears to believe that Africa has to play ‘catch-up’ with the developed West, but without the need to reform regional agrarian structures or global structures of capital, aid, and trade—despite the intensified inequalities and the food, financial, and environmental crises these have generated. As its critics have suggested, there is a substantial focus on imported technology and an emphasis on plant breeding in specialist centres without a full understanding of local socio-political situations or even of the differing agro-environmental contexts on the continent (Thompson 2014). There is also an assumption that the

necessary infrastructure would be in place to support successful adoption of the new technologies.

The implicit and explicit embrace of ideas of technology-led development, technological determinism, and path dependency have been flagged by other scholars. For example, in examining the discursive element of technological determinism in Monsanto's promotional campaigns, Kleinman and Kloppenburg (1991:432) argued that "this view implies that technology has a logic of its own that directs it along a single inevitable trajectory." The issue here is the promotion of a limited set of technological solutions to the complex challenges of agricultural development in Africa. Complex and interconnected economic, agronomic, social, and ecological problems are to be addressed by specific, productivity enhancing and commercially driven technical solutions while other technical and social innovations are given brief lip service, dismissed, or totally ignored.

The sustainable agricultural model proposed by AGRA emphasises the role of the private sector in the development of agricultural technologies and input and output markets, with success predicated on the 'free' market efficiently directing resource allocation. This is clearly indicated in the 2009 annual report:

The best science and technology is needed to improve smallholder productivity, and effective post-harvest processing and efficient markets are required to convert additional production into higher incomes for farmers (AGRA 2009:11).

While AGRA promises to support the development of local companies involved in agriculture, it is unclear how these efforts would not be undermined or overshadowed by transnational corporations (TNCs) with their oligopolistic conduct and performance, and associated inequalities in market power. Local companies and small-scale farmers could both be readily exploited by TNCs selling expensive technologies and sending the bulk of the profits abroad (Holt-Gimenez, Altieri and Rosset 2006). In sum, this AGRA's discourse does not properly address the undemocratic and asymmetric impacts of the contemporary food and agricultural trade and investment regime (McMichael 2016). Problems and their solutions are typically framed by AGRA in ways that do not acknowledge, question, or challenge hegemonic economic and social structures. Critics in the food sovereignty camp may see hunger and poverty as emerging from the globalisation of food and agriculture (Jarosz 2014), yet AGRA appears devoted to linking African farmers more tightly to global commodity markets.

4.3 Changes in the Definition of Sustainable Agriculture

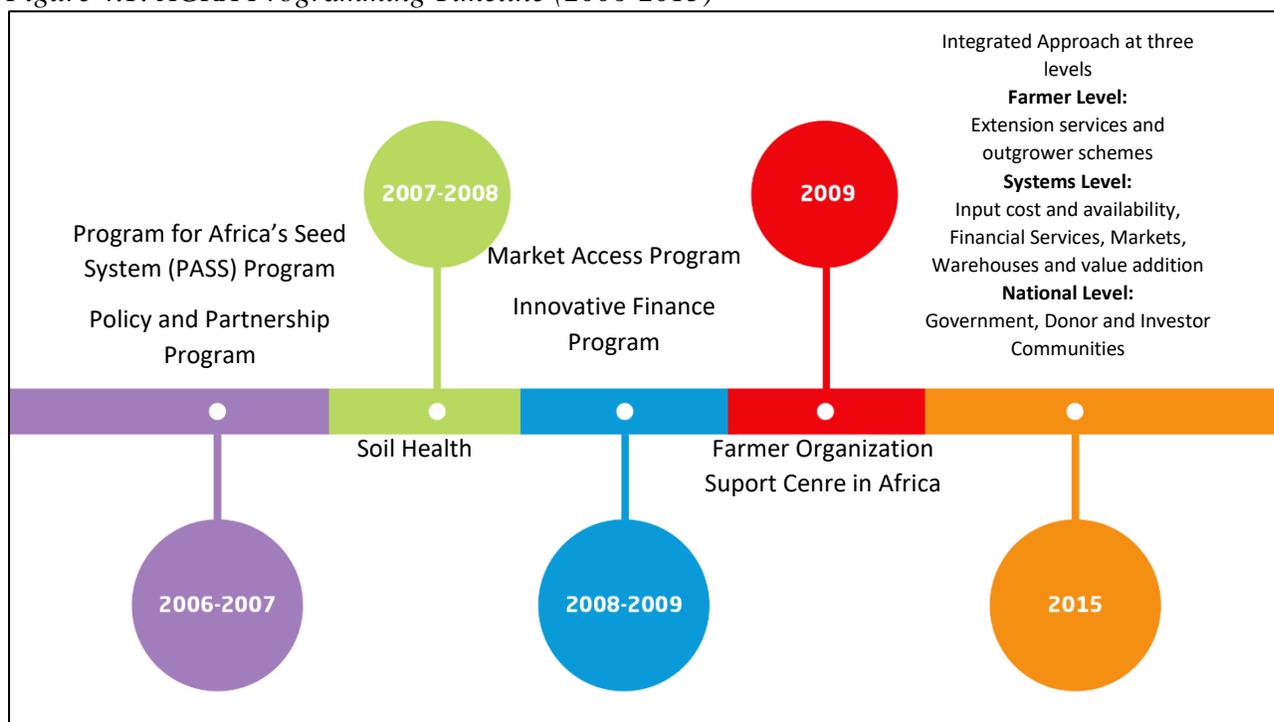
The second research question investigates the evolution of AGRA's sustainable agriculture discourses since its inception. Issues surrounding the sustainability of agriculture are certainly not straightforward and many organisations have reacted to changing circumstances, ideas and knowledge by changing the ways that they define sustainable agriculture. Transboundary institutions with various amounts of power also mediate how environmental issues are defined and the solutions that are proposed (Adger 2000). This section analyses some of the changes that have taken place (or not taken place) in AGRA's conception of sustainable agriculture over the years.

The analysis of the messages contained in AGRA's documents show that their definition of sustainable agriculture has, as its unchanging foundation, the use of fertilisers in combination with improved seeds to increase yields. Although AGRA was officially launched in Africa in 2006, its activities and interests in Africa started some years before that. The 1997 publication of Gordon Conway's book, *The Doubly Green Revolution: Food for All in the 21st Century*, set the groundwork for the establishment of AGRA. In 1999, the Rockefeller Foundation launched its New Green Revolution for Africa initiative and, in March 2000, established the African Seed Trade Association (AFSTA). These initiatives laid the foundation for AGRA's official launch in 2006. The early activities of AGRA aligned well with the Structural Adjustment Programs imposed by international lending organizations in many African countries; these programs aimed to make the economies of these and other developing countries more market-oriented in the name of debt reduction and poverty reduction (Lall 1995).

Over time, AGRA engaged in new programmes and entered into partnerships that link back to this notion. As part of a well-oiled communications scheme, and responding in part to contemporary developments and critiques, AGRA's definition of sustainable agricultural development has evolved over the years from one that emphasises farming using 'High Yielding Varieties' (HYVs) to one that puts more emphasis on partnerships and linking the agrifood system to international commodity markets. Whereas the focus in the beginning was on improving yields through fertiliser and seeds, the more recent focus has included partnerships and linking farmers up to the global commodity markets. This is evidenced in the changes to its programming over the years as shown in Figure 4.1. Some of these changes indicate that there are

overlaps between some programmes. In the first year, (2006) the seed programme was implanted followed by the Soil Health Programme in 2007. The Market Access Programme was implemented in 2008. In 2009 AGRA also implemented a programme to enable farmers acquire the credit needed to buy inputs. Finally, the Policy and Partnerships Programme was implemented with the aim to help African government promulgate and implement policies that support the adoption of the promoted technologies. All these activities are geared towards the commitment to “improving access to inputs, chiefly high-quality seeds and properly formulated fertilisers—mineral and organic—that are the foundation of a successful farm” (AGRA 2017b:1). With these changes in programming, AGRA has set farmers on the road towards wider adoption of the GR technologies without trying to impose them all at once or immediately in a context where they may not be satisfactorily supported or taken up.

Figure 4.1: AGRA Programming Timeline (2006-2015)



Source: AGRA 2015

4.3.1 Seeds: Program for Africa’s Seed Systems (PASS)

At the time AGRA was established in 2006, its agricultural development efforts were focused first and foremost on improving access to inputs, mainly seeds and properly formulated fertilisers, which it saw, and continues to see, as the foundation of a successful agriculture. To

AGRA, lack of improved, high yielding seeds and worn out, degraded soils are the main reason why Africa—in contrast to the rest of the world—has not yet witnessed a Green Revolution. The US\$150M Programme for Africa’s Seed Systems (PASS) was the first initiative to be launched with the objective to develop what are alleged to be more efficient, ‘equitable,’ and ‘sustainable’ seed systems and varieties for farmers on the continent. AGRA aims at engaging in new seed development and distribution systems that deliver varieties that are viewed to be more efficient users of plant nutrients (particularly those supplied by commercial fertilisers), more disease- and pest-resistant, and more tolerant of an increasingly variable climate. AGRA maintains that providing farmers with high-yielding seed varieties is an important part of the solution to sustainable agricultural development. These seeds are projected to “...help farmers generate higher crop yields and overcome the constant barrage of plant pests, drought and disease that are the enemies of agriculture everywhere in the continent” (AGRA 2009:10). The PASS initiative included four sub-programmes: cultivar breeding, creation and strengthening of private seed enterprises, graduate training of local plant scientists in local institutions (MSc and PhD levels), and training of local agro-dealers. The agro-dealers were to be responsible for the distribution of certified seeds and fertilisers in more remote areas. With these interventions, an African seed industry and distribution network was to build up, which in AGRA’s view was the surest route to agricultural sustainability. Agriculture becomes sustainable only if farmers have easy access to “improved, high-yielding variety” seeds. However, Thompson (2012) perceives a hidden agenda behind AGRA’s programme on seeds. According to him, the core goal of AGRA is not included in its promotional materials: free access to African genetic wealth without benefit-sharing, with the resulting ‘novel’ seed varieties privatised for corporate profit via patenting. Thompson defines this as theft given the privatisation of the new seed varieties without any financial participation by the farmers who, over generations, played a major part in developing the genetic resources.

4.3.2 The Soil Health Programme (SHP)

In 2007, AGRA’s sustainable agriculture agenda added the improvement of soil health to achieve the kinds of yields that the new seeds supposedly promised. This change took place at the time of the 2007/2008 global food crisis when agricultural sustainability and food security issues gained visibility. With the food crisis in 2008, agriculture regained its prominence in the world’s

development agenda and Africa was said to be the continent to be hit hardest because of its incapacity to produce enough food.

Apart from inadequate seed breeding progress, AGRA argues that depleted soils are another reason for low agricultural yields in Africa. After inaugurating its focused efforts on developing the seed system, AGRA launched the Soil Health Programme (SHP) in 2007 with an announced investment of US\$180 million. The goal was “to work with 4.1 million farmers and regenerate 6.3 million hectares of farmland through a balanced approach to improved soil management (AGRA 2007:34). Although, the reports speak of balance, the concentration is clearly on the application of inorganic fertilisers. The soil health programme identifies access to fertiliser as a constraint and therefore endeavours to strengthen fertiliser supply chains and to increase the use of fertilisers by smallholder farmers. In this regard, AGRA has claimed that “farmers in Africa use 10 times less fertiliser than elsewhere, with the result that crop yields are 2-5 times lower than the global average” (AGRA 2015:28).

The AGRA-sponsored seeds and soil health programmes have some connection to the roll-out of Structural Adjustment Policies: many African countries were struggling to upgrade their agricultural systems with the goal of becoming more self-reliant and also producing more commodities that could be exported. It was also a time when there was concern about crop failures and stagnating agricultural production. AGRA tailored its programming to fit into such a context. The initiatives to increase crop yields and thereby improve farm incomes, to promote environmental sustainability, and to develop a global partnership for development also aligned with several of the Millennium Development Goals³.

With the objective of increasing the availability of fertilisers, AGRA played a prominent role in establishing the Africa Fertiliser Agribusiness Partnership (AFAP) in 2012, which was initially focusing on Mozambique, Tanzania and Ghana. What is common about these countries is they all have access to the sea and are gateways to other countries: Ghana is a gateway to Mali, Niger, and Burkina Faso; Mozambique is a gateway to Botswana, Swaziland, Zimbabwe and Malawi; and Tanzania is a gateway to Zambia, Uganda, Malawi, Burundi, Rwanda, and the Democratic Republic of Congo. The emphasis is on the development of value chains (appropriate tariffs,

³ The United Nations Millennium Declaration signed by all 191 UN member states in September 2000 included the goals of combatting poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women by the year 2015.

storage capacity, local blending facilities, as well as transport networks), and improving the capacity of port operations to facilitate the importing of fertilisers. Some effort may be put into local production of some inputs (e.g. phosphates, which are in relative abundance in some parts of Africa) and local blending of imported materials. However, the emphasis is clearly fixed on adapting imported fertilisers for developing markets in Africa (Scarpone 2011).

4.3.3 Market Access, Value Addition, and Storage

Major shifts in discourse occurred 2008 as AGRA expanded on its commitment to increase yields to include market access, value addition, and storage. This initiative was instituted with the recognition that African farmers need markets to sell the supposed higher yields from the adoption of the improved seeds and soil health techniques. The argument for this addition in its sustainability agenda was that in some areas, “surpluses are produced but access to markets is non-existent, leading to local gluts and collapse in local prices in peak harvest season, which acts against farmers adopting yield-improving technologies” (AGRA 2010:20). The aim was to expand market access, built around a commercial orientation of smallholder farmers, farm storage technologies, and intermediate processing technologies.

The programme received US\$43m for the period 2008-2014 with the aim to “ensure that smallholders respond to market demands and specifications” (AGRA 2011:25). The development of rural marketplaces and collective marketing, commodity exchanges, warehousing systems and milling operations are measures to support small-scale farmers to expand their market access. An important part of the programme is also to identify strong partners for co-operation among non-governmental organisations (NGOs), farmer organisations and co-operatives.

For many years, African countries have pushed for increased agricultural productivity without making an equal push for improving markets. The result: localized gluts of staple foods that drive down prices and cause farmers to abandon new technologies that seem not to add much to their income. Thus, a vicious cycle of poverty continues in many African countries and food security remains elusive. (AGRA 2010:22).

This quote provides an argument for AGRA’s market access programme but also contradicts earlier assertions that African farmers lacked the capacity to increase yields. This statement indicates that there have been local surpluses and that what was needed was an effective marketing and distribution system to move surpluses to areas that could absorb them. AGRA also indicates that the market access program will “increase the commercial orientation of

smallholder farmers by bringing producers together for collective bulking and marketing” (AGRA 2010:20).

However, critics argue that this plan to increase market access is essentially a social license that legitimates agribusiness expansion in Africa (Patel 2013), and wards off some of the “land grab”⁴ critique and concern for the threat of land and knowledge dispossession directed towards its initiatives (McMichael 2013). In this relationship, smallholders risk surrendering their autonomy, not only through subordination to monopolistic agribusiness firms (what they plant, when and how, who buys it and the price they receive), but also through their increased reliance on markets for their food needs. The problem here is not only the high price of these inputs but the asymmetrical partnership with global agribusiness (Nyantakyi-Frimpong 2015). This parallels the findings of Vorley et al. (2012) that value-chain linkages work only for the top two to twenty percent of farmers who are already wealthy. Thus, this arrangement risks perpetuating and increasing the inequality that is already well established in the African agrifood system.

4.3.4 Financing for Agriculture Programme

AGRA identifies a key role for increased access to credit and finance in order to enable farmers to purchase fertilisers and other inputs that will enhance their yields. To help provide farmers with credit with which to purchase GR technologies, AGRA added the Financing for Agriculture Programme in 2008. Given that many African farmers operate on a subsistence basis, they lack the cash required to purchase inputs. Also, many of them are unable to acquire loans from banks due to lack of collateral. In light of the inability of smallholder farmers to afford fertilisers, AGRA also argues that subsidies from government may be required to incentivise fertiliser use.

AGRA’s Innovative Finance Programme (IFP) aims to provide loans for smallholders and other farmers and agribusiness firms, using loan guarantee funds to leverage larger loans from commercial banks. The banks’ risks are lowered through a pooled arrangement whereby risks are shared among several participants:

AGRA has established an innovative financing initiative to unlock millions of dollars in credit for farmers, agro-dealers and small-to-medium-sized agricultural enterprises all along the value chain. In 2008, AGRA and its partners provided US\$ 7.1 million in loan

⁴ Used to describe large-scale land acquisitions in developing countries, mostly by TNCs but also by affluent individuals, institutional investors, and sovereign wealth funds.

guarantee funds in order to leverage the availability of US\$ 60 million in affordable loans in Kenya and Tanzania.” (AGRA 2008:22).

AGRA’s loan guarantee initiative allegedly enables smallholder farmers to acquire the credit needed to participate in the GR and contribute to sustainable agricultural development. This is also aligned with its preference for viewing agriculture as a business enterprise and not as a way of life. Working in partnership with other organisations focused on African agricultural development, AGRA aims to “change smallholder agriculture from a subsistence way of life into a highly productive, efficient, sustainable and competitive system, and do so while protecting the environment” (AGRA 2010:9).

4.3.5 Policy and Partnerships Programme (PPP).

AGRA’s focuses on small-scale farmers who are the main producers of food in Africa and frequently makeup the majority of the population (DeVries and Toenniessen 2001). New technologies may be a key for many smallholders to exit poverty, but changes need to be made in local economic contexts and public policy. In 2009, AGRA launched the Policy and Partnerships Programme (PPP) with the aim to “develop strong national policy support systems that would drive accelerated and sustained adoption of agricultural technologies by smallholder farmers in AGRA’s target countries.” (AGRA 2011:26).

AGRA argues that African governments ought to be supported to develop evidence-based, country-specific agricultural policies that help smallholder farmers to adopt the new agricultural technologies. To further this objective, in 2011 AGRA launched the 19 Policy Action Nodes in Ghana, Mali, Mozambique and Tanzania with the aim “to improve the formulation and implementation of policy reforms through evidence-based policy research and advocacy” (AGRA 2012:28). AGRA clearly feels that appropriate policy frameworks are needed to ensure that the Programme for Africa’s Seed Systems, the Soil Health Programme, and the market access and financing programmes will succeed. AGRA says that without effective distribution systems for example, improved seed varieties will just sit on the shelf without being used. It also argues that subsidies are necessary to ensure that the benefits of fertiliser are available to every farmer regardless of their income. Therefore, according to AGRA, certain key building blocks must be put in place in order to support moving forward with these technologies.

AGRA claims to continue “to make progress in supporting countries to gather data, undertake analysis and generate the evidence for informed policy making” (AGRA 2017a:8) In this regard, the organisation has argued that its programmes cannot succeed without a proper institutional and regulatory framework. This is based on assumptions that smallholder farmers in Africa will increase their yields and achieve a more sustainable agriculture when there are policy changes at national, regional and global levels that favour them. Along with the other initiatives outlined, AGRA claims to advocate for policies that “promote rural development, environmental sustainability, social and economic equity and favourable trade agreements” (AGRA 2007:3). However, it appears that this, in part, a public relations exercise. It seems that AGRA is looking for policies that can be said to promote sustainability and equity, even though these are frequently secondary concerns both for AGRA and the governments involved.

In its 2013 report, AGRA indicate that each of the policy action nodes brings together local experts and stakeholders to address policy bottlenecks in their particular country through evidence-based research, advocacy and engagement with decision makers (AGRA 2013:38). In trying to implant and support its position, AGRA uses terms and phrases such as ‘evidence based’ and ‘bringing together experts’ to drive home the idea that their programmes are indeed endorsed by leading researchers and practitioners. While this may seem promising, further analysis of its discourse also indicates that actions to promote such outcomes are not confirmed and that there is no clear roadmap to achieving them.

A more recent tendency in AGRA’s approach is to engage with multiple stakeholders. In 2017, it spearheaded the Partnership for Inclusive Agricultural Transformation in Africa (PIATA). AGRA’s plan for building a more sustainable agriculture involves developing formal and informal (including de facto and off-the-record) alliances and partnerships with national governments, state and international agencies, NGOs, scientists, and private sector actors. The explicit part of this transformation program is encapsulated in the following annual report excerpt:

AGRA will deliver through an approach that simultaneously catalyzes change at the farmer level, strengthens input and output market systems and puts governments at the center to enable and champion private sector-led agricultural growth at national levels (AGRA 2017:21)

By emphasizing discursive tropes and framings such as “strengthening market systems” and “private sector-led agricultural growth,” AGRA points to its overall alignment with mainstream, neoliberal, development orthodoxy, and with dominant tendencies in the contemporary world agricultural system. Also, words such as ‘catalyze’ and ‘strengthens’ message that we are talking about growth, and increasing production and productivity. AGRA also uses words that signal the urgency of problems in African agriculture, that therefore justifies heroic intervention (Smith 2005). A verb like ‘deliver’ sounds very positive but conceals the specific actions to be taken, and is the kind of statement that Fairclough (2005) indicate is often used by text producers to make vague assertions and mask power relations.

It is hoped or presumed that increased production will more than offset the costs of external inputs. The emphasis on countries and regions that show potential for agricultural modernisation indicates that AGRA’s agenda is less the improvement of the production potential and sustainability of smallholder farmers than the implementation of its already established agenda of promoting GR technologies. Thus, the ways that AGRA’s sustainability agenda has evolved over the years appears to be, in part, a reaction to challenges it has encountered, and, in part, a well-crafted programme that have been strategically rolled out on step-by-step basis.

4.4 Communicating and Promoting Sustainable Agriculture

The study also examines AGRA’s reports to understand how it communicates and promotes its sustainable agriculture framings to farmers and other stakeholders in the African agrifood system. In order to promote its framing of ‘sustainable agriculture,’ AGRA deploys both discursive strategies and strategically chosen implementing partners. AGRA uses the discourses of food security, climate change, and science and technology to promote green revolution approaches to various potential audiences. It also partners with universities and research centres, governments, international organisations, private sector agro-dealers, extension officers, and farmer organisations to implement its agricultural agenda.

4.4.1 Discursive Strategies

Corporate actors often play a role in framing certain problems in public discourse, which can directly and indirectly influence the options being considered (Clapp and Fuchs 2009). To promote its version of sustainable agriculture to farmers and other stakeholders, AGRA resorts to several discursive strategies adopted by other international and national organisations. These

include the food security and poverty alleviation frames, the severity and threats of climate change, and the prominent role of science and technology. It also works to advance regulatory and government support structures that favour its programmes.

Food Security and Poverty Alleviation

The first and most persistent way that AGRA frames its idea of sustainable agriculture is in terms of food security, by explicitly invoking the need to eradicate hunger and poverty. The narrative of “doubling food production by 2050” is being utilised as a discursive device to get others to commit to technologies that will allegedly increase food production. The organisation invokes the idea that Africa is the most food insecure region in the world and that, for Africa to feed itself, there is a need to adopt GR technologies and practices. AGRA’s message is that its main “goal is to dramatically increase the productivity, food security and incomes of small-scale farmers” (AGRA 2007:1). This direction and framing were reaffirmed during the 2008 Conference on World Food Security. The message from the chair of AGRA’s board indicated that AGRA’s activities are “moving to transform African agriculture, and to do so in ways that meet not only the immediate needs for reducing poverty and increasing food security, but also the needs of future generations” (AGRA 2008:ix). This food security frame locates the causes of hunger and malnutrition in low crop yields and conceptualises technology as the solution to want and deprivation (Godfray et al. 2010; Jarosz 2014; Lee 2013).

The food security frame has had powerful resonance among Third World governments, development organisations and international agencies such as the FAO. African leaders are faced with the need to reposition agriculture within the continent’s neoliberal economic transformation, and to place it at the centre of plans for economic development (Collier and Dercon 2009). Saying the right things about food security and poverty alleviation—objectives which no one will criticize—improves acceptance of AGRA’s projects. Narratives about food security and poverty alleviation are used to justify the technical and commercial strategies of the organisation, and, particularly, to advance its assertions about the need for African farmers to adopt GR technologies and to link up with global commodity markets.

The food security narrative is, however, controversial. Critics argue that the assertions about feeding a hungry world with GR technologies are debatable, and that this narrow approach focuses on a small set of technologies instead of the situated agricultural knowledge and

capabilities of farmers (Chopra 2015). Such a narrow approach downplays the risks and potential disadvantages associated with pursuing these technological solutions. Doubling production has become a rhetorical goal in food security narratives even though there is not guarantee that it will substantially reduce levels of hunger (Tomlinson 2013). It should be noted that much agricultural crop production already goes to ethanol, to tobacco, illegal drugs, and alcohol, to feeding livestock, and to overfeeding the affluent. Kleinman and Kinchy's (2003) discussion of technological progressivism identifies the impacts of depending on (bio)technical solutions, and the danger of understanding technological progress as an end instead of a means. Such discourses are deployed to influence public opinion regarding the necessity of GR technologies and take advantage of the constitutive power of historically formed normative assumptions about the value and importance of technological progress. This view also relates to what Forsyth and Walker (2008) refer to as "nature-nature simplification" whereby organisations and individuals seek apparently easy but simplistic responses to what are complex socio-ecological problems.

The Severity of Climate Change

Another discursive strategy that AGRA draws on to promote its agricultural agenda is the discourse of climate change as a challenge to agricultural development. AGRA views its own conceptualization of sustainable agriculture as a transformative approach to development in the context of climate change. In the reports analysed, AGRA employed negative imagery of the threats and risks associated with climate change. These are taken to call for significant changes in agricultural systems at all levels. It thus invokes the urgency of (adapting to) climate change as a logical reason for privileging their own preferred approach to sustainable agriculture.

This stance is explicitly presented in the 2011 report:

(...) These challenges are compounded in Sub-Saharan Africa by climate change, an all-encompassing threat to our health, security and stability. Rising temperatures and changing rainfall patterns are already adversely affecting crop yields, and it is the poorest and most vulnerable that will bear the brunt of these changes – which they did little to create, but with which they must cope. (AGRA 2011:6)

Such a narrative fits well with the activities of many international organisations that purportedly aim to help farmers deal with climate change and improve agricultural productivity. For AGRA, GR technologies will help farmers to produce a safe, healthy and abundant food supply, while reducing agriculture's environmental footprint. These technologies are also positioned as a

solution to drought. According to this line of arguments, current local knowledge and practices will not be sufficient to adequately respond to the severe climate impacts that are in store. Therefore, it follows that developing countries require financial and technological assistance from AGRA and its partners to prepare for adverse climate effects. As political ecology posits, scientific knowledge is produced within specific socio-cultural contexts and both influences and reflects societal goals (Davis 2007). The way that AGRA characterizes the knowledge and capabilities of smallholder farmers serves to legitimise its own political agendas. This seems to align with Lave's (2012) perspective that political, economic and social contexts and conditions affect the production of environmental science because they affect how environmental issues will be viewed. Though smallholder farmers have been known to manage their farming systems to meet subsistence needs even in the face of environmental variability, and without depending much on modern agricultural technologies (Denevan 1995), AGRA focuses only on their limitations and does not acknowledge their resource-efficiency, resourcefulness and resilience.

Importance of Science and Technology

A central discursive element in AGRA's promotional campaign is a view of technology as inherently beneficial; there is no mention of any of its negative impacts in areas where GR technologies have been widely adopted. Boldly promoting the untrammelled benefits of technology also extends their discursive reach and power since many people already have an exaggerated faith in the potential of science and technology. By associating itself with and advancing this discourse, AGRA seeks to reduce resistance and gain acceptance for its programmes as beneficial, appropriate, and necessary. Since technology must inevitably be positive, any disagreement can only be seen as absurd (Shuba 2019). This position situates science-based information as authoritative, superior, objective, and unquestionable. Foucault (2003) explains how scientific discourse has a normalizing power in politics, marginalizing actors without the requisite expertise and limiting avenues of resistance. AGRA's positioning thus also works to disqualify and sabotage other forms of knowledge that are not defined as science-based (Foucault 2003). By using scientific knowledge as a defence for its programmes, AGRA is essentially placing science-based information above other sources and forms of knowledge, and ahead of any social and ethical considerations.

Differential power relations also explain the dominance of certain environmental narratives and the inability of counternarratives to gain traction (Robbins 2012). By engaging with university researchers, and offering scholarships and funding, the organisation works to ensure that the future citizenry of Africa is socialised to believe that GR technologies are indispensable to the development of agriculture and the continent. This relationship and its impacts illustrate the assertion by political ecologists that scientific knowledge is a culturally and politically mediated representation of the material world (Jasanoff 2004). AGRA seeks to strengthen and legitimise its position on agricultural technology—especially its promotion of industrial inputs—by aligning itself with trusted, authoritative sources. The central message of AGRA’s promotional materials is one of technological progress, and the beneficent role of science and scientists. Technology is portrayed over and over again as the most assured route to agricultural progress.

4.4.2 Implementing Partners

Normative influence comes into play when individuals accept information from others as accurate and valid, particularly in cases of uncertainty (Kaplan and Miller 1987). The partnerships that AGRA forms help it to influence farmers’ attitudes towards its activities. From the perspective of the theory of informational influence, AGRA’s reliance on implementing partners helps to legitimate its products and increases the likelihood that farmers will adopt the agricultural practices it promotes. Drawing on lessons from the first Green Revolution in Asia and Latin America that show that agricultural development is not just a product of science and technology but of good governance and wider investments in infrastructure and capacity-building, Conway (1997), stresses that the new revolution in Africa will require partnerships between the public and private sectors. AGRA aims to play a central role in transforming the agricultural sector in Africa and its food system, but it aims to increase its impact by reshaping the priorities of many other organisations.

It is apparent from studying its actions and own accounts, that AGRA is, first and foremost, focused on the development of the private sector, with the public sector cast in a supporting role. The analysis of its reports indicates that AGRA has intentionally attracted the largest collection of agricultural technical experts in Africa, with areas of specialisation extending the full length of the agrifood system, “from developing and delivering seeds, fertilisers, and agronomic best practices, to connecting farmers with markets” (AGRA 2016:17). Its staff also includes experts

on farmer organisations, agricultural policy, and financial services for agriculture. These areas and initiatives form part of AGRA’s strategic vision of building partnerships that pool the strengths and resources of the public and private sectors (AGRA 2008). AGRA claims to be “well placed to support adaptation directly, in collaboration with its many partners, and through high-level policy advocacy” (AGRA 2014:15). According to assertions made in its own organs of communication, all of AGRA’s work is conducted through partnerships with “farmers, farmer organisations, agricultural researchers, national governments, businesses, civil society groups, philanthropies and donors” (AGRA 2017:74).

Universities and Research Centres

An important avenue through which the organisation promotes its sustainable agricultural development agenda to farmers is through partnerships with universities and research centres. AGRA relies on creating its own research centres and on partnering with universities to expand its research capacity and its sphere of influence with respect to research and development. AGRA partners with eight universities under the Education for African Crop Improvement programme (EACI): University of Ghana and Kwame Nkrumah University (Ghana); Ahmadu Bello University and University of Ibadan (Nigeria); Makerere University (Uganda); Haramaya University (Ethiopia); Sokoine University (Tanzania); Cornell University (USA); University of KwaZulu-Natal (South Africa); and, Moi University (Kenya). AGRA has its own master’s programme implemented in partner universities to sponsor students to carry out research in the development and promotion of HYV seeds. The Improved Masters in Cultivar Development for Africa (IMCDA) programme, funded by the Bill & Melinda Gates Foundation (BMGF) through AGRA, was established to train a new generation of scientists/plant breeders with a product development mindset and capabilities applicable to work the public or private sectors. Implemented in three universities—Kwame Nkrumah University of Science and Technology (KNUST) in Ghana, Makerere University in Uganda, and the University of KwaZulu-Natal (UKZN)—IMCDA is designed to train plant breeders in the use of modern breeding technologies. AGRA also established a five-year (2009-2014) partnership with the Earth Institute (Columbia University of New York) aimed at “delivering the best science, technologies and policies to sustainably improve the productivity of Africa’s smallholder producers” (AGRA 2009:7).

These partnerships have enabled AGRA to establish good working relationships with host governments by projecting the organisation as providing new opportunities for training and employment. Establishing connections with these universities is also a way to build business–society relations that subtly, or not so subtly, help to change social attitudes towards its programming. This network building gives the organisation the opportunity to promote its projects and to obtain acceptance and legitimacy with host country political leaders, university administrators, scientists, and students. Establishing these centres and partnerships has given AGRA visibility, credibility, reputational dividends, and an aura of social responsibility, which are all helpful if not essential to implementing its programmes.

Governments and International Institutions

AGRA partners with multiple organisations in order to implement its agenda. Important institutional channels for AGRA’s work include the Comprehensive Africa Agriculture Development Programme (CAADP) and the New Partnership for Africa's Development (NEPAD). Partners in this consortium/network have included the Danish International Development Agency (DANIDA), Canada’s International Development Research Centre (IDRC), the Swedish Ministry of Foreign Affairs, and the United States Agency for International Development (USAID). In June 2008, AGRA entered into collaboration agreements with the Millennium Challenge Corporation (MCC), the International Fund for Agricultural Development (IFAD), the Food and Agriculture Organisation of the United Nations (FAO) and the World Food Programme (WFP). The agreement with the MCC involved collaboration on and implementation of projects in Ghana, Madagascar and Mali, in order to “foster broad-based agricultural growth and poverty alleviation” (AGRA 2008:2).

In 2017, the Partnership for an Inclusive Agricultural Transformation in Africa (PIATA) was formed as “an innovative and transformative partnership and financing vehicle to drive inclusive agriculture transformation across the continent” (AGRA 2017). This initiative opened new opportunities for AGRA to work with a wide range of stakeholders, including smallholder farmers and the groups that represent them, private agribusiness, African governments, national and international agricultural research institutes, NGOs and other civil society organisations.

Agro-Dealers

Another important aspect of AGRA's partnership is with agro-dealers. The dealers involved include private companies, state agencies, and NGOs that aim to work to secure access to credit for smallholder farmers and peasants so that they can purchase seeds, pesticides and fertilisers. The logic of the agro-dealers programme is to strengthen networks of village-based agro-dealers that can help to distribute seed developed through AGRA's breeding programmes. It supports the establishment of entrepreneurs who distribute seed and other agricultural inputs to farmers. There is an aspect of extension support, with training of agro-dealers with respect to production methods and knowledge of available products. Business management and technical support on storage, handling, and use of inputs is also provided. The ADP creates a distribution infrastructure oriented to the market. It is a key intervention for AGRA and assists it in constructing viable markets for products created via the research and development activities and infrastructure it supports.

Extension Officers

The Alliance also recognises the key role played by agricultural extension workers in disseminating agricultural knowledge and its preferred versions of 'best practices' to farmers. According to dominant interpretations, extension workers can link small-scale farmers to new research, helping to improve their knowledge and skills so they can take advantage of new production tools and market opportunities. With obvious awareness of the potential powers of persuasion that they represent, AGRA brings them aboard (along with the agro-dealers) to help advance its agricultural development model:

If extension services and agro-dealers used the optimization approach in advising farmers on fertilizer use, farmer profitability as well as productivity is expected to greatly increase. As farmers' financial ability is improved, they are expected to increase input use and further increase productivity (AGRA 2017:60).

Political ecology approaches allow us to recognise power relations and actors involved in the processes of defining and explaining environmental issues (Robbins 2012). Using discourse analysis to delve below and beyond what AGRA is presenting on the surface, the power dynamics involved in the training of extension officers becomes apparent; training a cadre of agro-dealers allows AGRA to stimulate and reinforce in local purveyors of inputs an orientation towards promoting its technologies. In this way as well, private sector actors partially supplant public-sector extension agents who might tend to offer a wider range of choices beyond those

profiting seed and agro-chemical companies. This is a defining feature of a neoliberal agricultural systems that seeks to privatise knowledge and control over agricultural production (Stone and Glover 2017). Further private sector capture—not only of research and development but also of outreach and education services—occurs when companies train public sector extension officers on the details of their products and the extension officers become de facto sales agents for those products.

Farmer-Based Organisations

Gathering farmers together in farmer-based organisations can facilitate increasing farmer access to inputs, credit, output markets, and technical training. It can also increase engagement with government programs and improve coordination. Documentary analysis reveals that, in AGRA's view, smallholder farmers need to be organised to realise economies of scale for providing and accessing inputs. Partnership with Farmer Based Organisations (FBOs) is vital to enable AGRA to more effectively engage smallholder farmers. It promotes farmer organisations because of their utility in facilitating communication and in providing markets for reasonable volumes of inputs. In 2010, AGRA established the Farmer Organisation Support Centre in Africa (FOSCA), “which identifies networks of organisations in AGRA's target countries, and links them to service providers to realise its goals” (AGRA 2010:13). This, it would seem, is an important part of AGRA's strategic vision to build partnerships that pool the strengths and resources of the private as well as the public sector. It is also worth noting that, while AGRA does emphasise the importance of smallholder producers in many of its communications, this is hardly a radical move given that the majority of farmers in Africa can be readily categorised as smallholders.

Through various discursive techniques, along with the partnerships with key organisations, AGRA has been able to promote its ideas of sustainable agriculture as the only reasonable option for farmers and other stakeholders. The different kinds of partnerships provide AGRA with multiple channels through which to exercise nearly hegemonic control over food production practices and agricultural commodity distribution in Africa. Its key role in these integrated and interacting networks helps to create a context in which farmers are unable to negotiate the agrifood system without AGRA influencing and shaping many of their ‘choices.’ As Foucault (2003) argues, discourses shape and limit how people can speak, think, and act, and through this, the social structures that are produced and reproduced. This analysis of Agra's discursive

practices documents a strong example of this process. By entering into partnerships at local, regional and international levels, AGRA has established itself and its narrative about the utility of GR technologies as the ‘saviour of farmers.’ Via the comprehensive and pervasive discursive frameworks that it has consciously elaborated, AGRA dominates agendas with respect to the development of farming systems—intervening as it does at the realms of both knowledge development and development models.

The political ecology view highlights the broader ability of organisations like AGRA to set agendas and support proposals that limit the range of opposing actors’ choices. This ability is a function of their dominant position within states and the global agrifood system. As globalisation has advanced, corporate actors have increasingly used their control of resources and networks to support, implement, and enforce their privately set rules and standards (Busch 2011). The partnerships joined or brokered by AGRA reflect an impressive reach and sophistication on the part of corporate-linked NGOs that have learned how to take advantage of the intricate dynamics and relationships among the key players in the African agrifood system. In discourse analysis, it is important not to ignore the history of these actions and discourses, nor the individuals and situations involved. Although, the GR technologies may lead to increased yields, the commitments to increase production through the purchase of more inputs (commercial seeds, fertilisers, pesticides, and machines) will likely pull farmers further onto the technology treadmill.

In efforts to promote their discourses, organisations—or at least some actors inside and associated with organisations—can sometimes end up believing their own propaganda. They may come to fervently believe that they are saving the world from hunger and the planet from further environmental degradation. So, conscious discourse becomes unconscious adoption of worldviews and orthodoxies—the insiders may become GR fundamentalists even as they take on new rhetoric embracing farmers as partners and ecology as their friend.

4.5 Silences in AGRA’s Sustainable Agriculture Discourse

Ruiz (2009) argues that it is important to pay attention to silences in discourse analysis—what is intentionally left unsaid or just completely ignored. Considering silences can also reveal how a dominant discourse operates to silence different understandings of the world. To do so, researchers must be attuned to the broader social context of the projects and texts that they are

studying (Waitt 2010). AGRA not only works to promote its definition of sustainable agriculture to farmers and other stakeholders; it also works to prevent other narratives of sustainable agriculture from getting to them (the farmers) by deliberately ignoring counter narratives. An analysis of the contents of its annual reports reveals that several key elements of the broader discussion on sustainable agriculture are not represented. Interrelated silences revealed in AGRA's agricultural sustainability discourses include: the contributions and rights of farmers; various aspects of social inequality in agriculture that may be intensified under conventional models of development; debates around the efficacy and consequences of GMO seeds and associated regimes of intellectual property rights; agroecology as an alternative approach to improving farming systems; threats to biodiversity connected to cultivation of more genetically and otherwise uniform crops; the multiple faces of power and political interference; and, its narrowly focused approach to agricultural sustainability.

4.5.1 Farmers' Agency: Where is the Farmer?

The discourse elaborated by AGRA suggests that farmers are central to, and at the centre of, their collaborative initiatives. However, deconstructing this discourse, one can see that farmers' agency in relation to knowledge and practices is constrained. Other actors and organisations are privileged and occupy more powerful positions in relation to technology development, knowledge sharing, and policy development. Farmers may have been 'connected' to the systems of technology development and dissemination sponsored by AGRA, but they have rarely been integrated as key players. When projects focus on achieving narrow, pre-defined goals and give insufficient attention to the quality of participation, the opportunity to meaningfully involve and engage farmers is lost along with any chance to integrate their locally rooted, situated and ground-tested skills and capabilities with the technical expertise of scientists. Under the model of agricultural development promoted by AGRA, there is little sign of any commitment to honouring and including the concerns and insights of farmers. Whereas AGRA appears to endorse the agency and empowerment of farmers, its actions expose this as a pose: its deeper project seems more oriented to remaking agriculture in ways that subordinate farmers to experts and to agribusiness firms that are also, to a large degree, under its influence and control.

A key part of the sustainable agriculture strategy of AGRA is linking smallholders to 'value-chains' and global agribusiness through increased access to the technologies allegedly required

to increase production. It argues that this will unleash the latent potential of Africa's 'underexploited' lands and bring significant benefits through reduction of poverty and food insecurity, and through protection of the environment. While promoting smallholders as key partners and beneficiaries, the AGRA initiative has, from the outset, been influenced by its strong (ideological and financial) links to agribusiness firms, and to their allies in governments and development institutions. Participation from smallholder farmers and their organisations has been encouraged, but only if they sign onto the kind of agribusiness-dominated agricultural development trajectory that AGRA advances. In practice, this has meant that organisations that challenge the legitimacy of the corporate food regime in Africa have been excluded, while more "moderate" and "pragmatic" voices are included (McMichael 2005).

The Green Revolution approach is often put forward as the only available and practicable body of agricultural knowledge—excluding and ignoring many traditional and alternative knowledges and practices (Thompson 2012; McMichael 2014). Critics argue that the monopolistic relations inherent in AGRA's market model mean that the organization, and its corporate allies and agronomist acolytes, tightly control the production process offering little space for experimentation by smallholders (Bergius 2019). Thus, farmers without scientific-technical knowledge (which, basically describes most smallholder farmers in Africa) are limited in their capacity to influence technical directions, development trajectories, or policies (Gengenbach et al. 2018). In this sense, scientific discourses (as a dominant norm) enable and constrain the capacity for agency—the capacity to possess and exercise certain forms of power. Although AGRA avows that its focus is on smallholder farmers, it does not define what it meant by "smallholder" and also does not indicate the extent to which such farmers will be empowered to make authentically autonomous decisions as to what is grown and how. AGRA's focus on the use of the GR technologies contributes to a shifting away from farmer-centred practices to ones mediated by agribusiness interests. This is exemplified by AGRA's collaboration with Syngenta for the supply of fertilisers (Syngenta Foundation 2019). The smallholders ultimately become "growers", providing the labour and some capital, absorbing many important risks, but not making the major management decisions. As Patel (2013) argues, the GR programme is a package to be adopted by smallholder farmers rather than to be thoroughly vetted and adapted to fit their realities and situations. Another important silence identified in this analysis is that

AGRA does not acknowledge any risk associated with accepting money from some of the world's leading capitalists, or emanating from its close corporate partnerships.

4.5.2 Inequality: Who are the Losers and Winners?

A significant subject that AGRA's reports elide, but which is nevertheless germane to questions of agricultural sustainability, is the issue of pre-existing and rising inequality. The documents fail to recognise the growing body of research that identifies how a neoliberal, technologically oriented agriculture has in many places failed to reduce poverty and vulnerability among farmers and other rural dwellers (McMichael 2014; Lee 2013). Market-oriented crop farming is a risky undertaking for poorer farmers, as they lack access to, and power in, the markets where inputs and agricultural commodities are traded for money (Bezner Kerr 2012; Patel 2013). Moreover, higher yields and the larger-scale agricultural activities often promote mechanisation, which tends to reduce the need for a rural labour force (Bezner Kerr 2012; Vanhaute 2011). Without substantive agrarian reforms in the realms of finance, land tenure, labour relations, and trading relations, the fate of many small farmers is likely to be demotion to the status of landless labourers—in a context where there are few agricultural or manufacturing sector jobs. This is not idle conjecture—it is well supported by generations of evidence from areas earlier targeted for GR remakes (Agarwal 1992; Bezner Kerr 2012; McMichael 2014; Patel 2013; Sobha 2007; Weis 2007).

4.5.3 GMO and Intellectual Property Rights

Although AGRA supports the scientific breeding of crops, its position on genetically modified organisms (GMOs) is rather unclear—perhaps intentionally so. AGRA affirms that conventional agriculture (rather than any alternative approaches) is the starting point and foundation of its green revolution. However, there is little further discussion of this issue. The general message from AGRA is that they are open to any technology able to increase yields and able to fight hunger. However, looking more closely at the scientific projects financed by AGRA, many of them include genetic engineering components, which is consistent with its embrace of productivity-enhancing tools. Bill Gates' speech at the 2009 World Food Prize Symposium enunciates this stance but may understate their commitment to agricultural biotechnologies, and therefore conceals as much as it reveals:

“We’re not advocates of any particular scientific method. We support a range of agricultural techniques. In some of our grants, we include transgenic approaches because we believe they can help address farmers’ challenges faster and more efficiently than conventional breeding alone.”

The ownership and control of the global seed supply has become increasingly concentrated, and as Kloppenburg noted, the biological realm has been increasingly commoditised, through a process of accumulation by dispossession (Kloppenburg 2010). Traditionally, innovation in African agriculture has proceeded through collective community processes, drawn on customary local and scientific practices based on sharing. AGRA’s vision of agriculture may push African countries down the path towards privatisation of innovation and knowledge—in the form of intellectual property rights (IPRs). These rights are based on a very different culture, where the right to deny access to innovations is supreme (Marsden 2013). Those supporting IPRs argue that they will hasten agricultural development and increase food production by encouraging private technology transfer and investment in research (Langford 1997). On the other hand, this trend can be also be read as another form of enclosure and dispossession despite the innocent-sounding discourse carefully adopted by its champions.

4.5.4 Biodiversity

Although maintaining crop diversity is known to be important for the sustainability of agriculture both locally and globally (Constance 2014), AGRA is deliberately silent on this. The GR agricultural system it promotes concentrates on few, select crops and cultivars. Biodiversity represents a main concern for Thompson (2014), who sees the development and distribution of hybrid seeds in Africa as theft of genetic biodiversity, without recognition of those who helped to develop this genetic material over many centuries. In sacrificing the ‘agronomic resilience’ of traditional varieties for the yield-enhancing but frequently more vulnerable GR seeds, the balance between crop and environment is undermined (Kloppenburg 2010). Again, apart from the production of more ‘HYVs’, AGRA’s documents are silent on how it will promote biodiversity in the African seed system. This silence supports fears that AGRA has the potential to harm smallholder farming systems. The main concerns include loss of food sovereignty via increased dependence on high-cost technology and the erosion of local biodiversity, agricultural knowledge systems and institutional capacities (Glover 2010; Scoones, Ian and Thompson 2011). There is also fear that AGRA could inadvertently foster environmental damage to African soils and aquatic systems through the more intensive use of fertilisers.

4.5.5 Power and Politics in AGRA's Sustainability Definition

AGRA's efforts to influence public perceptions and policy debates involve complex power relations including discursive contests over the production of "truth" about sustainable agriculture (Huber 2017). The politics of knowledge production and legitimation represents an important focus for analysis. In Foucault's (1984) view, in each society there is a general politics or regime of truth, which refers to the types of discourse that it accepts and makes function as true. Scientific discourses, including the actors and institutions that produce them, play key roles in the stabilizing and advancing the truth regime that helps determine what gets qualified as sustainable agriculture.

As was the case in the first Green Revolution in Asia and Latin America, strategic philanthropy, (as the Rockefeller Foundation describes it), has played a pivotal role in priming government involvement and in the transformation of agricultural landscapes. The tentacles of AGRA's neo-liberal order extend beyond the business sphere, creating an intricate web of relationships between business and philanthropy, government, public research agencies, and non-government organisations. These illustrates C. Wright Mill's (1956) argument in *the Power Elite* that elites maintain power and dominance through articulation of the interwoven interests of the leaders of the military, corporate, and political organs, and that ordinary citizens are relatively powerless and subject to manipulation by those entities. Strategically placed astride the food system, AGRA adds to its power and influence by bringing important elites alongside and inside organisational tent.

From the perspective of political ecology theory (Robbins 2012; Castree 2014), AGRA's partnerships have provided it with leverage and legitimacy that enables it to effectively promote and implant its vision of agricultural sustainability. The enrollment and mobilization universities and research centres especially, provides a scientific underpinning and amplitude to their activities. Having well-known figures such as the former UN Secretary General, Kofi Annan⁵ as one of its key board members also provides legitimacy to its particular, peculiar framing of sustainable agriculture. However, one concern is to discern whether such public figures are recruited and put forward as marketing devices, or if they are the actual architects of the green

⁵ Kofi Atta Annan served as the seventh Secretary-General of the United Nations from January 1997 to December 2006. He was the Board Chairman of AGRA from 2007–2018.

revolution movement. As in many important schemes (Kloppenburg 2004), the key architects are often not the individuals whose faces we see. Power pervades the agrifood landscape. The financial resources and connections of corporations and NGOs give them opportunities to define what agricultural sustainability should or should not be (Clapp 2014) and give them opportunities to use discursive power to shape broader discussions and debates surrounding these issues.

4.5.6 Narrowed Conceptions of Sustainability

AGRA's definition of agricultural sustainability concentrates on increasing yields through the use of GR technologies. Its sustainability claims are constructed in ways that allow it to shift the conversation to its narrowed definitions of sustainable agricultural development, obfuscating important connections among different sustainability challenges. As already discussed, the organisation is also engaging in efforts to create legitimacy for this framing by partnering with a variety of organisations that may have more perceived legitimacy than corporate actors with a profit motive. Corporate actors and their NGO surrogates attempt to frame their initiatives as legitimate and necessary to achieve food system sustainability (Castree 2014). If they are perceived as legitimate, they are made an integral part of the answer, and thus, their preferred solutions gain traction and primacy. In turn, alternative solutions receive less thought, attention and funding.

The narrowed definition of sustainability has many consequences. It shapes what can be known about agriculture and how it can be pursued in the context of Africa. In a system that favours partnerships with and funding from industry, alternative solutions such as those advanced by advocates of food sovereignty and agroecology may experience weakened legitimacy and support. Although AGRA represents itself as neutral, disinterested, and charitable, and its program as innovative and advanced, the validity of its claims linking expanded input use, increased agricultural output, and improved living conditions for smallholder farmers is questionable.

4.6 Implications for Agricultural Sustainability

As suggested by Gertler, Jaffe, and Beckie (2018:179), the way sustainability is defined has significance for “regional ecologies, scientific practices, development trajectories, markets, and the moral high ground in terms of food security and sustainability.” This also influences the

solutions that are proposed by organisations and individuals, and the discourses that are considered to be true. The findings of this study have multiple implications for understanding debates around agricultural sustainability, and for the sustainability of the African agrifood system itself. This section revisits AGRA's (explicit and implied) definition of agricultural sustainability and reconsiders it in relation to the three main dimensions of sustainability: social, economic and the environmental. For the purposes of this discussion, the social dimension is taken to include such concerns as participation, social inequalities and human health. The economic dimension involves funding, trade, land and commodity markets, and Intellectual Property Rights. The environmental dimension focuses on climate change, biodiversity, and resource efficiency. All the three dimensions of sustainability must be simultaneously and holistically integrated in order to achieve a truly sustainable agriculture. Reality is a seamless web; whether we acknowledge it or not, economic, social, and ecological dimensions of our activities are intertwined and inseparable.

4.6.1 Social Dimension of Sustainability

Although AGRA's agenda explicitly prioritises making the agricultural systems of African smallholder farmers (and others) sustainable through increasing yields and profits, a number of critics are not convinced that the AGRA model is based upon an adequate conception of the social realities involved in promoting technological innovation in Africa (McMichael 2011). The initiative is perceived to be overly dependent on the technological packages promoted by transnational agribusiness firms (such as Syngenta, Yara and Monsanto—now Bayer) while neglecting the deep and grounded knowledge of small farmers. This constitutes an attack on autonomy, culture, and community in that farming is intimately tied to networks of exchange of many kinds. It may particularly be an attack on the knowledge and power of women, as they are often the traditional selectors, keepers, and planters of seeds. Some also flag the theft of small farmers' seed technologies (Thompson 2011). Underlying these concerns is the perception that AGRA's projects are integrated into an unequal and unfair global trading systems.

AGRA argues that it values the active participation of all relevant stakeholders and that it is aware of the importance of ownership, at least in principle. For instance, in the seed programme, local partners are expected to be responsible for the selection of crop varieties (i.e. some form of participatory plant breeding), and extension services and farmers are encouraged to form

agricultural co-operatives that are purported to increase farmer capacity and amplify their voices. Of course, such co-operatives also provide a useful and efficient conduit for the transmission of AGRA's preferred approaches and technologies. AGRA's investments in graduate agricultural education and its co-operation with national and regional research facilities also can be viewed as a way to integrate regional needs and innovations into its programmes. However, although, AGRA recognises the importance of local participation, it does not specify how and to what extent local farmers will participate in its activities. It remains questionable whether AGRA's approach can meet the needs of small-scale farmers without more explicitly promoting their influence and role in elaborating innovations and co-generating knowledge.

With regards to reducing social inequalities, which is an important dimension of addressing social sustainability (Ikerd et al. 1997), AGRA focuses on smallholder farmers as the main target group and presents gender equity an important goal. AGRA claims that smallholder farmers are at the centre of what they do and that its approach is "working to mainstream gender considerations into grantee proposals and funding, and strives to strengthen gender competence within AGRA through training and by building gender insights into our investment programs." (AGRA 2012:12). However, the organisation fails to identify specific indicators and timelines with respect to how these insights are to be incorporated into their programming. Unlike the fertiliser programme, which is featured throughout the documents analysed, the gender component is mentioned only occasionally and tangentially. AGRA also fails to define who is to be regarded as a 'smallholder farmer' and it seemingly neglects the needs and rights of other disadvantaged groups, such as landless peasants and migrant workers.

Also left undiscussed are issues of unequal benefit and the possibilities that their activities will ultimately promote concentration in landholding. Africa is a diverse society, which makes it all the more important not to ignore (or brush aside) inequalities and local differences. AGRA's neglect of traditional technologies means that it is unlikely that its approach will significantly benefit already marginalised social groups, including certain disadvantaged ethnic minorities. AGRA indicates that gender and, specifically the inclusion of women, is "a critical crosscutting priority and that all programmes are to pay special attention to women farmers...who produce the majority of Africa's food" (AGRA 2011:13). It is, however, unclear how issues such as equal access to finance, land, labour, and new agricultural tools and technologies are addressed as there

appear to be no funding specifically committed to these. Also, the issues of creating new dependencies and who are the long-term local, national, and global beneficiaries are not addressed. As well, questions of land tenure and associated property rights are ignored.

When it comes to health, apart from the production of “healthy” food, health issues related to agricultural production are not raised by AGRA. AGRA appears to focus on improving caloric intake and thus reducing hunger. Other health issues are seen as lying outside the realm of agricultural programmes. AGRA’s neglect of occupational health issues is critical considering that a major part of the immense occupational health burden borne by farmers is due to the use of agrochemicals (ILO 2000). Generally, the interrelations between agriculture and a broad variety of health aspects—ranging from environmental health and food safety to chronic and infectious diseases (Bezner Kerr 2012; Patel 2013)—are not featured in AGRA’s activities. A diversified diet—based on diversified crop and livestock production—is widely seen as a key for achieving agricultural sustainability (Patel 2013). AGRA, however, focuses its attention on promoting the cultivation of a relative handful of crops.

In terms of education, AGRA’s focus is on supporting advanced academic training in agriculture (MSc, PhD), marketing know-how (agro-dealers), increasing the practical knowledge of farmers and training extension workers. According to AGRA’s 2011 status report, for example, about 100 MSc and PhD students have graduated from African universities with its funding. Furthermore, 13,500 agro-dealerships have been established and funded by AGRA. Its focus on tertiary education helps to set research agendas at key universities and risks excluding the underprivileged, who generally lack the basic education needed for access to higher level programmes. The extent to which AGRA’s education projects and extension services respond to the specific needs of those most in need is difficult to judge. Private extension services are typically contracted for the provision and promotion of inputs such as seeds and fertilisers. This raises question about access by poorer farmers, who are less lucrative targets for such commercially linked outreach. AGRA aims at counteracting this problem by facilitating the provision of financial assistance to impecunious farmers, however, the definition of ‘those in need’ remains fuzzy.

Paradoxically, AGRA’s focus on few countries is likely to increase rather than eradicate existing regional and national inequalities. Areas where the potential for easily improving yields is low,

and where climate change may have its most adverse consequences, may not be favoured locations from the organization's perspective. That is, the areas that need the most attention may not get support from AGRA because they lack the prerequisites for successful adoption of GR technologies. As Van Dijk (2005) argues, discourses work toward normalisation of certain practices, but this is only revealed with analysis that is mindful of context, locality, and temporality. AGRA concentrates its efforts in locales where there are fewer barriers to success, and then represents its successes as beneficial for, and readily generalisable to, the whole continent.

4.6.2 The Economic Dimension

The economic dimension of sustainability is clearly the central issue in AGRA's approach as it emphasises increasing yields and the incomes of farmers. Incomes are supposed to be increased through use of inputs that would increase agricultural yields. Production increases are expected to more than make up for rising expenditures for seeds and inputs so that net incomes of smallholder are expected to increase in the long run (Sanchez, Denning, and Nziguheba 2009). Of course, this says little about financial and agronomic risks, or about the stability of yields and income—import concerns especially for smallholders. All AGRA's programmes ultimately aim to serve one project: assuring provision of commercial inputs and facilitating the marketing of agricultural commodities. This includes establishing local supply and marketing networks, and promoting a functioning international trading system through trade liberalisation and government policies to support them.

Intellectual property rights (IPR) is a critical issue, particularly in regard to biotechnology research and development in the agricultural sector. However, at least in its more public communications, AGRA is mostly silent on this issue. Despite these purposeful silences, AGRA's position on IPR is clear in that it is seen as axiomatic that seed varieties developed by private companies have to eventually pay back the investments. The argument is also made (or implied) that everyone has the right to enjoy the benefits of their intellectual efforts and outputs—although the collective efforts and interests of generations of farmers are somehow overlooked. Most important for AGRA is the economic consideration that the enforcement of IPR can encourage investment and innovation. AGRA aligns itself with arguments that breeders, companies and research institutions that develop new varieties need to recover their investments

in research and development. However, critics argued that IPR regimes can lead to the concentration of ownership of agricultural resource, inhibit independent research and seed sharing, and narrow research agendas to focus on patentable and commercially interesting innovations (Thompson 2012).

Access to finance is important for farmers, especially if they are involved in commercial production of conventional commodities. Different types of financing are required: working capital to cover the time gap between incurring production costs and receipt of income; capital for expansion and investment in mechanisation; and reserves to hedge against adverse agronomic and market conditions. AGRA addresses this in its Financing for Agriculture Programme. However, it should be recognised that the provision of financing can result in rising indebtedness for farmers (Moseley, Schnurr and Bezner Kerr 2015; Schnurr 2015; Vanhaute 2011), especially where all the requisite elements of a high-output system are not in place to ensure adequate income to pay off debts. It is a risky strategy for most farmers to enter into debt unless they are going to engage in sustained commercial production with an adequate land base, adequate knowledge, and information, assured supplies of inputs, and clearly identified markets with fairly written and enforced contracts for their products. Despite AGRA's claims to be targeting the poorest of Africa's farmers, its commercial financing strategy likely only targets and fits a fairly small proportion of relatively wealthy producers.

AGRA sees the existing connectivity between farmers and markets as rudimentary, unresponsive to market demand, and therefore unprofitable and especially unfavourable for smallholder farmers. Access to markets and market information is identified by AGRA as path to making small-scale farming more profitable and more sustainable. AGRA targets this supposed lack of market access through its Market Access Programme. Through the establishment of farmer-based organisations and the development of new storage infrastructure, farmers are expected to gain the power to negotiate and to sell their products at higher prices. However, the targeted consumers and markets are not specified; the assumption appears to be that markets will efficiently and rationally distribute both the inputs and food where it is needed. This seems connected to implicit and explicit support for an open economy with liberalised trade systems. According to AGRA's logic, economic opportunities are created not for only small-scale farmers but also for small agro-dealers who are meant to provide and distribute the necessary agricultural

inputs. This remains a rather vague ideal because AGRA fails to provide more specific recommendations, or to analyze and report the degree to which such expectations are translated into the predicted outcomes. Moreover, regardless of any prowess this system has for providing access to inputs, it appears that AGRA is also busy creating access for multinational agrochemical companies to new markets in Africa.

4.6.3 Environmental Sustainability Dimension

Drawing on the lessons from the previous GR and its well-documented environmental impacts, AGRA claims to be “working together to gain a better understanding of the physical, biological and ecological consequences of agricultural intensification, and to promote practices that will lead to both productivities increase and environmentally sound management of Africa's resources” (AGRA 2012). This is one of the few official statements from AGRA on environmental topics and reveals a lot about its perspective on environmental sustainability. Not coincidentally, the Gates Foundation appears to adopt a somewhat similar position in its public utterances:

“the African Green Revolution shall be environmentally sustainable as it has to be sustainable over the long term. That means the viability of the soil, water, and other natural resources have to be protected as the food production and thus the farmers depend on them” (Gates Foundation 2012).

In AGRA's worldview, achieving environmental sustainability is a mostly a question of developing and promoting adoption of the right technologies. AGRA claims that the most positive ecological effect of its approach is that, degraded agricultural soils are improved and the conversion of more lands for agriculture are minimised through sustainable intensification. Consequently, other non-cultivated soils/landscapes such as forests and grasslands are protected, as further deforestation and land transformation to gain more arable terrain is prevented. As well, it asserts that further desertification and loss of biodiversity are prevented by this intervention. AGRA maintains that not reducing biodiversity by breaking new land is an important part of its programing; it is by this route that environmental sustainability should be promoted and not through “biodiversity friendly” new agricultural practices, an assertion evidently intended to sideline or obviate the need for alternative agricultural practices.

It is striking that AGRA appears to be silent on research findings that point to the fact that extensive use of fertilisers can cause salinisation, frequently pollutes water bodies, and can lead to biodiversity loss (Weis 2010). The use of organic fertiliser is mentioned a number of times but reducing the use of synthetic/manufactured fertilisers is certainly not an objective since increased

fertiliser use is seen as one of the main keys to increasing yields. This diagnosis of their environmental sustainability discourse is supported by the fact that, in AGRA's reports, only indicators for the sale of mineral fertilisers are available and no information about advancing more organic alternatives (such as green manuring, mulching, and rotations featuring leguminous crops) can be found. Commercial fertilisers, in particular nitrogen fertilisers, are obtained using tremendous amounts of fossil fuels for processing and as a feedstock (especially, natural gas). Negative effects of higher use of nitrogen fertilisers, such as runoff into streams, rivers and lakes, and pollution of groundwater are not discussed. Nor are the contributions of nitrogen fertiliser volatilisation to greenhouse gas emissions really addressed, except by referencing possible technical remedies such as fertiliser micro-dosing. Also, the problem of increasing the dependency on mineral fertilisers and consequently on fossil fuels is not discussed. The entire approach is based on the idea that outputs have to be increased through additional use of industrial inputs. The intensification associated with such a "treadmill of production," coupled with the nature of these particular strategies, has caused serious and sometimes irreversible environmental and social impacts (Weis 2010; Agarwal 1997).

Concerning climate change, AGRA argues that a "climate smart transformation..." (2011:6) is needed. Its perspective on so-called climate smart agriculture, focuses on adaptation to climate change, not mitigation: "We believe the best way for the foundation to address climate change is to help poor farmers adapt (...) such as drought-tolerant maize for Africa and stress-tolerant rice that can survive up to two weeks underwater" (AGRA 2012). Adaptation is seen by AGRA in very technical terms, a mere question of generating the right seeds and having good and efficient irrigation techniques complemented by the right doses of fertiliser, herbicides, fungicides, and insecticides. However, it should be underlined that an intact biodiversity, complex rather than simplified cropping strategies, and variable landscapes approaches are essential parts of adaptation and have great potential for increasing resilience (Patel 2013). This kind of adaptation is not discussed in the AGRA documents reviewed. Reducing GHG emissions from the agricultural sector, which is globally a source of 10-12% of all GHG emissions (IPCC 2012), is apparently not an element of AGRA's approach.

Again, as AGRA's main aim is to help farmers increase output, a sufficient supply of all requisite inputs is seen as essential, and water is an important component. As the application of

mineral fertilisers is only cost-effective and agronomically efficient when water is not a limiting factor, AGRA's approach can only work well where there is reliable rainfall or cost-effective access to irrigation (Schnurr 2015). The issue of how less favoured, water-scarce areas can benefit from AGRA's approach is not discussed. This concern could, however, help to explain why AGRA focuses on the specific subset of countries (11 out of 54 on the continent) that it has targeted.

Biodiversity is of great importance for a sustainable agriculture; it is a goal in itself and it helps to stabilise ecosystems and to maintain their resilience against shocks (Constance et al. 2014). AGRA, however, sees the importance and value of biodiversity less broadly: biodiversity is argued to benefit from the protection of non-agricultural landscapes from being transformed to arable land as the pressure to convert new land is lowered by the increased yields.

Campbell (2009) argues that the food regime underpinning the GR sidelines the ecological impacts that are involved in what Marx described as a metabolic rift that ruptures the interactions between human beings and nature. That is, AGRA's sustainable agriculture model, as part of a system animated by capitalist logic, interrupts the ecological cycling and recycling of nutrients, and involves a geographic and social distancing of humans from the ecological consequences of their actions. This is similar to Sachs' claim that "it is only by externalizing these costs [the depletion of nature] and then assuming them away as if they did not exist that some agricultural operations are presented as a success story, while in reality they should be considered as nothing short of a catastrophe" (Sachs 1987:196).

4.7 Chapter Summary

The advocates of the "New African Green Revolution" approach appear to believe they have identified the solutions for fighting hunger and reducing poverty—and for ensuring some sort of sustainable agricultural development. AGRA indicates that the solution to sustaining African agriculture lies in the use of technologies that increase yields, namely improved seeds, fertiliser and other agrochemicals, and linking smallholder farmers to markets. In this chapter, findings have been presented with respect on how sustainable agriculture is framed by AGRA and promoted to farmers and other stakeholders in the African agrifood system. The analysis has also focused on AGRA's many programmes and partnerships. The intent has been to map out how it works to define and operationalise its version of sustainable agriculture, how the definition has

evolved, and how it has been promoted in different venues and at multiple levels. Following the requirements of a sociological discourse analysis, issues that AGRA is silent on, or assumes away, are also analysed. The implications of AGRA's active (re)definition of sustainable agriculture are also considered with reference to social, economic and environmental dimensions of agricultural sustainability.

CHAPTER 5: CONCLUSION

5.1 Introduction

This final chapter presents a summary of key findings, a discussion of contributions to knowledge, and some reflections and reconsideration of various theoretical approaches. It also includes recommendations for future research along with some concluding remarks.

5.2 Summary of Findings

Although still understudied, the issue of sustainable agriculture has grown in prominence among researchers, governments, and those in the broader development community (Buttel 2006; Constance 2014). This thesis explores the sustainable agriculture agenda of the Alliance for a Green Revolution in Africa (AGRA) by investigating how sustainable agriculture has been defined by the organisation, how the definition has evolved over time, and how it is promoted to farmers and other stakeholders in the African agrifood system. Drawing on theories and concepts from political ecology, environmental sociology, and the sociology of food and agriculture, and employing the theory and methods of sociological discourse analysis, the study explored these questions by using data gathered from the annual reports of the organisation for 2008 through 2018. The rationale for choosing the annual reports for analysis was based on their accessibility and the (authorised) information they provide on AGRA's vision with respect to agricultural sustainability. More specifically, the annual reports contain official information and authorized statements on funding, partnerships, projects, and various other new initiatives. Spanning an important decade in the launching and development of the organisation, they provide historical depth on these elements of its discourse and related strategic initiatives. These documents were an appropriate and useful source of data for the study because they were written by AGRA staff and intended for important audiences including policy makers, scientists, partner organisations, donors, governments, and other NGOs. It is through these documents that the organisation signals and communicates its perspectives, priorities, and plans.

5.2.1 How does AGRA Conceptualise Sustainable Agriculture?

AGRA's definition of sustainable agriculture is based on an agricultural system that generally prioritises the use of industrial inputs to increase crop yields on an existing agricultural land base, that is, without clearing more land for cultivation. It involves the use of modern agricultural technologies and techniques such as 'improved seeds', synthetic fertilisers and pesticides,

enhanced access to markets and greater market integration, improved access to credit/financing for farmers, national policies favorable to these forms of intensification, and forging partnerships among stakeholders in the agrifood system. This definition stems from the view that African farmers do not have the capacity to deal with challenges of soil fertility and climate change, or the capacity to increase yields as a result of lack of scientific knowledge, lack of investment in agriculture, limited seed breeding activity and commercialisation systems that slow the introduction of new varieties, limited infrastructure for the distribution of synthetic fertilisers, weak governance and regulatory systems, lack of credit/financing, and lack of access to markets. For AGRA, agriculture becomes sustainable when farmers have ready access to inputs and to markets, adequate access to credit, and capacity to significantly increase production. Moreover, in terms of the larger agricultural system in which they operate, the organisation calls for policies that support and promote the uptake of new technologies. Furthermore, to sustain progress in the African agricultural system, the organisation emphasises economic development that provides other kinds of employment rather than recruiting more labour into farming.

5.2.2 How has AGRA's Framing of Sustainable Agriculture Evolved Over Time?

The study reveals that the organisation's narrative of sustainability has not actually evolved a great deal since its inception. Rather than any major evolution in perspective, the way that its programmes have been rolled out suggests the stepwise unfolding of a plan that did not change in any fundamental way over the decade considered. Rather, it responded to specific bottlenecks and barriers that it encountered in executing its goals. Changes in other aspects of its discourse, e.g. the limited and selective incorporation of certain terms and themes that gained currency in the discourse of sustainability experts and organizations, appear to have been more about marketing and insuring a social licence to operate than about any fundamental rethinking of its priorities.

Over time, the organisation developed and shared discursive resources to construct context-specific frames about sustainable agriculture that provided the foundation for subsequent constructions. The organisation's initial narrative about lack of appropriate seeds provided the foundation for successive sustainability discourses focusing on soil health, input and commodity markets, access to credit, capacity building in education and extension, policies, and partnerships. AGRA's use of seeds as a gateway to its agriculture agenda in Africa aligns with

Kloppenburg's (2005) observation about how efforts to control seeds have shaped the emergence of the agricultural biotechnology industry and many of the related developments in agriculture.

The findings further reveal that the discourses that AGRA has promoted to farmers and other stakeholders are part of a nested set of discursive strategies that are also advanced at national and international levels. To various degrees, AGRA's discourse aligns with changes in the agrifood landscape emanating from models and constructs promulgated by initiatives and organisations such as the structural adjustment programmes rolled out by the World Bank and the International Monetary Fund, the Comprehensive Africa Agriculture Development Programme, and UN's Millennium Development Goals and Sustainable Development Goals. Discursive alignment with trends in global sustainability discourses has worked to legitimise AGRA's projects and to associate them with the programs and pronouncements of leading organisations and experts. Such attempts at (partial) alignment with global discursive shifts are an example of how large NGOs, foundations, and corporate actors continuously work to construct positive images, which smooth the way for their preferred course of action and increase their ability to promote their ideas as legitimate.

5.2.3 How does AGRA Communicate and Promote its Notion of Sustainability to Farmers and other Stakeholders?

The findings indicate that in order to promote its vision of sustainable agriculture based on more intensive and extensive application of industrial inputs, and other so-called advanced technologies, AGRA resorts to several discursive strategies that are already widely used by other international and national organisations. It uses the discourses of food security, climate change, and the significance of science and technology to promote the adoption of contemporary Green Revolution technologies. AGRA gains discursive power and influence through philanthropy, partnerships with public and private sector institutions, and civil society groups, investments in research, education and extension, and promoting the development of regulatory structures that favour its preferred program. One of the striking findings is the organisation's skillful use of negative mental imagery associated with climate change to validate its position that the development and adoption of GR technologies are critical for achieving sustainable agriculture.

AGRA does not work directly with farmers. Rather, it promotes its vision of sustainable agriculture through implementing partners such as government agencies, farmer organisations

(including agricultural co-operatives conceived and established by AGRA), universities and research centres that it helps to establish and fund, extension professionals, and a network of agro-dealers.

In order to further promote its strategic vision as the only viable option for achieving agricultural sustainability, AGRA downplays and sometimes ignores issues such as the knowledge contributions of farmers, any possible impacts on inequality, controversies with respect to GMOs and intellectual property rights, the potential of agroecology, loss of biodiversity, and the pervasive influence of economic power in politics. Its own power is revealed by the fact that it seems able to largely ignore such issues despite the fact that these topics have been at the forefront of international debates concerning agricultural development and sustainability.

As an organisation with a central strategic vision, its silence (and silencing of others) on these issues may help it (and its allies) to focus on the main agenda of promoting GR technologies. Of course, AGRA's silences may also be tactical in that they reflect the reality that it is in partnerships with multiple organisations that may have complicated and even divergent views on such topics. It certainly does not want to jeopardise these relationships or to undermine potential support from other quarters. Silence may be thus safer and more efficacious than overtly speaking out and revealing a position—and thus removing any possible doubt about its true intentions.

5.3 Research Contributions

The findings in this thesis have several implications for understanding sustainable agriculture and sustainable agricultural development in the African agrifood system. They help in understanding the power dynamics at play in the African agrifood system, provide counter arguments to dominant discourses, and could be useful for policy makers.

First, by engaging in sociological discourse analysis, this research adds to our understanding of power relations embedded in discourses on African agriculture and offers novel ideas for approaching and opening up debates over agricultural sustainability. It draws attention to the broader discussion required in terms of how corporations, key philanthropic organisations, and their allies shape development trajectories and dominate knowledge politics. The partnerships that AGRA forms help to establish its hegemony in the food system and to present its version of sustainable agriculture as the only tenable way forward. A closer look at these partnerships also

helps to reveal how powerful philanthropic actors, such as AGRA, employ discursive resources to construct and reinforce legitimation claims. It provides a foundation for understanding not only how corporate power and the related power of philanthropic capital is exercised, but also how it is maintained. The involvement of many stakeholders in AGRA's activities indicates the multiple sources of power that it is able to, and feels it must, mobilise. Upon reflection, it also tells us something about the various potential sources of resistance that it feels it must marginalise in order to advance its definition and vision of sustainable agriculture. The way AGRA engages with the concept of sustainable agriculture, emphasising commercial and industrial technologies almost exclusively, has the potential to exclude critical and, especially, progressive voices. This approach risks sidelining useful ideas, but also deepening the substantial rifts and contradictions in the agrarian political economy. In the end it can be self-limiting as well, in that major contradictions cannot be ignored forever, and may eventually undermine even powerful organizations and development regimes that pretend that no serious problems exist (see Davidson and Grant 2012).

Second, for critical scholars and civil society organisations working to open spaces for farmer-led and more authentically agroecological initiatives in agricultural sustainability—more along the lines advocated by proponents of food sovereignty—the findings of this thesis may prove useful for decoding and countering AGRA's discourse. This study complements the growing body of research and evidence that documents negative impacts of contemporary versions of the green revolution and associated neoliberal models of agricultural development. Given the destructive impacts of conventional agriculture observed around the world, this thesis provides an avenue to critically analyse whether dominant models of development and the organizations that promote them will be able to affect the kinds of changes needed to create a truly resilient, just, and sustainable food system. To be more sustainable, the technologies and practices that farmers use must be context-specific and relevant to the multifaceted livelihood needs of farm households. Although African farmers are certainly capable of innovation and learning, the technologies and crop production recipes that AGRA currently promotes demand a high level of precision and certain kinds of scientific knowledge that many African smallholder farmers lack. To more reliably help farmers address sustainability challenges, an organization such as AGRA could attempt to learn effective practices from farmers, and to help share (via farmer-to-farmer and collaborative networks) what talented

gardeners and farmers are doing. Instead of importing technology from outside, this could be part of a strategy to co-generate affordable and safe technologies that are relevant to the African context.

Finally, for policymakers in Africa, this research helps to reveal what is afoot in terms of sophisticated and well-funded projects to direct and shape agricultural development. It suggests that governments could do more to harness local agricultural knowledge and practices in order to develop context-specific solutions that consider how locals have managed to sustain their agricultural systems for generations. As international networks play a more significant role in Africa's agricultural governance, governments can benefit from help to decode the underlying ideologies and assumptions that propel supposedly disinterested efforts to help—efforts that may undermine desirable attributes of African agricultural systems. For NGO practitioners and project managers, this research offers the opportunity to examine how concepts like 'sustainable agriculture' might affect the broader political terrain of their work. It supports their ability to recognize that power and politics play key roles in defining and prescribing practices that are considered sustainable or not, and that such definitions may be used to further certain interests that might not necessarily be beneficial to all involved.

5.3 Theoretical Reflections

This research has attempted to investigate how a dominant NGO in the African agrifood system frames and promotes its version of sustainable agriculture to farmers and to other important stakeholders. A political ecology perspective highlights the reality that organisations involved with agricultural research and development are political actors. While previous works on AGRA's activities have focused on the advantages and disadvantages of its activities, the somewhat unique contribution of this thesis is that it focuses upstream as well as downstream—on the specific types of agricultural development that AGRA promotes but also on how the crafting, reshaping, linking, and promoting of discourses is part of this initiative. It concludes that the sustainable agriculture initiatives supported by AGRA are part of the private sector-led GR approach that is currently dominant around the world. Although this thesis provides some new details and insights with respect to AGRA and its power plays in African contexts, its findings are in accord with much of the critique of power dynamics and development projects that development theorists have been discussing since the advent of the first Green Revolution.

From a political ecology perspective, the way an organisation perceives an environmental problem or development challenge leads it to select and foreground particular aspects of sustainability and to ignore others. This also allows it to more persuasively promote a specific assessment of the solutions that are possible and useful. This thesis has argued that the way AGRA sees and frames the problems of sustainable development in African agriculture (and the way it is allied with corporations and key research institutions) helps to determine what solutions it proposes. Since AGRA has diagnosed the key challenge of African agriculture as low yields leading to food insecurity, the organisation's key communications generally frame sustainable farming and sustainable agricultural development as developing and disseminating yield-enhancing technologies. The organisation employs a discursive approach that combines various forms of communicative strategies, and institutional and organisational initiatives, that aim to normalise and legitimise this approach while, at the same, ignoring social, economic, political, cultural and ecological complexities and contradictions in the agrifood system.

While many political ecology studies tend to be focused on a particular moment in time, the analysis in this research is both historically contextualised and uses a longitudinal data set. By analysing the discourses advanced in an eleven-year series of AGRA annual reports (2008-2018), the study reveals that discursive strategies are not one-off engagements mounted to strengthen the credibility and continuity of particular actions at a particular time, but are significant commitments that unfold over time and that shape subsequent actions (Fairclough 2003). AGRA's promotion of technology as the saviour of African farmers and farming at the beginning of its operations, has a strong thru-line in all of its subsequent elaborations in terms of promotion and programming. As it itself develops, AGRA has been able to further its power, including its influence over research, education, outreach, and broader development agendas and policies, by forming alliance with other organisations and agencies. It strategically and tactically employs complex discursive strategies that serve to legitimise its projects, demobilize would be critics, build dependable alliances, and entrench itself and its acolytes in the agrifood systems of African countries.

By delimiting what can and cannot be said, discourses act as precursors to policy and policy outcomes (Van Dijk 1998). This thesis helps to reveal how such a process works with regard to agricultural sustainability and agricultural development in Africa. A sociological discourse

analysis has made it possible to deconstruct AGRA's sustainability discourse to discover the powerful meta-narratives, the overt and covert signals, and the silences that are embedded therein. It has also helped to reveal the techniques that the organisation uses to dominate the discussion and maintain its hegemony in the African agrifood system despite the many critiques and demonstrated limitations of GR technologies.

5.4 Limitations of the Study and Recommendations for Further Research

Although the findings of this thesis provide important insights about the issue of agricultural development in Africa, and particularly about the role of a powerful NGO in the struggle to define and implement competing visions of a sustainable agriculture, its findings are naturally limited in some ways—and have certain limitations. First, because this study was limited by issues of time and cost, it was not possible to undertake field research with farmers and, therefore, the study could not investigate how farmers responded to AGRA's discursive tactics and strategic initiatives. Exploring these reactions would benefit from a longitudinal approach that could offer insights into the effects of these discourses on farmers' perspectives and choices over time.

Further research will be necessary, drawing on the traditions of political ecology, to empirically trace how AGRA's initiatives contribute to ongoing processes of accumulation and dispossession, and to evaluate other material impacts of their approaches to knowledge, communication, and agricultural development in the African context. More extensive document analyses, as well as participant observation and in-depth interviews, will help to reveal how farmers engage with these discourses, including how certain ideas are interpreted and put into practice, modified and adapted before adoption, or discounted altogether. Parallel research could be usefully done with research scientists, graduate students, extension agents, and others recruited into AGRA's networks.

A further limitation is that the present study was not able to examine how these discourses and associated practices are affecting the social life and organisation of farming communities. More research is needed to examine how the discourses of sustainable agriculture spearheaded by AGRA are affecting the social organisation of farming in terms of farm household interactions (internally and externally), and their interaction with the food they produce and the land that they

cultivate. An important theoretical starting point might be to investigate these dynamics using Marx's notion of alienation coupled with critical ethnography.

Another interesting avenue of research that this study could not explore is how and to what extent AGRA's activities influence the work of agricultural scientist. AGRA funds universities to carry out research and outreach programmes on its behalf. This relationship with universities and research centres may potentially compromise the independence and the collective and co-operative characteristics of science given that scientists might not want to reveal findings that are contrary to the views of their funders, or which are categorised as confidential give the proprietary nature of the intellectual properties involved. Although this has not been extensively studied, the tendency for scientist sponsored by AGRA to focus mostly on the positive sides of the technologies favoured by organisation is likely high. There are some indications that this is the case, but more empirical research is needed to investigate these relationships.

Finally, although the findings from this study offer insights into how one powerful agricultural sector actor, AGRA, has actively shaped public understandings of sustainable agriculture—by framing certain products, the agribusiness enterprises it works with, and its own activities as sustainable—more research is needed to understand the effects of such discursive strategies on members of the public, policy makers, NGOs, UN agencies, and other supposedly independent actors. The findings of such studies would help to illuminate significant practical and theoretical concerns regarding the global agrifood system and would suggest new directions for research, activism, and policy engagement.

5.5 Concluding Remarks

Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs (WCED 1987). Despite many initiatives and commitments by a wide range of organisations, and notwithstanding a widespread acceptance of the desirability of sustainability, the concept of sustainable agriculture remains contentious and contested. The lack of consensus on any definition, and the absence of even a common conceptual framework, reflects the complexity of the topic but also the ways that diverse interests have knowingly reinterpreted the idea to legitimise their own values and motives. While previous research has focused on links between sustainable practices and productivity, and the reasons why farmers do or do not adopt recommended measures, less is

known about how the concept is defined, and how these ideas have changed and been promoted over time. Using insights from political ecology theory and sociological discourse analysis, this thesis shows how AGRA, a powerful organizational presence in the African agrifood system, strategically uses language and related messaging and communications, in efforts to influence the meaning and interpretation of the concept of sustainable agriculture.

AGRA's discourse of sustainability can be summed up in its notions with respect to technology and innovation, the role of experts, and the significance of markets. AGRA's definition of sustainable agriculture, technology is paramount. It encourages specific types and particular modalities of innovation through funding of educational institutions to train PhD and Master's students to develop high yielding varieties of seeds, inputs, and farm management techniques. Farmers are cast as consumers who will acquire a package of inputs and ideas from innovators (scientists and agribusiness allies) in order to modernise their practices. This model shifts the locus of innovation away from farmers and much more into the hands of 'professionals'. When it comes to the role of experts, AGRA's sustainable farming model is science-based, where scientists are funded to develop productivity enhancing technologies and techniques, and an outreach network is further developed to promote (diffuse) these to farmers for adoption. Evidently, top-down, formal scientific knowledge is preferred and valued more than local ways of knowing and doing. Thus, scientists become the only recognised and valued experts in agriculture.

Markets also play a prominent role in the sustainability path advocated by AGRA. Global and regional market channels capable of ensuring the availability and timely delivery of inputs are crucial to ensuring the viable operation of sustainable farming systems as conceived by AGRA. The organisation emphasises the use of agro-dealers and farmer co-operatives as vehicles for expediting the delivery of inputs to farmers—and of increasing the uptake of these commercial products. It also aims to ensure the easier commercialisation of farm products through establishing local market outlets and linking farmers to national and international markets.

Analysing key AGRA documents reveals something about the power relations involved in efforts to inform and persuade various audiences about the benefits of GR technologies. AGRA is not only capable of deploying significant resources to promote itself and the approaches it favours, but also engages in high-level and extended discursive games to increase the acceptance of its

preferred technologies. Despite competing approaches to sustainability found in the scientific literature and practitioner accounts, AGRA's discourse tend to reduce the choices involved to one key decision: adoption of the GR technological package. Regardless of widespread reporting of findings that are critical of the views and approaches espoused by AGRA, it continues to propagate discourses in which technical fixes are presented as more-or-less synonymous with sustainability, and their alternatives as unsustainable, backward, and associated with poverty. The preoccupation of AGRA with commercially viable technological solutions restrict its vision and help to sideline potentially efficacious alternatives such as low-input, agroecological farming methods, organic farming, mixed farming involving livestock as part of the farming system, intercropping, production co-operatives, and farmer-to-farmer learning networks among other avenues for studying and sharing the knowledge of smallholders.

This study reveals a clearer picture of the nature of the power relations underlying debates surrounding sustainable agricultural practices and development in Africa. How power shapes ideas and norms, frames issues, and determines which ideas and what knowledge is considered valid are important for understanding the struggle over the governance of food and, especially, the representation and enactment of "sustainable agriculture".

Further, the findings demonstrate that AGRA's narrow focus on increasing yields ignores historical experiences that were associated with the Green Revolution in Asia, including depletion of soils and groundwater, greater inequalities in incomes, and dramatic decreases in crop diversity (Weis 2010). It also ignores the fact that the production of food by African smallholders is much more than a business transaction; it is a way of life, of sharing, of reproducing and defining family, and of spiritual observance (Jaffe and Kaler 2016). Moreover, AGRA appears insensitive to issues of social differentiation—or, perhaps, it implicitly endorses rising inequalities. While some discussion about gender is entertained, the development model ignores the ways that women may be further excluded, marginalised, and exploited. "Sustainable agricultural practices" based primarily on technology and yields not only tend to misread the ecological complexities of particular places but may also ignore the ecocultural practices of people who are part of, and key actors in, those ecosystems.

AGRA has selectively adopted elements of agrifood discourses advanced by other international actors to suit its goal of expanding GR technologies while sidelining initiatives that do not align

with its priorities and worldview (or those of its allies in corporate and university administrative suites, or of its key funders such as the Bill and Melinda Gates Foundation and the Rockefeller Foundation). AGRA realizes discursive power through its ability to promote its preferred development strategies as crucial to broader objectives such as economic growth, food security, and poverty alleviation. The multifaceted discourses promoted by AGRA are influential and powerful in part because they draw on many elements that undergird mainstream/dominant understandings of agricultural progress that have been supported by other influential organisations.

Another significant conclusion to be drawn from this study is that AGRA's definition of sustainable agriculture contributes to the production and reproduction of farming systems that align with the vision and priorities of key commercial allies. The concept of sustainability is deeply contested but, through AGRA, agribusiness interests are able to exploit these ambiguities and to exercise their influence to frame sustainable agriculture in their favor. This thesis has shown that, despite AGRA's energetic (and naïve and even duplicitous) promotion of its chosen production methods as technologies that will benefit the poor and boost food production, it is tightly tied in with agrochemical industries and their products including GM crops, pesticides, and chemical fertilisers. AGRA supports the development of an agriculture that may ultimately eliminate peasants and other smallholders by stripping them of their knowledge, autonomy, and land. The result may be increased commodity production but also the transformation of agriculture into an input–output operation governed solely by profit, and into what La Vía Campesina (2009) refers to as an “agriculture without farmers”.

This thesis has helped to reveal maneuvering and manipulations behind the seemingly generous call for a Green Revolution in Africa that deserve to be more critically examined by policy makers in Africa. The call appears to be guided by strategic thinking based on a development paradigm that does not appear sensitive to the realities of rural Africa, nor to have been crafted by Africans. While some African actors who have gained some standing in the process of implementing AGRA's agenda, the lead players and the orchestrators are not from the continent, let alone from the ranks of the smallholder farmers in whose name the so-called revolution is being waged. Instead, AGRA relies on pre-scripted and prescribed approaches, and foreign technical expertise.

Since such projects tend to ignore issues of inequality and inequity in local power structures, they may, predictably or inadvertently, end up benefitting certain groups, typically those who already enjoy relative advantages. Political ecology argues that these power dynamics must not be ignored by those wishing to help to make the agrifood system truly sustainable. AGRA's increasing influence in the African food system is not being subjected to democratic scrutiny, unlike governments that are at least formally accountable to electorates. Moreover, AGRA appears to have bought the compliance and silence of most scientists and others in academia, NGOs and the media, who might normally be expected to critique some aspects of the organisation's work. Of course, given its persuasive powers and alignment with dominant ideas about agricultural development, many of the debatable claims it makes about the merits of GR technologies seem to have been readily (if not already) accepted and internalised by academics and policymakers.

Although this research is based on a case study of AGRA, it contributes to a broader discussion on how corporations and their NGO and foundation allies seek to shape development agendas and trajectories, and dominate knowledge politics. While AGRA promotes its version of sustainability as the only viable and logical way forward for African agriculture, the reality is likely to be messier and more complex. Future progress on sustainable agriculture agendas will inevitably be characterised by contention, and by continuous redefinition of problems and reassessments of actions. However, recognising a diversity of views, models, and perspectives can only help to put African agriculture on a more truly sustainable path.

A sustainable agriculture should take inequality, farmer agency, democracy, and cultural and ecological diversity seriously. After careful review, this thesis contends that by neglecting the wider, systemic and structural issues that affect agrarian transformation, while only concentrating on Africa's supposed technological deficits, AGRA's interventions will neither be sufficient nor sustainable. This is not an argument to reject all scientific and technology-based productivity growth that might be useful to farmers. Rather, it is a call for a more balanced analysis and full-cost evaluation of technological options, as well as a more careful examination of sustainability objectives, and of particular pathways and possible outcomes. It is my hope that this thesis will help smallholder farmers and others to become more aware of how corporations and their NGO partners work to create and maintain a particular worldview with respect to what

is practical, ethical, and desirable in agrifood systems. It is my hope that this work will help farmers and their allies become more aware of alternative development paths, more savvy about how elites use discursive strategies to shape farming systems, and more able to resist and challenge those who pretend that there is no option. It is also my hope that it will alert more social scientists to the value of studying the powerful, and of interrogating even widely held assumptions and supposedly self-evident truths.

REFERENCES

- Adger, W. Neil. 2000. "Social and Ecological Resilience: Are they Related?" *Progress in Human Geography* 24(3):347-364.
- African Union. 2014. "Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods." Retrieved on September 30, 2018 (<https://www.resakss.org/sites/default/files/Malabo%20Declaration%20on%20Agriculture%202014%2026-.pdf>).
- Agarwal, Bina. 1992. "The Gender and Environment Debate: Lessons from India." *Feminist Studies* 18(1):119-158.
- Agarwal, Bina. 1997. "Environmental Action, Gender Equity and Women's Participation." *Development and Change* 28(1):1-44.
- AGRA. 2007. "A Proposal for a Soil Health Programme for the Alliance for a Green Revolution in Africa." Retrieved May 15, 2018 (www.knowledgebase.terrafrica.org/fileadmin/user_upload/terrafrica/docs/AGRA_Soil_Health_Proposal_final.pdf).
- Ajzen, Icek. 1991. "The Theory of Planned Behavior." *Organizational Behavior and Human Decision Processes* 50(2):179-211.
- Ajzen, Icek. 2011. "The Theory of Planned Behaviour: Reactions and Reflections." *Psychology & Health* 26(9):1113-1127.
- Altieri, Miguel A. 1989. "Agroecology: A New Research and Development Paradigm for World Agriculture." *Agriculture, Ecosystems & Environment* 27(1):37-46.
- Altieri, Miguel A. 1995. *Agroecology: The Science of Sustainable Agriculture*. 2nd. ed. Boulder: Westview Press.
- Ansoms, An. 2010. "Views from Below on the Pro-Poor Growth Challenge: The Case of Rural Rwanda." *African Studies Review* 53(02):97-123.
- Arribas-Ayllon, Michael and Valerie Walkerdine. 2008. "Foucauldian Discourse Analysis." Pp. 91-108 in *The Sage Handbook of Qualitative Research in Psychology*, edited by C. Willig and W. Stainton-Rogers. London, UK: Sage.
- Bakker, Karen, and Gavin Bridge. 2006. "Material Worlds? Resource Geographies and the 'Matter of Nature'." *Progress in Human Geography* 30(1):5-27.
- Baron, Robert S., Joseph A. Vandello, and Bethany Brunsman. 1996. "The Forgotten Variable in Conformity Research: Impact of Task Importance on Social Influence." *Journal of Personality and Social Psychology* 71(5):915-927.
- Barr, Neil and John W. Cary. 1992. *Greening a Brown Land: The Australian Search for Sustainable Land Use*. Melbourne, Australia: Macmillan Education.
- Bassett, Thomas J. 1988. "The Political Ecology of Peasant-Herder Conflicts in the Northern Ivory Coast." *Annals of the Association of American Geographers* 78(3):453-472.

- Bassett, Thomas J., Alex W. Peimer. 2015. "Political Ecological Perspectives on Socioecological Relations." *Natures Sciences Societies* 23(2):157-165.
- Bebbington, Anthony and Jeffrey Bury. 2014. *Subterranean Struggles: New Dynamics of Mining, Oil and Gas in Latin America*. Austin, TX: University of Texas Press.
- Behrman, Julia, Ruth Meinzen-Dick and Agnes Quisumbing. 2012. "The Gender Implications of Large-Scale Land Deals." *Journal of Peasant Studies* 39(1):49-79.
- Bergevoet, R. H. M., C. J. M. Ondersteijn, H. W. Saatkamp, C. M. J. Van Woerkum, and R. B. M. Huirne. 2004. "Entrepreneurial Behaviour of Dutch Dairy Farmers Under a Milk Quota System: Goals, Objectives and Attitudes." *Agricultural Systems* 80(1):1-21.
- Bergius, Mikael, and Jill Tove Buseth. 2019. "Towards a Green Modernization Development Discourse: The New Green Revolution in Africa." *Journal of Political Ecology* 26(1):57-83.
- Beus, Curtis E. and Riley E. Dunlap. 1992. "The Alternative-Conventional Agriculture Debate: Where Do Agricultural Faculty Stand?" *Rural Sociology* 57(3):363-380.
- Bezner Kerr, Rachel. 2012. "Lessons from the Old Green Revolution for the New: Social, Environmental and Nutritional Issues for Agricultural Change in Africa." *Progress in Development Studies* 12(2):213-229.
- Binder, Claudia R., Giuseppe Feola, and Julia K. Steinberger. 2010. "Considering the Normative, Systemic and Procedural Dimensions in Indicator-Based Sustainability Assessments in Agriculture." *Environmental Impact Assessment Review* 30(2):71-81.
- Blaikie, Piers M. 1985. *The Political Economy of Soil Erosion in Developing Countries*. London, UK: Routledge.
- Blaikie, Piers M. and H. C. Brookfield. 1987. *Land Degradation and Society*. London, UK: Routledge.
- Bogdanski, Anne. 2012. "Integrated Food-Energy Systems for Climate-Smart Agriculture." *Agriculture & Food Security* 1(1):1-10.
- Bouis, Howarth E., Robin D. Graham, and Ross M. Welch. 2000. "The Consultative Group on International Agricultural Research (CGIAR) Micronutrients Project: Justification and Objectives." *Food and Nutrition Bulletin* 21(4):374-381.
- Bowen, Glenn A. 2009. "Document Analysis as a Qualitative Research Method." *Qualitative Research Journal* 9(2):27-40.
- Branca, Giacomo, Nancy McCarthy, Leslie Lipper, and Maria Christina Jolejole. 2011. "Climate-Smart Agriculture: A Synthesis of Empirical Evidence of Food Security and Mitigation Benefits from Improved Cropland Management." *Mitigation of Climate Change in Agriculture Series* 3:1-42.
- Braun, Bruce. 2000. "Producing Vertical Territory: Geology and Governmentality in Late Victorian Canada." *Cultural Geographies* 7(1):7-46.
- Bryman, Alan. 2008. "Of Methods and Methodology." *Qualitative Research in Organizations and Management* 3(2):159-168.
- Bryman, Alan. 2015. *Social Research Methods*. 5th. ed. Oxford, UK: Oxford University Press.

- Burman, Erica, and Ian Parker. 1993. *Discourse Analytic Research: Repertoires and Readings of Texts in Action*. London, UK: Routledge.
- Busch, Lawrence. 2011. *Standards: Recipes for Reality*. Cambridge, MA: MIT Press.
- Buttel, Frederick H. 1996. "Environmental and Resource Sociology: Theoretical Issues and Opportunities for Synthesis." *Rural Sociology* 61(1):56-76.
- Buttel, Frederick H. 2001. "Some Reflections on Late Twentieth Century Agrarian Political Economy." *Sociologia Ruralis* 41(2):165-181.
- Buttel, Frederick H. 2006. "Sustaining the Unsustainable: Agro-Food Systems and the Environment in the Modern World." Pp. 212-229 in *Handbook of Rural Studies*, edited by P. Cloke, T. Marsden, and P. H. Mooney. London, UK: Sage Publications.
- Buttel, Frederick H., Gilbert W. Gillespie Jr., and Olaf F. Larson. 1990. *The Sociology of Agriculture*. Westport, CT: Greenwood Press.
- Campbell, Bruce M., Philip Thornton, Robert Zougmore, Piet Van Asten, and Leslie Lipper. 2014. "Sustainable Intensification: What is its Role in Climate-Smart Agriculture?" *Current Opinion in Environmental Sustainability* 8:39-43.
- Caradonna, Jeremy L. 2014. *Sustainability: A History*. Oxford, UK: Oxford University Press.
- Cassidy, Emily S, Paul C West, James S Gerber, and Jonathan A. Foley. 2013. "Redefining Agricultural Yields: From Tonnes to People Nourished Per Hectare." *Environmental Research Letters* 8(3):1-8.
- Castree, Noel. 2014. *Making Sense of Nature: Representation, Politics and Democracy*. New York: Routledge.
- Chang, Hong-Wen, Jane A. Piliavin, and Peter L. Callero. 1988. "Role Identity and Reasoned Action in the Prediction of Repeated Behavior." *Social Psychology Quarterly* 51(4):303-317.
- Cheyns, Emmanuelle. 2011. "Multi-Stakeholder Initiatives for Sustainable Agriculture: Limits of the 'Inclusiveness' Paradigm." *Governing Through Standards: Origins, Drivers and Limitations* 1(1):210-235.
- Claeys, Priscilla. 2015. *Human Rights and the Food Sovereignty Movement: Reclaiming Control*. London, UK: Routledge.
- Clapp, Jennifer. 2014. "Financialization, Distance and Global Food Politics." *Journal of Peasant Studies* 41(5):797-814.
- Cochrane, Willard W. 1958. "The Need to Rethink Agricultural Policy in General and to Perform some Radical Surgery on Commodity Programs in Particular." *American Journal of Agricultural Economics* 67(5):1017-1019.
- Collier, Paul, and Stefan Dercon. 2009. "African Agriculture in 50 Years: Smallholders in a Rapidly Changing World?" *Proceedings of a Technical Meeting of Experts*. Rome: FAO.
- Collier, Paul. 2007. *The Bottom Billion: Why the Poorest Countries are Failing and What Can be Done About It*. New York: Oxford University Press.

- Constance, Douglas H. 2009. "AFHVS Presidential Address - The Four Questions in Agrifood Studies: A View from the Bus." *Agriculture and Human Values* 26(1):3-14.
- Constance, Douglas H. 2010. "Sustainable Agriculture in the United States: A Critical Examination of a Contested Process." *Sustainability* 2(1):48-72.
- Constance, Douglas H. 2014. "Rural Sociology." Pp. 62-74 in *Encyclopedia of Agricultural and Food Systems* Vol. 5, edited by N. K. Van Alfen. San Diego, CA: Elsevier.
- Constance, Douglas H., William H. Friedland, Marie-Christine Renard, and Marta Rivera-Ferre. 2014. "The Discourse on Alternative Agrifood Movements." Pp. 3-46 in *Alternative Agrifood Movements: Patterns of Convergence and Divergence*, edited by D. H. Constance, M. Renard, and M. Rivera-Ferre. Bingley, UK: Emerald Group Publishing Ltd.
- Conway, Gordon R. 1997. *The Doubly Green Revolution: Food for All in the 21st Century*. London, UK: The Penguin Press.
- Conway, Gordon. 1999. "Food for All in the 21st Century." *Social Research* 66(1):351-373.
- Cornwall, Andrea. 2007. "Buzzwords and Fuzzwords: Deconstructing Development Discourse." *Development in Practice* 17(4-5):471-484.
- Dant, Tim. 2012. *Knowledge Ideology and Discourse: A Sociological Perspective*. New York: Routledge.
- Davidson, Debra J. and Don Grant. 2012. "The Double Diversion: Mapping its Roots and Projecting its Future in Environmental Studies." *Journal of Environmental Studies and Sciences* 2(1):69-77.
- Davis, Diana K. 2007. *Resurrecting the Granary of Rome. Environmental History and French Colonial Expansion in North Africa*. Athens, OH: Ohio University Press.
- Dawson, Neil, Adrian Martin, and Thomas Sikor. 2016. "Green Revolution in Sub-Saharan Africa: Implications of Imposed Innovation for the Wellbeing of Rural Smallholders." *World Development* 78:204-218.
- De Schutter, Olivier. 2011. "How Not to Think of Land-grabbing: Three Critiques of Large-scale Investments in Farmland." *The Journal of Peasant Studies* 38(2):249-279.
- Denevan, William M. 2003. *Cultivated Landscapes of Native Amazonia and the Andes*. Oxford, UK: Oxford University Press.
- Denzin, Norman K, and Yvonna S Lincoln. 2018. *The Sage Handbook of Qualitative Research*. Los Angeles: Sage.
- Desmarais, Annette Aurélie, Darrin Qualman, André Magnan, and Nettie Wiebe. 2015. "Land Grabbing and Land Concentration: Mapping Changing Patterns of Farmland Ownership in Three Rural Municipalities in Saskatchewan, Canada." *Canadian Food Studies/La Revue Canadienne des Études sur L'alimentation* 2(1):16-47.
- Deutsch, Morton, and Harold B. Gerard. 1955. "A Study of Normative and Informational Social Influences Upon Individual Judgment." *The journal of Abnormal and Social Psychology* 51(3):629.

- DeVries, J, and G Toenniessen. 2001. *Securing the Harvest: Biotechnology, Breeding and Seed Systems for African Crops*. Wallingford, England: CABI Publishing.
- Dunlap, Riley E., Beus, Curtis E., Howell, Robert E. and Waud, Jack. 1992. "What is Sustainable Agriculture?" *Journal of Sustainable Agriculture* 3(1):5-41.
- Fairbairn, Madeleine. 2014. "'Like Gold with Yield': Evolving Intersections Between Farmland and Finance." *Journal of Peasant Studies* 41(5):777-795.
- Fairclough, Norman. 1992. *Discourse and Social Change*. Cambridge, MA: Polity Press.
- Fairclough, Norman. 2003. *Analysing Discourse: Textual Analysis for Social Research*. New York: Routledge.
- Fairclough, Norman. 2013. "Critical Discourse Analysis and Critical Policy Studies." *Critical Policy Studies* 7(2):177-197.
- Fairhead, James, and Melissa Leach. 1996. "Enriching the Landscape: Social History and the Management of Transition Ecology in the Forest–Savanna Mosaic of the Republic of Guinea." *Africa* 66(1):14-36.
- Fairhead, James, Melissa Leach, and Ian Scoones. 2012. "Green Grabbing: A New Appropriation of Nature?" *Journal of Peasant Studies* 39(2):237-261.
- FAO. 2013. *Climate-Smart Agriculture Sourcebook*. Rome: Food and Agriculture Organization of the United Nations. Retrieved on March 3, 2018 (<http://www.fao.org/3/a-i3325e.pdf>).
- FAO. 2015. *The State of Food Insecurity in the World Meeting the 2015: International Hunger Targets: Taking Stock of Uneven Progress*. Rome: Food and Agriculture Organization of the United Nations. Retrieved on June 5, 2019 (<http://www.fao.org/3/a-i4646e.pdf>).
- FAO.1996. *The State of Food and Agriculture*. Rome: Food and Agriculture Organization of the United Nations. Retrieved on January 15, 2018 (<http://www.fao.org/3/w1358e/w1358e.pdf>).
- Feher, Istvan and Judit Beke. 2013. "The Rationale of Sustainable Agriculture." *Iustum Aequum Salutare* 9(3):73-88.
- Fernandez, Margarita, Katherine Goodall, Meryl Olson, and V. Ernesto Méndez. 2013. "Agroecology and Alternative Agri-Food Movements in the United States: Toward a Sustainable Agri-Food System." *Agroecology and Sustainable Food Systems* 37(1):115-126.
- Forsyth, Tim and Andrew Walker. 2008. *Forest Guardians and Forest Destroyers: The Politics of Environmental Knowledge in Northern Thailand*. Seattle, WA: University of Washington Press.
- Foucault, Michel. 1980. *Power/Knowledge*. New York City, NY: Pantheon Books.
- Foucault, Michel. 1981. "The Order of Discourse." Pp. 51-78 in *Untying the Text: A post-Structuralist Reader*, edited by R. Young. Boston, MA: Routledge & Kegan Paul.
- Foucault, Michel. 2003. *The Essential Foucault: Selections from Essential Works of Foucault, 1954-1984*. New York City, NY: The New Press.

- Gee, James Paul. 2010. *An Introduction to Discourse Analysis: Theory and Method*. 3rd. ed. London, UK: Routledge.
- Gengenbach, Heidi, Rachel A. Schurman, Thomas J. Bassett, William A. Munro, and William G. Moseley. 2018. "Limits of the New Green Revolution for Africa: Reconceptualising Gendered Agricultural Value Chains." *The Geographical Journal* 184(2):208-214.
- Gertler, Michael, JoAnn Jaffe, and Mary A. Beckie. 2018. "Duelling Discourses of Sustainability." Pp. 163-187 in *Contested Sustainability Discourses in the Agrifood System*, edited by D. H. Constance, J. T. Konefal, and M. Hatanaka. London, UK: Routledge.
- Glover, Dominic. 2010. "The Corporate Shaping of GM Crops as a Technology for the Poor." *The Journal of Peasant Studies* 37(1):67-90.
- Godfray, CharlesJ., JohnR. Beddington, Ian R. Crute, Lawrence Haddad, David Lawrence, James F. Muir, Jules Pretty, Sherman Robinson, Sandy M. Thomas, and CamillaToulmin. 2010. "Food Security: The Challenge of Feeding 9 Billion People." *Science* 327(5967):812-818.
- Gould, Kenneth A., David N. Pellow, and Allan Schnaiberg. 2004. "Interrogating the Treadmill of Production: Everything you Wanted to Know About the Treadmill but were Afraid to Ask." *Organization & Environment* 17(3):296-316.
- Grbich, Carol. 2013. *Qualitative Data Analysis: An Introduction*. Thousand Oaks, CA: Sage.
- Gupta, Akhil. 1989. *Postcolonial Developments: Agriculture in the Making of Modern India*. Durham, NC: Duke University Press.
- Hajer, Maarten A. 1995. *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford, UK: Oxford University Press.
- Hansen, James W. 1996. "Is Agricultural Sustainability a Useful Concept?" *Agricultural Systems* 50(2):117-143.
- Hardy, Cynthia. 2001. "Researching Organizational Discourse." *International Studies of Management & Organization* 31(3):25-47.
- Harvey, Celia A., Mario Chacón, Camila I. Donatti, Eva Garen, Lee Hannah, Angela Andrade, Lucio Bede et al. 2014. "Climate-Smart Landscapes: Opportunities and Challenges for Integrating Adaptation and Mitigation in Tropical Agriculture." *Conservation Letters* 7(2):77-90.
- Hayati, Dariush, Zahra Ranjbar, Ezatollah Karami. 2010. "Measuring Agricultural Sustainability." Pp. 73-100 in *Biodiversity, Biofuels, Agroforestry and Conservation Agriculture. Sustainable Agriculture Reviews*. vol 5, edited by E. Lichtfouse. Dordrecht, Netherlands: Springer.
- Hinrichs, C. Clare. 2014. "Transitions to Sustainability: A Change in Thinking about Food Systems Change?" *Agriculture and Human Values* 31(1):143-155.
- Holt-Giménez, Eric and Annie Shattuck. 2011. "Food Crises, Food Regimes and Food Movements: Rumbblings of Reform or Tides of Transformation?" *The Journal of Peasant Studies* 38(1):109-144.

- Horlings, Lummina G., and Terry K. Marsden. 2011. "Towards the Real Green Revolution? Exploring the Conceptual Dimensions of a New Ecological Modernisation of Agriculture that could 'Feed the World'." *Global Environmental Change* 21(2):441-452.
- Horrigan, Leo, Robert S. Lawrence, and Polly Walker. 2002. "How Sustainable Agriculture Can Address the Environmental and Human Health Harms of Industrial Agriculture." *Environmental Health Perspectives* 110(5):445-456.
- Huber, Matthew T. 2017. "Hidden Abodes: Industrializing Political Ecology." *Annals of the American Association of Geographers* 107(1):151-166.
- IAASTD. 2008. "International Assessment of Agricultural Knowledge, Science and Technology for Development. Global Summary for Decision Makers" Retrieved on April 10, 2018 (http://www.wecf.eu/download/2008/Global_SDM_130408_FINAL.pdf).
- Ignatova, Jacqueline A. 2017. "The 'Philanthropic' Gene: Biocapital and the New Green Revolution in Africa." *Third World Quarterly* 38(10):2258-2275.
- Ikerd, John E. 1993. "The Need for a System Approach to Sustainable Agriculture." *Agriculture, Ecosystems & Environment* 46(1-4):147-160.
- Ikerd, John E., Donald Osburn, and J.C. Owsley. 1997. *Some Missouri Farmers' Perspectives of Sustainable Agriculture*. Department of Agriculture, Food and Natural Resources, University of Missouri, Columbia, MO. Unpublished Manuscript. Retrieved on May 21, 2018 (<http://web.missouri.edu/~ikerdj/papers/tsu-surv.htm>).
- IPCC. 2014. Climate Change. 2014: *Synthesis Report. Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Switzerland: IPCC.
- Jaffe, JoAnn and Amy Kaler. 2016. "Coffee Ceremonies, Gender, and Food Security in Two Ethiopian Villages." Pp. 117-137 in *Transforming Gender and Food Security in the Global South*, edited by J. Njuki, J. R. Parkins, and A. Kaler. New York City, NY: Routledge.
- Jarosz, Lucy. 2014. "Considering Sovereignty, Care Ethics and Policy in Food Politics." *Dialogues in Human Geography* 4(2):229-232.
- Jasanoff, Sheila, eds. 2004. *States of Knowledge: The Co-Production of Science and the Social Order*, New York City, NY: Routledge.
- Jordan, Jeffrey L., and Douglas H. Constance. 2008. "Sustainable Agriculture and the Social Sciences: Getting Beyond Best Management Practices and into Food Systems." *Southern Rural Sociology* 23(1):1-22.
- Jørgensen, Marianne W. and Louise Phillips. 2002. *Discourse Analysis as Theory and Method* London. Thousand Oaks, CA: Sage.
- Kaplan, Martin F., and Charles E. Miller. 1987. "Group Decision Making and Normative versus Informational Influence: Effects of Type of Issue and Assigned Decision Rule." *Journal of Personality and Social Psychology* 53(2):306-313.
- Kleinman, Daniel Lee, and Abby J. Kinchy. 2003. "Why ban Bovine Growth Hormone? Science, Social Welfare, and the Divergent Biotech Policy Landscapes in Europe and the United States." *Science as Culture* 12(3):375-414.

- Kleinman, Daniel Lee and Jack Kloppenburg Jr. 1991. "Aiming for the Discursive High Ground: Monsanto and Biotechnology." *Sociological Forum* 6 (3): 427-447
- Kataki, P. K. 2002. "Shifts in Cropping System and Its Effect on Human Nutrition: Case Study from India." *Journal of Crop Production* 6(1-2):119-144.
- Kautonen, Teemu, Marco Van Gelderen, and Erno T. Tornikoski. 2013. "Predicting Entrepreneurial Behaviour: A Test of the Theory of Planned Behaviour." *Applied Economics* 45(6):697-707.
- Kloppenburg, Jack Ralph. 2004. *First the Seed: The Political Economy of Plant Biotechnology, 1492-2000*. Madison, WI: University of Wisconsin Press.
- Kloppenburg, Jack Ralph. 2010. "Impeding Dispossession, Enabling Repossession: Biological Open Source and the Recovery of Seed Sovereignty." *Journal of Agrarian Change* 10(3):367-388.
- Konefal, Jason and Maki Hatanaka. 2018. "Shifting Visions of Sustainability in United States Agriculture: A Case Study of the Role of Multi-Stakeholder Governance." Pp. 203-223 in *Contested Sustainability Discourses in the Agrifood System*, edited by D. H. Constance, J. T. Konefal, and M. Hatanaka. London, UK: Routledge.
- Konefal, Jason. 2018. "Fault Lines in Agricultural Sustainability: Contestation, Cooptation, Reform, and Transformation." Pp. 279-286 in *Contested Sustainability Discourses in the Agrifood System*, edited by D. H. Constance, J. T. Konefal, and M. Hatanaka. London, UK: Routledge.
- Kress, Gunther. 1985. "Ideological Structures in Discourse." Pp. 135-161 in *Handbook of Discourse Analysis, Vol. 4: Discourse Analysis in Society*, edited by T. Van Dijk. London, UK: Academic Press.
- La Vi'a Campesina. 2008. "Food Sovereignty for Africa: A Challenge at Fingertips." Retrieved on April 18, 2018 (http://viacampesina.net/downloads/PDF/Brochura_em_INGLES.pdf).
- La Vía Campesina. 2007. *Forum for Food Sovereignty: Nyéléni Declaration*. Sélingué, Mali: La Vía Campesina. Retrieved on September 30, 2018 (https://nyeleni.org/DOWNLOADS/Nyelni_EN.pdf).
- La Vía Campesina. 2009. "A G8 on Agriculture Without Farmers = More Hunger and Poverty." La Vía Campesina. Retrieved on August 15, 2019 (<https://viacampesina.org/en/a-g8-on-agriculture-without-farmers-more-hunger-and-poverty/>).
- Lall, Sanjaya. 1995. "Structural Adjustment and African Industry." *World Development* 23(12):2019-2031.
- Lang, Tim and Michael Heasman. 2015. *Food Wars: The Global Battle for Mouths, Minds and Markets*. 2nd. ed. London, UK: Routledge.
- Langford, Jock. 1997. "Intellectual Property Rights: Technology Transfer and Resource Implications." *American Journal of Agricultural Economics* 79(5):1576-1583.
- Latour, Bruno. 2005. *Reassembling the Social: An Introduction to Actor-Network Theory*, Oxford, UK: Oxford University Press.

- Lave, Rebecca. 2012. "Bridging Political Ecology and STS: A Field Analysis of the Rosgen Wars." *Annals of the Association of American Geographers* 102(2):366-382.
- Le Billon, Philippe, and Melanie Sommerville. 2017. "Landing Capital and Assembling 'Investable Land' in the Extractive and Agricultural Sectors." *Geoforum* 82:212-224.
- Lee, Richard Philip. 2013. "The Politics of International Agri-Food Policy: Discourses of Trade-Oriented Food Security and Food Sovereignty." *Environmental Politics* 22(2):216-234.
- Levidow, Les. 2015. "European Transitions Towards a Corporate-Environmental Food Regime: Agroecological Incorporation or Contestation?" *Journal of Rural Studies* 40:76-89.
- Levins, Richard A. and Willard W. Cochrane. 1996. "The Treadmill Revisited." *Land Economics* 72(4):550-553.
- Li, Fabiana. 2013. "Relating Divergent Worlds: Mines, Aquifers and Sacred Mountains in Peru." *Anthropologica* 55(2):399-411.
- Lockeretz, William. 1988. "Open Questions in Sustainable Agriculture." *American Journal of Alternative Agriculture* 3(4):174-181.
- Marsden, Terry. 2013. "From Post-Productionism to Reflexive Governance: Contested Transitions in Securing More Sustainable Food Futures." *Journal of Rural Studies* 29:123-134.
- McMichael, Philip, and Mindi Schneider. 2011. "Food Security Politics and the Millennium Development Goals." *Third World Quarterly* 32(1):119-139.
- McMichael, Philip. 2005. "Global Development and the Corporate Food Regime." Pp. 265-299 in *New Directions in the Sociology of Global Development*, edited by F. H. Buttel and P. McMichael. Bingley, UK: Emerald Group Publishing Limited.
- McMichael, Philip. 2014. "The Land Question in the Food Sovereignty Project." *Globalizations* 12(4):434-451.
- Menozzi, Davide, and Cristina Mora. 2012. "Fruit Consumption Determinants Among Young Adults in Italy: A Case Study." *LWT-Food Science and Technology* 49(2):298-304.
- Menozzi, Davide, Martina Fioravanti, and Michele Donati. 2015. "Farmer's Motivation to Adopt Sustainable Agricultural Practices." *Bio-based and Applied Economics Journal* 4(2):125-147.
- Moseley, William, Matthew Schnurr, and Rachel Bezner Kerr. 2015. "Interrogating the Technocratic (Neoliberal) Agenda for Agricultural Development and Hunger Alleviation in Africa." *African Geographical Review* 34(1):1-7.
- Moyo, Dambisa. 2009. *The end of Poverty: Economic Possibilities for Our Time*. New York: The Penguin Press.
- Murgai, Rinku, Mubarak Ali, and Derek Byerlee. 2001. "Productivity Growth and Sustainability in Post-Green Revolution Agriculture: The Case of the Indian and Pakistan Punjab." *The World Bank Research Observer* 16(2):199-218.
- NEPAD. 2009. "Comprehensive Africa Agriculture Development Programme (CAADP): Pillar III Framework for African Food Security." Retrieved on June 5, 2019 (<http://www.nepad-caadp.net/content/caadp-pillar-iii-framework-african-food-security>).

- Neufeldt, Henry, Molly Jahn, Bruce M Campbell, John R Beddington, Fabrice DeClerck, Alessandro De Pinto, Jay Gullede, Jonathan Hellin, Mario Herrero, Andy Jarvis, David LeZaks, Holger Meinke, Todd Rosenstock, Mary Scholes, Robert Scholes, Sonja Vermeulen, Eva Wollenberg and Robert Zougmore. 2013. "Beyond Climate-Smart Agriculture: Toward Safe Operating Spaces for Global Food Systems." *Agriculture & Food Security* 2(12):1-6.
- Nigbur, Dennis, Evanthia Lyons, and David Uzzell. 2010. "Attitudes, Norms, Identity and Environmental Behaviour: Using an Expanded Theory of Planned Behaviour to Predict Participation in a Kerbside Recycling Programme." *British Journal of Social Psychology* 49(2):259-284.
- Norman, David, Rhonda Janke, Stan Freyenberger, Bryan Schurle, and Hans Kok. 1997. "Defining and Implementing Sustainable Agriculture." *Kansas Sustainable Agriculture Series* 1:1-14.
- Nyantakyi-Frimpong, Hanson and Rachel Bezner Kerr. 2015. "A Political Ecology of High-Input Agriculture in Northern Ghana." *African Geographical Review* 34(1):13-35.
- O'Brien, Karen L. and Robin M. Leichenko. 2000. "Double Exposure: Assessing the Impacts of Climate Change within the Context of Economic Globalization." *Global Environmental Change* 10(3):221-32.
- O'Leary, Zina. 2014. *The Essential Guide to Doing Your Research Project*. 2nd. ed. Thousand Oaks, CA: Sage.
- Otero, Gerardo and Gabriela Pechlaner. 2008. "Latin American Agriculture, Food, and Biotechnology: Temperate Dietary Pattern Adoption and Unsustainability." Pp. 31-56 in *Food for the Few: Neoliberal Globalism and Biotechnology in Latin America*, edited by G. Otero. Austin, TX: University of Texas Press.
- Parker, Ian. 1992. *Discourse Dynamics: Critical Analysis for Social and Individual Psychology*. London, UK: Routledge.
- Patel, Raj, Rachel Bezner Kerr, Lizzie Shumba, and Laifolo Dakishoni. 2015. "Cook, Eat, Man, Woman: Understanding the New Alliance for Food Security and Nutrition, Nutritionism and its Alternatives from Malawi." *Journal of Peasant Studies* 42(1):21-44.
- Patel, Raj. 2012. *Stuffed and Starved: The Hidden Battle for the World Food System*. New York: Melville House.
- Patel, Raj. 2013. "The Long Green Revolution." *The Journal of Peasant Studies* 40(1):1-63.
- Perkins, Harold A. 2007. "Ecologies of Actor-Networks and (Non) Social Labor within the Urban Political Economies of Nature." *Geoforum* 38(6):1152-1162.
- Perkins, John H. 1997. *Geopolitics and the Green Revolution: Wheat, Genes, and the Cold War*. Oxford, UK: Oxford University Press.
- Perreault, Tom. 2013. "Dispossession by Accumulation? Mining, Water and the Nature of Enclosure on the Bolivian Altiplano." *Antipode* 45(5):1050-1069.
- Petersen, Brian, and Sieglinde Snapp. 2015. "What is Sustainable Intensification? Views from Experts." *Land Use Policy* 46:1-10.

- Phillips, Nelson, Thomas B. Lawrence, and Cynthia Hardy. 2004. "Discourse and Institutions." *Academy of Management Review* 29(4):635-652.
- Pickering, Andrew, eds. 1992. *Science as Practice and Culture*. Chicago: University of Chicago Press.
- Pimentel, David, and Marcia Pimentel. 1990. "Comment: Adverse Environmental Consequences of the Green Revolution." *Population and Development Review* 16:329-332.
- Popkin, Barry M. 2001. "The Nutrition Transition and its Relationship to Demographic Change." Pp. 427-445 in *Nutrition and Health in Developing Countries*, edited by R. Semba and M. Bloem. Totowa, NJ: Humana Press.
- Pretty, Jules. 2008. "Agricultural Sustainability: Concepts, Principles and Evidence." *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 363(1491):447-465.
- Reardon, Thomas, Christopher B. Barrett, Julio A. Berdegue, and Johan F. M. Swinnen. 2009. "Agrifood Industry Transformation and Small Farmers in Developing Countries." *World Development* 37(11):1717-1727.
- Reytar, Katie, Craig Hanson, and Norbert Henninger. 2014. "Indicators of Sustainable Agriculture: A Scoping Analysis. Working Paper, Installment 6 of Creating a Sustainable Food Future". Retrieved January 25, 2018 (<https://www.wri.org/publication/indicators-sustainable-agriculture-scoping-analysis>).
- Rivera-Ferre, Marta G. 2012. "Framing of Agri-Food Research Affects the Analysis of Food Security: The Critical Role of the Social Sciences." *International Journal of Sociology of Agriculture & Food* 19(2):162-175.
- Robbins, Paul, and Rob Krueger. 2000. "Beyond Bias? The Promise and Limits of Q Method in Human Geography." *The Professional Geographer* 52(4):636-648.
- Robbins, Paul. 2007. *Lawn People: How Grasses, Weeds, and Chemicals Make Us Who We Are*. Philadelphia, PA: Temple University Press.
- Robbins, Paul. 2012. *Political Ecology: A Critical Introduction*. 2nd. ed. Malden, MA: Wiley-Blackwell.
- Robertson, G. Philip, and Peter M. Vitousek. 2009. "Nitrogen in Agriculture: Balancing the Cost of an Essential Resource." *Annual Review of Environment and Resources* 34:97-125.
- Robinson, John. 2004. "Squaring the Circle? Some Thoughts on the Idea of Sustainable Development." *Ecological Economics* 48(4):369-384.
- Rockefeller Foundation. 2006. "Africa's Turn: A New Green Revolution for the 21st Century." Retrieved on June 22, 2019 (https://assets.rockefellerfoundation.org/app/uploads/20060701123216/dc8aefda-bc49-4246-9e92-9026bc0eed04-africas_turn.pdf).
- Rosset, Peter M., and María Elena Martínez-Torres. 2014. "Food Sovereignty and Agroecology in the Convergence of Rural Social Movements." Pp. 137-157 in *Alternative Agrifood Movements: Patterns of Convergence and Divergence (Research in Rural Sociology and Development, Vol. 21)*. Bingley, UK: Emerald Group Publishing Ltd.

- Ruiz, Jorge R. 2009. "Sociological Discourse Analysis: Methods and Logic." *Forum Qualitative Sozialforschung/Forum Qualitative Social Research* 10(2):1-22.
- Sachs, Jeffrey D. 2005. *The End of Poverty: Economic Possibilities for Our Time*. London, UK: The Penguin Press.
- Sanchez, Pedro A., Glenn L. Denning, and Generose Nziguheba. 2009. "The African Green Revolution Moves Forward." *Food Security* 1(1):37-44.
- Schewe, Rebecca L., and Diana Stuart. 2017. "Why Don't They Just Change? Contract Farming, Informational Influence, and Barriers to Agricultural Climate Change Mitigation." *Rural Sociology* 82(2):226-262.
- Schnaiberg, Allan and Kenneth Alan Gould. 2000. *Environment and Society: The Enduring Conflict*. Caldwell, NJ: Blackburn Press.
- Schnaiberg, Allan. 1980. *The Environment: From Surplus to Scarcity*. New York: Oxford University Press.
- Schnurr, Matthew A. 2015. "GMO 2.0: Genetically Modified Crops and the Push for Africa's Green Revolution." *Canadian Food Studies/La Revue Canadienne Des Études sur L'alimentation* 2(2):201-208.
- Scoones, Ian, and John Thompson. 2011. "The Politics of Seed in Africa's Green Revolution: Alternative Narratives and Competing Pathways." *IDS Bulletin* 42(4):1-23.
- Scoones, Ian. 2016. "The Politics of Sustainability and Development." *Annual Review of Environmental Resources* 41(1):293-319.
- Seale, Clive. 2004. *Researching Society and Culture*. Thousand Oaks, CA: Sage.
- Shiva, Vandana. 1991. "The Green Revolution in the Punjab." *The Ecologist* 21(2):47-60.
- Smith, Pete, Peter J. Gregory, Detlef Van Vuuren, Michael Obersteiner, Petr Havlík, Mark Rounsevell, Jeremy Woods, Elke Stehfest, and Jessica Bellarby. 2010. "Competition for Land." *Philosophical Transactions of the Royal Society B: Biological Sciences* 365(1554):2941-2957.
- Sobha, I. 2007. "Green Revolution: Impact on Gender." *Journal of Human Ecology* 22(2):107-113.
- Spicer, Neil. 2012. "Combining Qualitative and Quantitative Methods." Pp. 479-493 in *Researching Society and Culture*. 3rd. ed., edited by C. Seale. London, UK: Sage.
- Stiglitz, Joseph E. 2007. *Making Globalization Work*. New York: WW Norton & Company.
- Stone, Glenn Davis, and Dominic Glover. 2017. "Disembedding Grain: Golden Rice, the Green Revolution, and Heirloom Seeds in the Philippines." *Agriculture and Human Values* 34(1):87-102.
- Struik, Paul C., Thomas W. Kuyper, Lijbert Brussaard, and Cees Leeuwis. 2014. "Deconstructing and Unpacking Scientific Controversies in Intensification and Sustainability: Why the Tensions in Concepts and Values?" *Current Opinion in Environmental Sustainability* 8:80-88.

- Shuba, Curtis J. 2019. *Distorting the Reality of Climate Change: Anti-Reflexive Narratives of Conservative Think Tanks in Canadian Newspapers*. Master's Thesis. University of Regina, Saskatchewan, Canada. Retrieved October 28, 2019 (https://ourspace.uregina.ca/bitstream/handle/10294/9007/Shuba_Curtis_MA_SOC_Fall2019.pdf?sequence=1&isAllowed=y).
- Symons, Kate. 2014. "Anti-Politics, Apocalypse and Adaptation in Kenya's National Climate Change Response Strategy." *Scottish Geographical Journal* 130(4):266-278.
- Syngenta Foundation. 2019. "AGRA & Syngenta Partner for Africa." Retrieved on August 15, 2019 (<https://www.syngentafoundation.org/news/recent-news/agra-syngenta-partner-africa>).
- Taylor, Marcus. 2015. *The Political Ecology of Climate Change Adaptation Livelihoods, Agrarian Change and the Conflicts of Development*. London, UK: Routledge/Earthscan.
- Thompson, Carol B. 2012. "Alliance for a Green Revolution in Africa (AGRA): Advancing the Theft of African Genetic Wealth." *Review of African Political Economy* 39(132):345-350.
- Thompson, Carol B. 2014. "Philanthrocapitalism: Appropriation of Africa's Genetic Wealth." *Review of African Political Economy* 41(141):389-405.
- Thompson, Paul B. 2010. *The Agrarian Vision: Sustainability and Environmental Ethics*. Lexington, KY: University of Kentucky Press.
- Tilman, David, Christian Balzer, Jason Hill, Belinda L. Befort. 2011. "Global Food Demand and the Sustainable Intensification of Agriculture." *Proceedings of the National Academy of Sciences* 108(50):20260-20264.
- Timmermans, Stefan, and Iddo Tavory. 2012. "Theory Construction in Qualitative Research: From Grounded Theory to Abductive Analysis." *Sociological Theory* 30(3):167-186.
- Toenniessen, Gary, Akinwumi Adesina, and Joseph DeVries. 2008. "Building an Alliance for a Green Revolution in Africa." *Annals of the New York Academy of Sciences* 1136(1):233-242.
- Tomlinson, Isobel. 2013. "Doubling Food Production to Feed the 9 Billion: A Critical Perspective on a Key Discourse of Food Security in the UK." *Journal of rural studies* 29: 81-90.
- Tonkiss, Fran. 2012. "Discourse Analysis." Pp. 263-282 in *Researching Society and Culture*. 3rd. ed. edited by C. Seale. London, UK: Sage.
- Turner, Matthew. 1993. "Overstocking the Range: A Critical Analysis of the Environmental Science of Sahelian Pastoralism." *Economic Geography* 69(4):402-421.
- UNCTAD. 2008. "UNCTAD Annual Report 2008." United Nations Conference on Trade and Development. Retrieved on July 20, 2019 (https://unctad.org/en/Docs/dom20091_en.pdf).
- Van Dijk, Jan AGM. 2005. *The Deepening Divide: Inequality in the Information Society*. Thousand Oaks, CA: Sage.

- Van Dijk, Teun A. 1995. "Discourse Semantics and Ideology." *Discourse & Society* 6(2):243-289.
- Van Dijk, Teun A. 2001. "Critical Discourse Analysis." Pp. 349-379 in *Handbook of Discourse Analysis*, edited by D. Schiffrin, D. Tannen, and E. Heidi. Hamilton, MA: Blackwell Publishers Ltd.
- Van Weezel, Stijn. 2016. "Food Imports, International Prices, and Violence in Africa." *Oxford Economic Papers* 68(3):758-781.
- Vanhaute, Eric. 2011. "From Famine to Food Crisis: What History Can Teach Us About Local and Global Subsistence Crises" *The Journal of Peasant Studies* 38(1):47-65.
- Velten, Sarah, Julia Leventon, Nicolas Jager, and Jens Newig. 2015. "What is Sustainable Agriculture? A Systematic Review." *Sustainability* 7(6):7833-7865.
- von Braun, Joachim, Ken B. Johm, and Detlev Puetz. 1994. "Nutritional Effects of Commercialization of a Woman's Crop: Irrigated Rice in the Gambia." Pp. 343-362 in *Agricultural Commercialization, Economic Development and Nutrition*, edited by Braun, J.V. and E. Kennedy. Baltimore, MD: Johns Hopkins University Press.
- Waitt, Gordon R. 2010. "Doing Foucauldian Discourse Analysis-Revealing Social Realities." Pp. 217-240 in *Qualitative Research Methods in Human Geography*, edited by I. Hay. Don Mills, ON: Oxford University Press.
- Watts, Michael. 1983. "On the Poverty of Theory: Natural Hazards Research in Context." Pp. 231-262 in *Interpretations of Calamity*, edited by K. Hewitt. London, UK: Allen and Unwin.
- WCED. 1987. *Our Common Future*. Oxford, UK: Oxford University Press.
- Webster, Paul. 1999. "The Challenge of Sustainability at the Farm Level: Presidential Address." *Journal of Agricultural Economics* 50(3):371-387.
- Weis, Tony. 2007. *The Global Food Economy: The Battle for the Future of Farming*. London, UK: Zed Books.
- Weis, Tony. 2010. "The Accelerating Biophysical Contradictions of Industrial Capitalist Agriculture." *Journal of Agrarian Change* 10(3):315-341.
- Wilson, Geoff A. 2001. "From Productivism to Post-Productivism and Back Again? Exploring the (Un) Changed Natural and Mental Landscapes of European Agriculture." *Transactions of the Institute of British Geographers* 26(1):77-102.
- Windfuhr, Michael, and Jennie Jonsén. 2005. *Food Sovereignty: Towards Democracy in Localized Food Systems*. Rugby, UK: ITDG Publishing.
- World Bank. 2008. "Food Price Crisis Imperils 100 Million in Poor Countries. News and Broadcast." Retrieved on February 1, 2019 (<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21729143~pagePK:64257043~piPK:437376~theSitePK:4607,00.html>).
- Yapa, Lakshman. 2002. "Improved Seeds and Constructed Scarcity." Pp. 81-97 in *Liberation Ecologies: Environment, Development and Social Movements*, edited by R. Peet and M. Watts. London, UK: Routledge.

Yin, Robert K. 2013. *Case Study Research and Applications: Design and Methods*. London, UK: Sage.

Zimmerer, Karl S., Judith A. Carney, and Steven J. Vanek. 2015. "Sustainable Smallholder Intensification in Global Change? Pivotal Spatial Interactions, Gendered Livelihoods, and Agrobiodiversity." *Current Opinion in Environmental Sustainability* 14(1):49-60.

APPENDIX: DATA SOURCES

- AGRA in 2008: Building on the New Momentum in African Agriculture. AGRA in 2008. Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). 2009. <https://agra.org/AGRAOld/wp-content/uploads/2016/04/agra-annual-report-2008.pdf> (Accessed May 15, 2019)
- AGRA in 2009: Engaging Globally, Working Locally. Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). 2010. <https://agra.org/AGRAOld/wp-content/uploads/2016/04/agra-annual-report-2009.pdf> (Accessed June 8, 2019)
- AGRA in 2010: Driving Real Change. AGRA in 2010. Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). 2011. <https://agra.org/AGRAOld/wp-content/uploads/2016/04/agra-annual-report-2010.pdf> (Accessed May 7, 2019)
- AGRA in 2011: Investing in Sustainable Agricultural Growth – A Five-Year Status Report. Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). (Accessed May 15, 2018)2012. <https://agra.org/AGRAOld/wp-content/uploads/2016/04/agra-annual-report-2011.pdf> (Accessed May 15, 2018)
- AGRA in 2012: Moving from Strength to Strength. Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). 2013. <https://agra.org/AGRAOld/wp-content/uploads/2016/04/agra-annual-report-2012.pdf> (Accessed July, 2019)
- AGRA in 2013: Transforming African Agriculture through Partnerships. Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). 2014. <https://agra.org/AGRAOld/wp-content/uploads/2016/04/agra-annual-report-2013.pdf> (Accessed May 15, 2018)
- AGRA in 2014: Positioning for Rapid Progress Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). 2014. <https://agra.org/AGRAOld/wp-content/uploads/2016/04/annual-report-2014-positioning-for-rapid-progress.pdf> (Accessed November 10, 2018)
- AGRA in 2015: A New Era for African Agriculture <http://agra.org/2015AnnualReport/> (Accessed January 10, 2018)
- AGRA in 2016: Towards Africa’s Agricultural Transformation. Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA). 2016 <https://agra.org/news/wp-content/uploads/2017/06/AGRA-2016-AR-final.pdf> (Accessed May 7, 2019)
- AGRA in 2017a: Catalysing an Inclusive Transformation in Africa. <https://agra.org/wp-content/uploads/2018/08/AGRA-2017-Annual-Report0708201802.pdf> (Accessed May 15, 2018)
- AGRA in 2017b: Strategy Overview for 2017-2021 Inclusive Agricultural Transformation in Africa. <https://agra.org/wp-content/uploads/2018/02/AGRA-Corporate-Strategy-Doc-3.-2.pdf> (Accessed October 9, 2018)
- AGRA in 2018: Impact, Progress, Partnerships. https://agra.org/ar-2018/wp-content/uploads/2019/07/AGRA-Annual-Report_v18_FINAL_Print-Ready_LR.pdf (Accessed September 15, 2019)