2020

Sustainable Land Management and Smallholder Farmers in Zimbabwe

Owen Prince Gono
Walden University

Walden University

College of Management and Technology

This is to certify that the doctoral dissertation by

Owen P. Gono

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Daphne Halkias, Committee Chairperson, Management Faculty
Dr. Judith Forbes, Committee Member, Management Faculty
Dr. Nikunja Swain, University Reviewer, Management Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2020

Abstract

Sustainable Land Management and Smallholder Farmers in Zimbabwe

by

Owen P. Gono

MBA, Keller Graduate School of Management, 1999

BSc, Pepperdine University, 1995

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

November 2020

Abstract

The sustainability of smallholder farms in Southern Africa is largely dependent on farmers' decision-making abilities regarding land management practices; however, smallholder farmers in Zimbabwe have knowledge gaps on sustainable land management practices. The purpose of this qualitative multiple case study was to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs. To address the research problem and purpose of the study, qualitative data were collected from multiple sources of evidence, including semistructured interviews with 7 smallholder farmers in Zimbabwe, archival data, and reflective journaling notes. This study was framed, first, by Ashely and Carney's sustainable livelihoods framework and, second, by Leach, Mearns, and Scoones's environmental entitlements framework. Fifteen themes were gleaned from five conceptual coding categories grounded in the conceptual framework: (a) relationship with trainers, (b) materials provided by trainers for sustainable land management, (c) land management strategies needed by farmers, (d) sustainable land management activities favored by farmers, and (e) unfavorable conditions for smallholder farmers. There is a need for agricultural transformation in Zimbabwe to drive change in knowledge systems, technology development and delivery, institutions, and policies. This research study may contribute to positive social change by providing training and innovative methods of sustainable land management practices to smallholder farmers in Zimbabwe aimed at improved rural food security and livelihoods, viable crop-livestock systems, and market participation.

Sustainable Land Management and Smallholder Farmers in Zimbabwe:

A Multiple Case Study

by

Owen P. Gono

MBA, Keller Graduate School of Management, 1999

BS, Pepperdine University, 1995

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

November 2020

Dedication

For my family

My kids, the Gono people,

Because of you, LIFE IS BEAUTIFUL!

For my mother, your love, your dedication can never be fully appreciated.

In the memory of my late father Paul Marshie, thank you.

Acknowledgments

I would like to thank my dissertation committee Chair Dr. Daphne Halkias. Dr. H., was indefatigable and very committed to the study far beyond the call of duty as a great teacher and mentor. She was always an email away to answer any questions which she always followed with encouraging words and pointed guidance. Using Isaac Newton's words I can only say this: "if I have seen further it is by standing on the shoulders of giants." I also love and cherish your sixth sense. You knew when the student needed help, needed a push, needed a break, and above all you were able to guide students to discover and develop their potentials.

Dr. Judith L. Forbes, my Committee Member and Dr. Nijunja Swain, the study's University Research Reviewer, thank you so much. I acknowledge their contributions and supportive feedbacks throughout the dissertation process. I am so thankful to Dr. Nse Evelyn Obot who sacrifice a lot of her precious time and effort to help me choose an appropriate software to record and transcribe the collected data.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

In the sub-Saharan continent of Africa, agriculture is the backbone of the economy. In Zimbabwe, land underpins the economic, social, and political lives of most people (Hakeem, 2015; Moyo et al., 2019). According to researchers, land management and agricultural strategies in Zimbabwe need to compete with environmental goals to sustain better land, water, soil nutrients, and biodiversity (Kadzamira & Ajayi, 2019; Nezomba, Mtambanengwe, Tittonell, & Mapfumo, 2017). The Fast Track Land Reform Program (FTLRP) in Zimbabwe, instituted in 2005, provided land to the landless and poor people who lived in the country's rural areas (Moyo, Chambati, & Yeros, 2019). These new smallholder farmers face sizable challenges, including climate change, drought, unpredictable market, unskilled labor, crop and animal pests and diseases, sickness and accidents, and changing agricultural policies and political influences (Dube, Moyo, Ncube, & Nyathi, 2016).

Nevertheless, stakeholders have found it difficult to disseminate such knowledge to those who could benefit from it. The lack of suitable mechanisms for disseminating the available knowledge on sustainable land management through training to smallholder farmers in Zimbabwe presents a barrier to innovation and sustainable adoption of viable land management techniques (Bertin, Zacharie, Ann, Ebenezar, & Alain, 2014; Chagumaira et al., 2016). Before such training can be offered to address the smallholder farmer's needs, more research is needed. Specifically, qualitative researchers should explore the specific knowledge among smallholder farmers in Zimbabwe to tailor

sustainable land management training to their particular needs (Mapiye, 2016; Stoeffler, Alwang, Mills, & Taruvinga, 2016).

Agriculture and food security are key factors in most sub-Saharan countries of Africa. This study may provide knowledge and new options to support smallholder farmers to achieve food security by better managing agricultural risks associated with climate shocks (Masikati, Descheemaeker, & Crespo, 2019). Additionally, this study may assist agricultural experts, policymakers, and other stakeholders concerned about food security, poverty, livelihoods, and sustainability of agriculture production in Zimbabwe in their efforts to adopt new approaches for future agricultural implementation.

This chapter provides insight into the potential impact and challenges of smallholder farmers in Zimbabwe with sustainable land management. I will present background information and state the problem, including a description of the gap in the scholarly literature knowledge. Following is a presentation of the logical alignment between the problem, purpose, and research question, and the study's conceptual framework. After doing so, I define the key terms used throughout this study. Finally, I discuss the assumptions, scope and delimitations, limitations, and significance of the study.

Background of the Study

The FTLRP in Zimbabwe, instituted by legislation in 2005, provided land to the landless and poor people who lived in rural areas (Moyo et al., 2019). Challenges faced by the smallholder farmers in Zimbabwe who were granted over 80% of land through land reform programs continue to this day, in a country where the majority of people

remain vulnerable to hunger and poverty (Scoones, 2015). Land underpins Zimbabwe's economy, and agriculture is 70% of people who live in rural areas. Agriculture is the mainstay of the rural economy, and agrarian livelihood was once viewed as the life of the future. Nevertheless, Zimbabwe finds itself facing an agrarian crisis where 70% of people living in rural areas fail to raise agricultural productivity (World Bank, 2017).

The world is grappling with how to provide food and nutrition to a projected population of 9 billion by 2050 (World Bank, 2017). In Zimbabwe, the economy is in deep trouble due to the transformations brought about by the FTLRP, which caused the agricultural sector to collapse (Moyo et al., 2019). The most serious implication of the land reform of 2000 is its connection to food security and people's livelihoods. Agriculture contributes significantly to the livelihoods of over 70% of the population in Zimbabwe, most of whom rely on rain-fed agriculture, making them vulnerable to the effects of climate change (Makate et al., 2017).

The contentious issue in Zimbabwe is the continuous decline of agricultural production (Makate, 2017). Smallholder farmers have continually blamed the land reform program of 2000 for triggering the disruptions to the commercial agricultural sector and the entire economy. There has been a shift in the explanation about agricultural performance decline in the semiarid country of Zimbabwe. Several scholars have argued that farmers' lack of training in economic mismanagement, governance issues, and soil fertility management is a major constraint to the economy and crop production (Brown et al., 2012). Droppelmann et al. (2017) indicated that sustainable

intensification of agriculture is required in Africa in order for the continent to meet the demands for food and the protection of resources.

The lack of education and exposure to information on climate change creates a wide gap and renders smallholder farmers in Zimbabwe ill-prepared to handle climate change and variability. Gukurume (2013) noted that climate change has severely affected the majority of rural communities in Zimbabwe. Gukurume wrote that rural communities have noted: "unpredictable rains, high temperature (heatwave), successive drought, shortening rainfall seasons and seasonal changes in the timing of rainfall" (p. 89). Climate change has compounded the vulnerability of most smallholder farmers and rural communities in the country as they face food insecurity and abject poverty (Gukurume, 2013). Commenting on the economic implications of Zimbabweans' dependence on agriculture, Matondi (2012) and Gukurume (2013) wrote, "vulnerability thus manifests itself in poorer countries and communities due to a lack of resources or entitlements and lack of capability to respond or adapt to climate variability" (p. 91).

Slater et al. (2007) argued that the ability of any country to adapt and cope with the hazards of climate change "depends on economic resources, infrastructure, technology, and social safety net" (p. 91). There is a void between the increased frequency of extreme weather conditions in Zimbabwe and the 80% of poor smallholder farmers who have no adaptive capacity to successfully invest in agricultural activities successfully. Mandoti (2012) has monitored Zimbabwe's agricultural problems for over 16 years. After the land reform of 2000, the author noted that the agricultural sector never recovered. Before FTLRP, there were better and well-organized and -managed

agricultural activities in the agriculture sector, and there was a strong lobby for commercial firms, which resulted in strong supporting systems such as access to credit, financing, better farming infrastructure, and sophisticated irrigation systems. Zamchiya (2014) and Richardson (2015) argued that many smallholder farmers in Zimbabwe lack the necessary information on climate change and the capital to buy farming equipment and inputs such as seeds, fertilizer fuel. The absence of knowledge, skills, training, and farming experience has led to the plunging of agricultural productivity in Zimbabwe, which has led to increased poverty and other livelihood shocks in the country (Bjornlund et al., 2019).

Problem Statement

Poor land management practices negatively affect smallholder farmers' socioeconomic welfare in Zimbabwe, resulting in 70% of the national population living in food-insecure households and below the poverty level (Bjornlund et al., 2019). Agriculture and the smallholder farming sector dominate Zimbabwe's economy, contributing 15–20% of gross domestic product and providing employment and direct livelihoods for about 70% of the population, including 30% of formal employment (World Bank, 2017). Documented barriers to deliver and adopt sustainable land management practices by smallholder farmers in Zimbabwe include economic capacity, weak information technology development, lack of knowledge dissemination, inadequate irrigation systems, and water delivery, degraded soils, conflicts among different interest groups, and inadequate government policies (Johnson, Kovarik, Meinzen-Dick, Njuki, & Quisumbing, 2016; Kellner, von Maltitz, Seely, Atlhopheng, & Lindeque, 2018). The

general problem is the lack of training on sustainable land management practices among smallholder farmers in Zimbabwe (Chagumaira, Ririnda, Nezomba, Mtambanengwe, & Mapfumo, 2016; Mapiye, 2016).

Despite field-based evidence that modern technologies can increase and sustain agricultural yields, adoption levels of such technologies by smallholder farmers in Zimbabwe have remained low (Kadzamira & Ajayi, 2019). The sustainability of smallholder farms in Zimbabwe is largely dependent on farmers' decision-making abilities regarding land management practices, given the level of knowledge and information available to them (Jiri, Mafongoya, & Chivenge, 2015; Mutsvangwa-Sammie et al., 2016). Scholars indicate that the dissemination of innovative agricultural training has been integral in solving many land management problems (Tatsvarei, Mushunje, Matsvai, & Ngarava, 2018). Delivery of sustainable land management practices can be accomplished if farmers accept trainers in their existing social networks (Dicecca, Pascucci, & Contò, 2016). Should smallholder farmers in Zimbabwe not receive training in sustainable land management techniques, the persistence of poverty and deteriorating living conditions will continue to challenge smallholder farmers' fragile livelihoods (Helliker, Chiweshe, & Bhatarasa, 2018; Scoones, Mavedzenge, Murimbarimba, & Sukume, 2018). The specific problem is that smallholder farmers in Zimbabwe have knowledge gaps on sustainable land management practices, presenting a barrier to training these farmers on innovative agricultural practices tailored to their needs (Makate, Makate, Mango, & Siziba, 2019; Moyo et al., 2019; Scoones, Mavedzenge, & Murimbarimba, 2018).

Purpose of the Study

The purpose of this qualitative multiple case study was to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs. I used the qualitative paradigm and a multiple case study methodology to address the research problem. Semistructured interviews, archival data, and reflective field notes were used to explore the specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices. I triangulated the data sources to establish the credibility of the study's findings.

Research Question

The central research question was, What are the specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices?

Conceptual Framework

This study was framed first, by the sustainable livelihoods framework (Ashley & Carney, 1999), which "provides an understanding of the livelihoods of local communities being studied, what assets they have, and what they do/can do with these assets" (Yaro, 2004, p. 9), and, second, by the environmental entitlements framework, which focuses on the wider influence and importance of diverse institutions operating at multiple-scale levels from micro to macro (Leach, Mearns, & Scoones, 1999). These institutions influence who has access to and control over what resources within a specific environment and arbitrate contested resource claims (Leach et al., 1999). In Zimbabwe, upon gaining independence in 1980, lawmakers realized that land reform represented a

powerful means for righting the country's natives' wrongs in both social and economic spheres. Land reform policies were deemed instrumental in tackling poverty for disadvantaged populations, a case in point being rural dwellers, for whom subsistence farming was critical to their livelihoods (Helliker et al., 2018; Scoones et al., 2018).

In previous studies, researchers have promoted the sustainable livelihoods framework as a valuable tool for analyzing how farmers could acquire and maintain resources for their work (Nikolakis & Grafton, 2015). Researchers using the sustainable livelihoods framework as a theoretical lens have gathered farmers' information, such as who gained what, what assets the farmers accumulated, gender and distribution of assets, and how assets have improved their livelihoods. Studies have shown that the FTLRP in Zimbabwe has had mixed results on farmers' livelihoods and enhanced the potential for future agricultural production for smallholder farmers (Kellner et al., 2018; Murisa, 2011). In Zimbabwe's case, while upholding land as an asset may have improved the livelihoods of farmers, it has also likely endangered them (Mapiye, 2016). In this study, the sustainable livelihoods framework was used as a theoretical lens to gain a deeper understanding of the specific knowledge gaps among smallholder farmers in Zimbabwe (Dube, Homann-Kee Tui, Rooyen, & Rodriguez, 2014).

In a revised approach to the environmental realm set out by Sen (1981), Leach et al. (1999) shifted emphasis to institutional aspects (from micro to macro scales) impacting the ability of individuals to use, access, and manage environmental goods and services, along with the implications of such a situation for various social actors. The environmental entitlements framework can more practically be utilized as an analytical

toolbox offering insights into actors' endowments, entitlements, capabilities, and transformation of environmental goods and services (Leach et al., 1999). By understanding the "institutional matrix" (Scoones, 1998, p. 12) influencing the livelihoods of smallholder farmers in Zimbabwe, researchers can learn about sustainable land management practices that may reverse rural farmers' fragile livelihood systems in Zimbabwe (Chagumaira et al., 2016; Mapiye, 2016). Coupled with poor land management practices and rainfall variability, the dominant source of livelihood and production risk in drier environments has also negatively affected the sustainability of rain-fed smallholder agriculture in Zimbabwe (Makate et al., 2019; Scoones, Mavedzenge, & Murimbarimba, 2018). Chapter 2 further elaborate on the logical connections among key elements of the conceptual framework to the study's purpose and explain how the framework relates to the study approach, research question, and research method.

Nature of the Study

The study's nature was qualitative to logically align with the purpose of the study and provide data for the research questions. A descriptive multiple case study was used as the research design for the study, given that the study's purpose called for a deeper understanding of the complex social phenomena of land management practices and livelihood strategies among smallholder farmers in Zimbabwe (Yin, 2017). Before the needs of the smallholder farmer can be adequately addressed, scholars recommended that qualitative studies should explore the specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices to tailor sustainability

training to their needs (Dube et al., 2014; Mapiye, 2016; Stoeffler et al., 2016). Qualitative research explores the world of a given context from the viewpoint of the people living in it and is associated with the interpretivist paradigm (Cooper & White, 2012). The dialogue developed between researcher and participants with the in-depth interview method of qualitative research approaches can bring forth new meanings from within a given social context. From a historical perspective, qualitative research methodologies for the interpretivist paradigm were developed to give a voice to a society's victims of oppression and their struggles with dominant institutions, organizations, and social groups for social change (Cooper & White, 2012).

A multiple case study investigating a social phenomenon can involve individuals living within that social context as a separate unit of study (Yin, 2017). When the data focus is only on individuals in a multiple-case study design, the study's central phenomenon, in this case, smallholder farmers in Zimbabwe, is the context and not the target of the study (Eisenhardt & Graebner, 2007; Yin, 2017). The unit of analysis will be the smallholder farmer in Zimbabwe. This design allows for investigating differences within and between cases (Yin, 2017). Participants for this case study were recruited using purposeful criterion and snowball sampling strategies and screened with the following inclusion criteria: adults over the age of 18; smallholder farmer in Zimbabwe; acquired their farming from the FTLRP in Zimbabwe instituted in 2005; and possess knowledge regarding the experiences with the topic of the study (Patton, 2014). Snowball sampling is the most common form of purposeful sampling and works by asking a few key participants who already meet the study's criteria to refer others who may also meet

the criteria (Merriam & Tisdell, 2015). I conducted seven in-depth face-to-face individual interviews with smallholder farmers in Zimbabwe. Schram (2006) recommended a range of five to 10 participants for a qualitative study, stating that a larger sample size may thwart a deeper investigation of the phenomena under study.

Definitions

Agricultural innovation systems (AIS): A strategy to enhance technologies for "agricultural research and development conducted through various training and innovation platform establishment" (Triomphe et al., 2014, p. 89). The primary purpose of AIS is to mitigate hunger and poverty by enhancing economic development in sub-Saharan Africa (Triophe et al., 2014).

Biodiversity: Environmentally friendly land use that helps to conserve all three elements of agricultural biodiversity, namely genetic diversity of domesticated crops, animals, fish, and trees; diversity of wild species on which agricultural production depends (such as wild pollinators, soil micro-organisms, and predators of agricultural pests); and diversity of wild species and ecological communities that use agricultural landscapes and their habitat (Scoones, 2015, p. 23).

Communal Areas Management Program for Indigenous Resource Use (CAMPFIRE): The Zimbabwe government created the program in 2005 to replace the socially-just Community-Based Natural Resource Management (CBNRM) and to resolve the conflict that had broken out between the Zimbabwe rural populations and wildlife megafauna. CAMPFIRE's main objectives were the "enhancement and the conservation

of biodiversity and the rich natural heritage of Zimbabwe through effective participation of communities and the generation of income for them" (Harison, 2015, p. 2).

The Zimbabwe government created Community-Based Natural Resource Management (CBNRM): The natural resources management program in 1989 with the primary purpose of conserving valued wildlife megafauna such as lions, buffalo, and elephants as a way to promote rural livelihoods and development (Harison, 2015).

Decision-making: The degree to which a set of criteria--economic, environmental, and social--are used to select the best/most sustainable system from a host of other farming systems (Mutsvangwa-Sammie et al., 2015).

Drought-mitigating measures: The degree to which a large number of actions are taken to minimize the impact of drought on the environment, economic, and social systems (Nhundu et al., 2015).

Environmental entitlement framework (EEF): A conceptual framework that highlights institutions' role in mediating the relationship between environment and society. This view rests on the assumption that frameworks are grounded in entitlements where social actors are positioned to command environmental goods and services beneficial to their well-being (Chagumaira et al., 2016).

Fast Track Land Reform Program (FTLRP): The exercise where land was confiscated by force by the Zimbabwe government from White farmers and was divided into A1 model small-scale farms allocated to the poor and A2 model farms allocated to resource-rich commercial farmers (Matondi, 2012).

Food security: Secure access by households and individuals to nutritionally adequate food at all times and procured in conformity with human aspirations and dignity (Yaro, 2004). According to Yaro (2004, p. 1), food security is an important component of human welfare and development that must be safeguarded and sustained by the world, national districts, villages, households, and individuals.

Indigenous knowledge: This term refers to indigenous knowledge due to its connection to agricultural development and environmental conservation (Matondi, 2012).

Information technologies development: The degree to which the agricultural sector uses national information infrastructures to support its agricultural development activities (Johnson et al., 2016).

Innovation agricultural practice: The willingness to form an entirely new method that transcends the current existing level of smallholder farming structure (Chagumaira et al., 2016; Tatsvarei et al., 2018).

Knowledge dissemination: The degree to which new agricultural information and technologies are shared in developing countries. The assumption of farmers to adapt or innovate, make better decisions, and adopt a successful farming technology, the information needed to be shared with other farmers (Johnson, 2016).

Land management: The complexity of both natural and managed ecosystems and functions, including primary and secondary production, soil conservation, recycling of soil nutrient and water resources (Mutsvangwa-Sammie et al., 2016).

Land management practices: The degree to which smallholder farmers use manure, fertilizer, composts, and fallow to enhance soil fertility and land conservation investments and guarantee long-term productivity (Scoones, 2015).

Rangeland management: An ecosystem complex consisting of native, natural grasslands pastures that can include naturally or artificially revegetated lands to provide plant cover. Rangeland management is an active approach by livestock farmers in the semiarid savanna communal of Zimbabwe to employ restoration techniques to their farms to improve crops and animal husbandry (Marques et al., 2016; Moyo et al., 2013).

Smallholder farmer: A concept that primarily refers to communal and small-scale farmers but now includes resettled farmers who operate primarily for subsistence living with very few farmers growing crops such as cotton and paprika for commercial purposes. Smallholder farmers benefited from high-skilled commercial farmers for agro-inputs and as a part of the public extension system. The land reform exercise of 2000 has shifted the focus for agro-processing industries from large scale commercial farmers to smallholder farmers (Zamchiya, 2013).

Socioeconomic: A measure that combines the social and economic status of an individual, community, or nation; socioeconomic status is positively influenced by better health (Moyo et al., 2016).

Sustainability: A term that describes farming systems' ability to continue fulfilling their purpose in the future. The farming systems must be resourceful and socially, commercially, and environmentally supportive.

Sustainable land management: Global efforts to restore degraded land and preserve soil and land to "ensure the long-term continuation of ecosystem services" (Margues et al., 2016, p. 2). Key principles to mitigate land degradation are "maintaining and enhancing soil cover, reducing topsoil disturbances and compaction, rotating and interplanting crop/plants, integrating crop and livestock systems, enhancing plant and animal species diversity, and balancing nutrient withdrawal and replenishment" (Margues et al., 2016, p. 2). Basic pillars of sustainable land management include enhancing productivity, security, protection, viability, and social acceptance (Marques et al., 2016).

Sustainable livelihoods: A set of issues that comprise people's capabilities, their assets, and activities that are required as a means of living (Chagumaira et al., 2016). Livelihood is considered sustainable "when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets while not undermining the natural resource base" (Scoones, 1998, p. 5). Scoones give the generic definition (1998) refers to sustainable livelihoods as people's capability to have access to livelihood resources that comprise natural resources, economic resources, human resources, and social capitals.

Sustainable natural resource management (SNRM): A shift of focus in managing public lands and resources where more attention is placed on sustaining ecosystems. The process requires knowledge about the ecosystems, an understanding of the ecosystems' relationships, and knowledge about the human values, activities, and resources to use (Masikati et al., 2019).

Assumptions

Four assumptions influenced data collection and analysis strategies for the study. The first assumption was that smallholder farmers would be willing to volunteer as participants in this research study. The data collected from in-depth interviews would provide honest, reliable, accurate, and well-articulated information on specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practice. Exploration and description of smallholder farmers' perspectives regarding specific knowledge gaps rely on the presumption that the recruited participants' real-life experiences support in-depth knowledge on the study's central topic. The successful completion of similar studies (Jiri, Mofongo, & Chivenge, 2015; Mapiye, 2016) suggested that the study's research purpose was achieved by applying this method. The study design included subject matter reviews to triangulate findings and address this critical assumption.

A second study assumption of this study pertained to the integrity of the data collection, processing, and analysis process. It was assumed that in-depth knowledge about the study's purpose during the recording, coding, and analysis of the study data would be accurately collected and reported.

The third assumption driving this study was that the multiple case study design assumed that insights and perspectives recorded in the in-depth interviews would provide the information needed to triangulate information from multiple sources' findings (Guion, Diehl, & McDonald, 2011; Patton, 2014). Being that the interviewer in this study was also a native Zimbabwean, this shared cultural background helped establish rapport

and trust during the interview process so participants could feel comfortable sharing their knowledge gaps in sustainable land management. It was assumed transcription of the interview data would be accurate, and the study design included member checking to address this assumption.

The fourth assumption of this study was that utilizing a multiple case study design would contribute new knowledge to the study's conceptual framework and its underlying theories. Yin (2017) indicated that the multiple case study design in qualitative research and cross-case synthesis as a technique for analyzing qualitative data are preferred methods for strengthening the validity and robustness of qualitative research. Additionally, data analysis results using the multiple case study design are commonly used to build or extend theory (Eisenhardt & Graebner, 2007).

Scope and Delimitations

This multiple case study was limited to seven smallholder farmers in Zimbabwe with the following boundaries set on their participant characteristics: adults over the age of 18; smallholder farmer in Zimbabwe; acquired their farming from the FTLRP in Zimbabwe instituted in 2005; and possess knowledge regarding their experiences with the topic of the study (Patton, 2014). The population's specific boundary was chosen due to the need to fill knowledge gaps on sustainable land management practices of smallholder farmers in Zimbabwe that cannot be explored by using other methodologies, including assessments and surveys. This study excludes those smallholder farmers in Zimbabwe who have previous successful experience with sustainable land management practices. This study also excludes those smallholder farmers in Zimbabwe who received

training from nongovernment organizations, such as the United Nations Development Programme (UNDP) on sustainable land management practices. Excluded from this study are similar, yet different, conceptual frameworks, most notably the sustainable rural livelihood framework by Scoones (2015), which excludes smallholder farmers' indigenous knowledge and knowledge gaps on sustainable land management practices.

This research is transferable to smallholder farmers and their communities in other sub-Saharan Africa regions because participants face similar economic, livelihood, agricultural, and food security challenges as do many other smallholder farmers in the region. Formerly, researchers have been primarily focused on trainers, nongovernment humanitarian workers, and government officials' roles in exploring the livelihood challenges of smallholder farmers in Zimbabwe. However, Dube et al. (2014), Mapiye (2016), and Stoeffler et al. (2016) indicated the need for using a qualitative methodology that gives in-depth access to smallholder farmers' knowledge gaps with sustainable land management practices in Zimbabwe.

Limitations

Limitations, a characteristic of every research study, are elements of the study that are out of the researcher's control and can sometimes impact the study results' trustworthiness (Golafshani, 2003). The study's first limitation was that the researcher being a Zimbabwean could inadvertently contribute to cultural bias in the study. Motivations and influences based on a personal cultural lens can create ethnocentrism in judging research participants and their responses solely by the values and standards of one's own culture (Chenail, 2015). To minimize culture bias, a peer debriefer not

belonging to the Zimbabwean culture and skilled in qualitative research methods analyzed was the same data, and the results were compared and contrasted with the researcher's own, with all discrepancies discussed until a consensus was established (Creswell & Miller, 2000).

The second limitation of the study was that the case study method received scholarly criticism for not offering statistical generalization, limiting the transferability of data results or the general population from which the sample of seven smallholder farmers in Zimbabwe originated (Yin, 2017). The multiple case study method is not used for this purpose but to augment external validity and guard against observer bias, cross-case comparison, and advancing theory generation (Stake, 2013).

Significance of the Study

Significance to Practice

The results and recommendations arising from this research may prove useful to policymakers and other local community leaders who seek to develop local-level policy and interventions that can stimulate resource-conserving agriculture to improve sustainable land management practices in smallholder farms in Zimbabwe (OECD, 2018; Ziadat, Bunning, & De Pauw, 2017). The results of this study may also inform small farming communities in Zimbabwe on how innovative methods of ecosystem sustainability particular to their needs can strengthen their impoverished livelihoods.]

Significance to Theory

Scholars have identified a gap in the research literature on documenting and describing the land management practices and livelihood strategies among smallholder

farmers in Zimbabwe. This research is important because its results will address this gap in the scholarly literature on developing sustainable land management with a fragile livelihood system. In the sub-Saharan continent of Africa, agriculture is the backbone of the economy. In Zimbabwe, land underpins the economic, social, and political lives of most people (Hakeem, 2015; Moyo et al., 2019). There is evidence that the lack of suitable mechanisms for disseminating the available knowledge on sustainable land management from researchers to smallholder farmers in Zimbabwe presents a barrier to innovation and sustainable adoption of viable land management techniques (Chagumaira et al., 2016; Murisa, 2011). Before such training can address the needs of the smallholder farmer, qualitative studies should explore the experiences of smallholder farmers in Zimbabwe in order to tailor sustainable land management training to their particular needs (Dube et al., 2014; Mapiye, 2016; Stoeffler, Alwang, Mills, & Taruvinga, 2016) and contribute such data to the scholarly literature.

Significance to Social Change

This research study may contribute to social change by directly providing valuable knowledge from smallholder farmers to agricultural educators. In turn, educators can disseminate this knowledge through training and innovative methods of sustainable land management practices to smallholder farmers in Zimbabwe, aiming at improved rural food security and livelihoods, viable crop-livestock systems, and market participation.

Summary and Transition

In the sub-Saharan continent of Africa, agriculture is the key to the smallholder livelihoods who live in the rural areas and is considered the backbone of the country's economy. There is an interconnectedness of agriculture and environmental change that requires a serious active role when governments and institutions make policies and strategies in sustainable agriculture development. Environmental integration should be reflected in both policies and strategies about the processes of agricultural development. This should be evidenced by smallholder farmers and other institutions' concerns to emphasize enhancing agri-environmental sustainability.

In Zimbabwe, the smallholder farmers saw two agricultural models introduced to farming livelihoods: the Plough-Based and the Conservation Agriculture (CA). The two agricultural models were introduced because of their potential to increase yields. The Plough-Based model focused on five practices: plowing, maintaining, crop rotation, sole cropping, and planting in line. Plow-based agriculture was abandoned because there was a continuous decline of yields and was associated with a severe increase of soil erosion in the farming areas and not soil conservation policies.

Zimbabwe is viewed as a fertile ground for the introduction of Conservation Agriculture (CA). Three key principles are associated with conservation agriculture (CA): (a) minimal soil disturbance, which is achieved through the use of minimum-tillage, (b) permanent soil cover achieved through the mulch of crop residues retention, and (c) crop rotations. The efforts to intensify smallholder agriculture in the sub-Saharan countries of Africa, Zimbabwe, in particular, have been failing to yield. More worrying is

the challenge of climate change, increasing drought, a record number of unskilled labor, and an increase in soil degradation that would diminish soil productivity and natural resources.

Chapter 2 presents a review of the literature on environmental factors affecting agriculture in Zimbabwe, such as climate change, deforestation, genetic engineering, soil degradation, irrigation, pollutants, waste, sustainability, and studies that helped influence the research. I examined the rising temperature in Zimbabwe, rainfall variability, diminishing soil productivity, declining natural resources, chronic food insecurity, and how it can mitigate these challenges.

Chapter 2: Literature Review

Poor land management practices negatively affect most smallholder farmers in Zimbabwe, resulting in 70% of the national population living in food-insecure households and below the poverty level (Moyo et al., 2017). Despite field-based evidence that modern technologies can increase and sustain agricultural yields, adoption levels of such technologies by smallholder farmers in Zimbabwe have remained low (Kadzamira & Ajayi, 2019). Dissemination of innovative agricultural training can solve many land management problems and can be accomplished if farmers accept trainers in their existing social networks (Dicecca, Pascucci, & Contò, 2016). The specific problem is that smallholder farmers in Zimbabwe have knowledge gaps on sustainable land management practices, presenting a barrier to training these farmers on innovative agricultural practices tailored to their needs (Makate, Makate, Mango, & Siziba, 2019; Moyo et al., 2019; Scoones, Mavedzenge, & Murimbarimba, 2018). The purpose of this qualitative multiple case study was to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs.

In Chapter 2, I present the literature search strategy alongside the conceptual framework for this study. In the chapter's literature review, I synthesize knowledge on the challenges facing smallholder farmers in Zimbabwe in relation to sustainable land management practices and adoption of innovative agricultural practices that may reverse these farmers' fragile livelihoods (see Chagumaira et al., 2016; Mapiye, 2016). The chapter concludes with a summary of key points.

Literature Search Strategy

I began the literature search by seeking supporting materials on the environmental factors affecting agriculture in Zimbabwe, such as climate, deforestation, genetic engineering, irrigation, pollutants, soil degradation, and waste. A specific question of interest was whether smallholder farmers in Zimbabwe would succeed in attaining knowledge on sustainable land management, which emphasizes how to sustain land, water, soil nutrients, and biodiversity (Kadzamira & Ajayi, 2019; Nezomba et al., 2017). Degraded and nutrient-depleted soils in Zimbabwe create a limitation for the country to improve crop and livestock productivity. I undertook a keyword search of Walden University Library databases to find relevant literature concerned with available knowledge on sustainable land management "to ensure the long-term continuation of ecosystem services" (Marques et al., 2016, p. 2).

The articles and materials used in this research came from scholarly peer-reviewed journals. The literature review includes information published from 1985 to 2016, with 85% of the referenced resources published in the last 5 years. To find literature, I searched Google Scholar and the following Walden University Library databases: ProQuest, Business Source Premier, and Google Scholar. The search terms I used are directly related to this study: *food security*, *sustainable livelihoods*, *biodiversity*, *rangeland management*, *climate change*, *farmers' livelihoods*, *agricultural innovation systems*, *knowledge dissemination*, *land management*, *information technologies development*, *sustainable natural resources management*, *soil nutrition*, *socioeconomic*, and *sustainable land management.*

The current literature and deductive arguments were instrumental in providing context regarding the natural resources, economic resources, human resources, and social capitals prevalent in Zimbabwe and their attendant effects (see Scoones, 1998). The literature review gives a snapshot of land management and smallholder farmers' livelihoods in Zimbabwe. I also review the literature on climate change, environmental degradation, and nutrient-depleted soil in Zimbabwe and the impact on agricultural productivity for both crops and livestock (e.g., Helliker et al., 2018; Nyamadzawo et al., 2013; Scoones et al., 2018) and the need for smallholder farmers to attain knowledge on sustainable land management (Berin et al., 2014; Chagumaira et al., 2016).

Conceptual Framework

This study was framed, first, by the sustainable livelihoods framework (Ashley & Carney, 1999), which "provides an understanding of the livelihoods of local communities being studied, what assets they have, and what they do/can do with these assets" (Yaro, 2004, p. 9), and, second, by the environmental entitlements framework, which focuses on the wider influence and importance of diverse institutions operating at multiple-scale levels from micro to macro (Leach et al. 1999). These institutions influence who has access to and control over what resources within a specific environment and who arbitrates contested resource claims (Leach et al. 1999). Colonial systems in Africa resulted in unequal land ownership structures, leading to, among other serious challenges, inequality, and poverty (Todes, Kok, Wentzel, Van Zyl, & Cross, 2010). Worldwide, land reform constitutes a key developmental policy that, at its core, seeks to minimize unequal resource distribution and drive down poverty rates (Dinh, Cameron, & Nguyen, 2015). In

Zimbabwe, upon gaining independence in 1980, lawmakers saw that land reform represented a powerful means for righting the country's natives' wrongs in both social and economic spheres. Land reform policies were deemed instrumental in tackling poverty for disadvantaged populations, a case in point being rural dwellers, for whom subsistence farming is critical to their livelihoods (Helliker et al., 2018; Scoones et al., 2018).

In previous studies, researchers have promoted the sustainable livelihoods framework as a valuable tool for analyzing how farmers could acquire and maintain resources for their work (Nikolakis & Grafton, 2015). Researchers using the sustainable livelihoods framework as a theoretical lens have gathered farmers' information, such as who gained what, what assets the farmers accumulated, gender and distribution of assets, and how assets have improved their livelihoods. Studies have shown that the FTLRP in Zimbabwe has had mixed results on farmers' livelihoods and enhanced the potential for future agricultural production for smallholder farmers (Kellner et al., 2018; Murisa, 2011). As such, while upholding land as an asset may have improved Zimbabwean farmers' livelihoods, it has also likely endangered them (Mapiye, 2016). In this study, I used the sustainable livelihoods framework as a theoretical lens to gain a deeper understanding of the specific knowledge gaps among smallholder farmers in Zimbabwe (Dube et al., 2014).

The advent of the sustainable livelihoods framework emerged from the inadequacy of classical neo-Marxist theories to account for poverty reduction and inequalities. The sustainable livelihoods framework is manifested as an actor-oriented

perspective seeking greater insights into lived experiences of network, community, and family (De Haan & Zoomers, 2005). Contributions to the framework originate from economists and Marxist scholars in agricultural economics and geography (Scoones, 2009). Conceptually, the approach emerged from wide-ranging fields such as applied social science, agro-ecosystems, and participatory rural development approaches (Norton & Foster, 2001). Affording a particular microeconomics-level focus on household accumulation patterns and agricultural activities (e.g., farm production; De Haan & Zoomers, 2005), it has been applied in various livelihood studies, including research into the effects of the Green Revolution in India (e.g., Mumuni & Oladele, 2016).

The sustainable livelihoods framework (see Figure 1) was originally born from the work of Chambers and Conway (1992) on capabilities, equity, and sustainability—work that carries a marked influence by that of Sen (1981, 1984, 1985) on capabilities and freedoms. When used as the foundation of the sustainable livelihoods framework approach, the definition of livelihood is the capabilities, assets (stores, resources, claims, and access), and activities required for a means of living. This conceptual framework also indicates that a livelihood must be sustainable and cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide a sustainable livelihood strategy for the next generation. Finally, a livelihood must also be part of a social network that contributes net benefits to other livelihoods at the local and global levels in the long and short terms (Chambers & Conway, 1992). Changing attitudes that increase livelihoods at the micro-level must also be connected to environmental

sustainability and provide an impetus for designing and implementing sustainable livelihoods (Ashley & Carney, 1999).

Appendini (as cited in De Haan & Zoomers, 2005, p. 24) wrote, "the central objective of the livelihoods approach was to search for more effective methods to support people and communities in ways that are more meaningful to their daily lives and needs as opposed to ready-made interventionist instruments." This definition focuses on people, their strengths, and the various means of financial, community, and social capital that individuals use to sustain households' long-term sustainability.

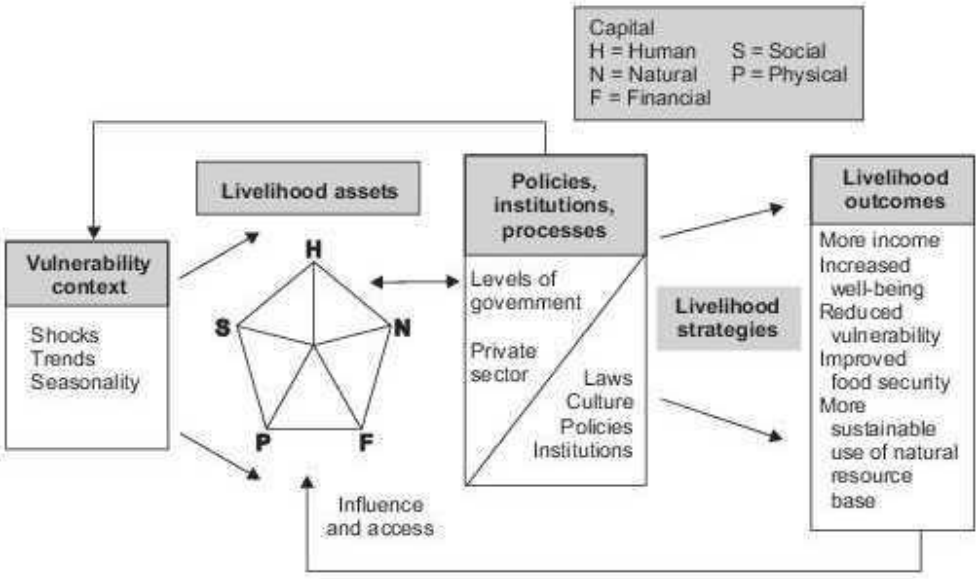


Figure 1. The sustainable livelihoods framework. From *Sustainable Livelihoods: Lessons From Early Experience* (p. 11), by C. Ashley and D. Carney, 1999, London, UK: Department for International Development. Copyright 1999 by Caroline Ashley and Diana Carney. Adapted with permission (see Appendix A).

Mapiye (2016) used the sustainable livelihoods framework in assessing the livelihoods of resettled farmers in Nyahukwe, Zimbabwe. As advocated in its use in

future research, land reform aims to gain and sustain resources through new indigenous land management strategies to build sustainable livelihoods.

Scholars have used the second seminal framework considered here, the environmental entitlements framework (see Figure 2), to understand broader influences on rural livelihoods. Leach et al. (1999) put forward the environmental entitlements framework, built on Sen's entitlements work (e.g., 1981) that theorized why people living in a context without a food shortage still experience famine. This is the case with Zimbabwe today, where food security and famine remain a constant challenge among smallholder farmers. Additionally, there is evidence that the lack of suitable mechanisms for disseminating available knowledge on sustainable land management from researchers to smallholder farmers in Zimbabwe also presents a barrier to innovation and sustainable adoption of viable land management techniques, though no in-depth investigation has been conducted that explores these issues from the smallholder farmer's perspective (Chagumaira et al., 2016; Murisa, 2011). Additionally, these food security issues are also linked to a lack of research documenting specific indigenous land management practices of smallholder farmers in Zimbabwe, which has led to an additional barrier to agricultural training and integration of sustainable land management practices that may reverse these farmers' fragile livelihood systems (Chagumaira et al., 2016; Mapiye, 2016).

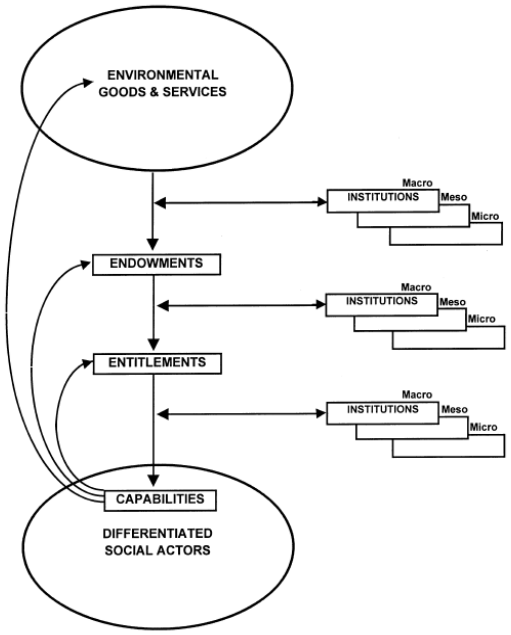


Figure 2. The environmental entitlements framework. From "Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management," by M. Leach, R. Mearns, and I. Scoopes, 1999, *World Development, 27*, p. 4. Copyright 1999 by Melissa Leach, Robin Mearns, and Ian Scoones. Reprinted with permission (see Appendix B).

In a revised approach to the environmental realm set out by Sen (1981), Leach et al. (1999) shifted emphasis to institutional aspects (from micro to macro scales) impacting the ability of individuals to use, access, and exert control over environmental goods and services, along with the implications of such a situation for various social actors. The environmental entitlements framework can more practically be utilized as an analytical toolbox offering insights into actors' endowments, entitlements, capabilities, and transformation of environmental goods and services (Leach et al., 1999). By understanding the "institutional matrix" influencing the livelihoods of smallholder farmers in Zimbabwe (Scoones, 1998, p. 12), lessons can be learned on sustainable land management practices that may reverse these farmers' fragile livelihood systems to better

rural livelihoods in Zimbabwe (Chagumaira et al., 2016; Mapiye, 2016). The environmental entitlements framework's theoretical argument was built with in-depth case studies from Ghana, India, and South Africa (Leach et al., 1999). By bringing the two frameworks together, this adapted framework can comprehensively focus on why smallholder farmers in Zimbabwe do what they do regarding sustainable land management. The deeper connections of sustainable livelihoods, many of which override the macro-level (government) to micro-level policy considerations (local community leaders) who seek to develop local-level policy and programs that are slated to boost agricultural practices while conserving resources, thus enhancing for smallholder farms in Zimbabwe productivity related to both water and land) (Bjornlund et al., 2019).

The sustainable livelihoods framework and the environmental entitlements framework explicitly link the outcomes (i.e., capabilities) to livelihood strategies, feeding this back into the following asset base and creating an iterative loop (Bjornlund et al., 2019). The addition of a loop is important as it appreciates the interconnectedness and causational links between the assets available to smallholder farmers in Zimbabwe and the livelihood strategies that can be undertaken, such as sustainable land management strategies, to break down barriers to sustainable livelihoods for these farmers and their families (Bjornlund et al., 2019; Chagumaira et al., 2016). Finally, the sustainable livelihoods framework and the environmental entitlements framework can be employed as a theoretical lens for qualitative and participatory research on the topics that take in-depth consideration of context (Bjornlund et al., 2019). An inductive research approach using a multiple case study strategy can enable themes to emerge from the data and allow

the data and smallholder farmers' perspectives to drive data analysis and recommendations for further research (Yin, 2017).]

Literature Review

The Smallholder Farmer in Zimbabwe: A Historical Perspective

In the sub-Saharan continent of Africa, agriculture is the backbone of the economy. In Zimbabwe, land underpins the economic, social, and political lives of most people (Hakeem, 2015; Moyo et al., 2019). Before 2005, the Gross Domestic Product (GDP) growth averaged 4.3% each year (Chitiga, 2011; Richardson, 2005). During the colonial period that ended in April 1980, the agricultural sector supplied 60% of inputs used in most manufacturing bases, and the agricultural sector employed 350,000 native workers. The White colonial farm owners grew enough food for themselves and the entire country, and the rest was exported (Richardson, 2005). Richardson (2005) argued that before Zimbabwe attained its independence in 1980, 6000 White commercial farmers occupied land equivalent to 42% of the country, and they controlled most of the country's fertile agricultural land. Before the land distribution, Zimbabwe was viewed as the "jewel" of Africa because it had a very impressive productive farmland, which was well managed by people with entrepreneurial knowledge (Richardson, 2005; Parmer, 1990).

During the colonial period, because of the segregationist land policies, the natives were forced to move to the rural areas where land was poor, arid, and unproductive (Chitiga, 2011; Moyo, 2011). Hulme, Moor, and Shepherd (2001) argued that most of Zimbabwe's poor people live in rural areas. The smallholder farmer is impoverished. Yields in Zimbabwe's rural areas remain appallingly very low despite improved

technological innovation (Hulme et al., 2001). Mutambanengwe and Mapfumo (2005) are concerned with the decline in soil productivity in the rural area farming systems. Malnutrition and population growth in rural areas call for increased agricultural production (Baudron et al., 2013).

The introduction of the Plough-Based Alvord Agricultural Model was meant for the majority of smallholder farmers in the rural areas of Zimbabwe (Baudron et al., 2013). The agricultural model was structured by the colonial land and marketing policies during the colonial period because of the model's potential to increase yield, generally referred to as agricultural intensification (Baudron et al., 2013). Agricultural intensification is capital and ecological driven. Capital-driven intensification is focused on greater use of hybrid seeds, chemical inputs, and adoptions of mechanization. whereas ecological intensification can increase resource use efficiency, such as water and nutrient use (Baudron et al., 2013). The plow-based agricultural model involved five key practices meant to sustain poor soil in rural areas: “plowing, maintaining, crop rotation, sole cropping, and planting inline” (Bauldron et al., 2013, p. 399).

The agricultural model's use faced socio-economic constraints by many smallholder farmers: they were poor and did not have cash, labor, low output, and high input prices (Zingore et al., 2007). The plow-based agricultural model was criticized for causing soil erosion on the natural resource base and biodiversity loss. Scholars such as Theirfelder and Wall (2009) framed the plow-based agricultural model as unproductive and destructive. Due to social and economic factors, the plow-based model did not benefit the smallholder farmers in Zimbabwe (Djurferldt et al., 2008).

The FTLRP in Zimbabwe, instituted in 2005, provided land to the landless and poor people who lived in rural areas. Various authors such as Chitiga (2011), Matsa (2011), Moyo (2011), Musemwa and Mushumje (2011), Parmer (1990), and Richardson (2005) argued that Zimbabwe inherited a thriving agro-based economy.

Smallholder farmers and the landless population live in rural areas, and both are very poor. Land distribution in Zimbabwe was the main focus of the government soon after attaining independence in 1980. For most of the sub-Saharan countries of Africa, land underpins, to a greater extent, the majority of people's economic, social, and political lives (Moyo, 2011). The belief about improving crop agricultural productivity was central to the new government. The Zimbabwe government strongly believed that land distribution would address many economic questions affecting most of the population living in rural areas. After independence, commercial farms were taken from White colonial farmers and distributed to landless natives who became new smallholder farmers. Gore, Katerere, and Moyo (1992) argued that major agricultural policies and strategies focused on these agro-climatological factors to influence Zimbabwe's agriculture.

Whitlow (1980) noted that the environmental factors influencing Zimbabwe's agricultural potential are climate, soil, and secondary terrain factors. The factors are found in the five natural regions of Zimbabwe. The factors affect residential patterns and farmers' livelihoods, and land-use patterns (Mupaso et al., 2014). Significantly, properties that influence agricultural potential are rainfall, depth, and healthy soil that can hold moisture, a relevant degree of land slope, and waterlogging's ability to sustain crops

during dry weather. Mupaso, Nyamutowa, Masunda, Chipinza, and Mugabe (2011) argued that Zimbabwe is a subtropical country, with rainfall mostly erratic, unreliable, and insufficient. An irrigation system is necessary to do well agriculturally. According to Marongwe et al. (2011), Rusinamhodzi, Corbeels, Nyamangara, and Giller (2013), and Tinonnell and Giller (2013), soil organic matter content in Zimbabwe has severely diminished and has affected crop agricultural productivity. Nutrient depleted soil in Zimbabwe creates a limitation for the country to improve food security (Titonnell & Giller, 2013).

Moyo (2011) and Musemwa and Mushunje (2012) claimed that the new smallholder farmers in Zimbabwe were not efficient in managing newly owned land as they faced natural environmental factors (soil, topography, climate, and rainfall). From 2005 to 2015, agricultural productivity had been on a steady decline. In addition to natural factors, the new smallholder farmers faced social and economic factors necessary to improve agricultural production, such as capital, financial management, credit facilities, helpful external services, maintenance, and the availability of market opportunity (Muposa et al., 2014). Many commentators on agriculture in Zimbabwe argued an increase in soil degradation, soil erosion, deforestation, and land mismanagement (Mutambwanengwe & Mapfumo, 2005).

The new smallholder farmers in Zimbabwe face huge challenges, including climate change, drought, unpredictable market, unskilled labor, crop and animal pests and diseases, sickness and accidents, and changing agricultural policies and political influences (Kellner et al., 2018). Hakeem (2015) points out that climate change, rising

temperature, and the trigger of increasing rainfall variability will result in smallholder farmers being unable to adapt and losing everything. Climate change challenge, diminishing soil productivity, and the decline in natural resources has affected smallholder farmers in Zimbabwe (Kellner et al., 2018). Due to climate change, there is a challenge of chronic food insecurity in Zimbabwe with no evidence on how to mitigate these challenges. There is a need for agricultural transformation in Zimbabwe to "effectively call for structural and process change in knowledge systems, technology development and delivery, institutions and policies" (Hakeen, 2016, p. 438). There is a lack of knowledge in the stakeholder communities about the nature, magnitude, and direction of the impact of climate change (Hakeen, 2016). In his analysis, Hakeen (2016) calls for major transformation processes in the agricultural sectors to search and develop innovations suited for climate change adaptations.

Challenges of the Smallholder Farmer in Africa

The majority of smallholder farmers in Africa's sub-Saharan countries are family-owned enterprises (Dieter et al., 2016). Decisions for major developmental goals, including complex innovation and adoption for sustainable agricultural practices, are usually made as an individual family business. Most African governments have emphasized agricultural development by focusing on diffusing new knowledge and technologies to benefit smallholder farmers to improve agricultural productivity and reduce poverty in the rural areas (Dieter et al., 2016; Teshome, de Graaff, Ritsema, & Kassie, 2014). The governments' major goals for smallholder farmers are to improve

agricultural productivity through the adoption of sustainable agricultural practices (Dieter et al., 2016).

Smallholder farmers' goals to improve agricultural productivity by adopting sustainable agricultural practices encountered some severe barriers and recurring agricultural and economic challenges (Cordingley, Snyder, Rosendahl, Kizito, & Bossio, 2015; Dieter et al., 2016). The smallholder farmers lacked appropriate skills, knowledge, and they are no longer getting assistance from research or extension services. Due to economic pressure, the governments' support for agricultural activities had declined, which altered many farmers' decisions to improve agricultural practices through the adoption of land management (Cordingley et al., 2015). Smallholder farmers in Africa find it challenging to participate in complex innovation and adopting sustainable agricultural practices (Kadzamira & Ajayi, 2019). The array of challenges identified in the theoretical and practice literature are as follows.

Traditional cultivation methods are still being practiced in Zimbabwe. The majority of smallholder farmers in the sub-Saharan countries of Africa have a vibrant heritage of farming knowledge passed on from generation to generation for thousands of years (Campbell, Clarke, & Gumbu, 1991). The current success and failure in agricultural development and land management practices are evident in traditional farming in Zimbabwe and across many countries in Africa (Campbell et al., 1991). The common agricultural practice, such as slash-and-burn agriculture and environmental management across Africa, defies new friendly agricultural techniques in Zimbabwe (World Bank, 2013).

Limited access to markets. Many smallholder farmers in Zimbabwe face serious problems that affect farmers' prospects to advance from subsistence farming to higher-income pathways (Chapoto et al., 2013). Farm location and market access correlate with distance to markets and access to roads. The farm size of the farmer dictates how much to grow in order to supply the markets. To resolve their ongoing land management problems, smallholder farmers must have access to or knowledge of financial assets and linkages to financial services, ability to manage water resources, cost inputs, transaction costs, price volatility, access and adoption production technologies, skills training, access to roads and ownership of transport, use of farm labor, education, linkages to groups, use of information and communication, marketing and business relations (Chapoto et al., 2013; Ferris et al., 2014).

Smallholder groups are largely unorganized. Based on the current agricultural performance trend, political, technological, and environmental circumstances, small family farmers individually cultivate small farm areas in Zimbabwe (Chapagain & Raizada, 2017). The smallholder farmers maintain the conventional system to operate individually in fear of dependency and exploitation from other smallholder farmers (Chapagain & Raizada, 2017). Smallholder farming is predominantly a household business, and there is no clear distinction between traditional collector networks and democratic producer organizations or cooperatives. These traditional collector networks and producer organizations are poorly organized and are not regulated (World Bank, 2013).

Informal landholding. Zimbabwe is facing a rampant outburst of informal sector activities in the urban landscape (Chirisa, Kawadza, & Bandauko, 2014). The major challenges involve informal land deals, limited and acceptable land tenure options, and political involvement in urban planning, which stifle the efficient practice of land delivery (Chirisa et al., 2014). Zimbabwe government needs to strengthen land tenure rights to help small family farmers to have confidence. Security in land tenure rights is essential because a customary tenure system's persistence hinders small family farmers from investing in land with confidence (Chirisa et al., 2014). Lack of secure tenure places smallholder farmers at risk of dispossession of land when new agricultural policies are put in place by the next government (Chapagain & Raizada, 2017; WB, 2013).

Poor access to credit. The huge challenge that smallholder farmers face in accessing finance intermediation services at fair, appropriate, and affordable terms with most financial institutions in the country (WB, 2013). The smallholder farmers are considered poor and the lack of collateral to secure a loan is a critical barrier to accessing credit loans (Herald, 2013; Mago, Hofish & Mago, 2013). Agricultural development significantly lags in smallholder farms; to a large extent, small family farmers are viewed as people who are not creditworthy (Mago et al., 2013).

Poor soil fertility and limited water resources. Close to 70% of Zimbabwe's 13.5 million people live in peasant farming areas characterized by low and erratic rainfall and inherently low soil fertility (Nyamangara, Mugwira, & Mpofu, 2000). Practically, agricultural practice is taking place on an environmentally fragile land for crop production. There are some signs in the country of a shortage of arable land. There are

multiple nutrient deficiencies and increased soil acidity for the land open for agriculture (Nyamangara et al., 2000). Water scarcity and soil fertility in most smallholder farming systems pose a serious threat to food crop production in the country. The majority of smallholder farmers are poor, and as a result, they lack the tools to strengthen the innovation platforms that will help build their social capital (Jayne, Chamberlin, & Headey, 2014).

Changing weather patterns and water scarcity. Sub-Saharan countries of Africa are grappling with the effects of weather patterns, which are threatening food and water security and social, economic, and political stability (Brazier, 2015). Agricultural growth and land-use change will face increasingly severe stress in the future. The smallholder farmers' challenge is to address resource management issues to prepare for climate change and a generally hazardous future urgently. Apart from increasing the prevalence of pests and diseases, changing weather patterns affect smallholder farmers' confidence in planting crops (World Bank, 2013). Zimbabwe's smallholder farmers rely on rain-fed agriculture, and there is no extensive modern irrigation system in the country (Brazier, 2015).

Inefficient inter-cropping techniques. Agriculture productivity is constrained by multiple and complex biophysical challenges (Murendo et al., 2016). Smallholder farmers face climate change and variability, soil fertility, pest, and disease prevalence (Shiferaw et al., 2014). Sustainable agricultural practices offer smallholder farmers an option to enhance the agricultural production system and, at the same time, conserve the natural resource base (Kassie et al., 2013). Sustainable agricultural practices, apart from

agriculture conservation and agroforestry, also include legume intercropping and rotation, improved crop varieties, drought-tolerant crops, pest management, and soil and soil water conservations (Vanlauwe et al., 2014). The smallholder farmers in Zimbabwe lack the techniques to integrate intercrop food crops to enhance agricultural productivity. Subsistence and cash crop cultivation are combined, but smallholder farmers lack intercropping techniques, and as a result, the market yield is negatively affected (World Bank, 2013).

Low literacy and numeracy. Agricultural policies that promote growth and investment should go hand-in-hand with social protection interventions targeting nutrition and health and should include education (Rapsomanikis, 2015). The majority of the smallholder farmers who were allocated land had very little formal education (Richardson, 2005). The lack of education of smallholder farmers in Zimbabwe puts a strain on their ability to adapt to weather patterns, participate in sustainable land management practices, and employ new cultivation techniques to improve crop productivity (Rapsomanikis, 2015). The smallholder farmers are considered very poor; the majority have no money to send the younger generation to school (Rapsomanikis, 2015).

An aging population. Rural population aging is a global phenomenon (Heidi-Ottosen, 2014). Zimbabwe is experiencing rapid rural population aging, reflecting an array of complex factors affecting older agricultural holders. Younger people are migrating to towns and cities (WB, 2013). The aging population and the movement of younger people to cities impact agricultural production in the country. The general view

is that older farmers are unproductive and cannot adapt to new technologies, demands of climate change, and cope with the requirement of sustainable land management (World Bank, 2013). The major challenge of older farmers is to find younger people to control farming land for the future, solve food security for the country, and protect the most important role of agriculture as the people's livelihoods (Heidi-Ottosen, 2014).

Economic and Social Capital Barriers to Adoption of Sustainable Land Management Practices

Economic capacity. Several studies have shown that Zimbabwe, South Africa, and Swaziland are the three countries in the Southern Africa region that has been the most affected by El Nino (World Bank, 2016). Zimbabwe's economic outlook slowed down, with GDP in 2014 declining from 3.8% to an estimated 1.5% in 2015 due to El Nino related weather conditions that depressed agricultural output. However, growth is projected to remain at 1.5% in 2016, with inflation expected to remain negative for 2016 and 2017. Zimbabwe's economic growth is expected to revert to trend growth of 2–3% in 2017–18 (World Bank, 2016). However, these projections are subject to upside and downside risks, both of which are intensified by Zimbabwe's precarious economic trends. Meanwhile, a further decline in global commodity prices, an economic shock in South Africa, has had a major negative impact on Zimbabwe's recovery (Christensen, 2016). During the commodity price boom, most African countries survived by more commodity production and exports added by low global interest rates. These exercises were most accompanied by strong capital inflows, large investments, exploration, production of

commodities, energy generation, infrastructure construction, and transportation enhancement (World Bank, 2015).

The Zimbabwe situation has taken a sudden turn, with the economic environment worsening due to commodities prices declining. The problems are compounded by the Zimbabwe government's inability to encounter the impact of commodity price swings for both short- and long-range terms (Christensen, 2016). Several studies have indicated that the falling of commodities prices has forced African countries to rely on domestic policies and financing. Accessing external financing had become very difficult and very costly; Zimbabwe is particularly affected the most in Southern Africa (Christensen, 2016).

The world is facing extreme weather conditions triggered by the El Nino event that have impacted Africa's planting and harvesting seasons. Studies have suggested that drought in Africa's sub-Saharan countries played a big role in slowing agricultural production (Mushore et al., 2016; Green, 2015). Kellner et al. (2018) argued that adverse weather conditions reduced agricultural output in 2015 and continued to disrupt production in 2016. The majority of smallholder farmers in Zimbabwe rely on rain-fed agriculture (Mushore et al., 2016). Mushore et al. (2016) indicated that the declining agricultural production trend is linked to precipitation decreases. On the other hand, the recent appreciation of the U.S. dollar against the South African rand, combined with domestic factors, has negatively affected external competitiveness, and falling commodity prices have reduced the value of mining exports (Sui & Sun, 2016).

In a global economy where trade flows and capital flows are in constant interplay, Zimbabwe is disadvantaged by the economic spillover effects of exchange rates and stock returns (Sui & Sun, 2016). This difficult external environment is not unique to Zimbabwe; similar developments have been observed in other countries in the region and beyond, particularly as examined between BRICS markets and the U.S. market (Christensen, 2016; Sui & Sun, 2016). Indeed, the impact of these shocks on Zimbabwe's macroeconomic indicators has been mitigated. The country takes steps to revive all sectors of the economy, including mining, manufacturing, and production industries, following a decade of economic crisis and profound structural change (Makonese, 2016). During this tumultuous economic period, an evolving Zimbabwean economy is emerging, defined by renewed economic and regional value chains (Ncube, 2017).

In the past five years, Zimbabwe's government implemented some reforms to stabilize and revitalize the economy. Gradual economic growth is gaining momentum, rising from the previous economic crisis, and GDP is averaging 6% annually (World Bank, 2016). The service industry is continuing to grow as the government makes considerable progress in building a skilled labor force; however, the industry's growth includes mining, manufacturing, and production, is expected to remain stagnant. Agriculture, mining, and manufacturing sectors struggled to cope with capital costs, and the issue is worsened by the country's high public debt that constrains the government to raise capital for investments (World Bank, 2016).

Economic growth in 2016 is expected to remain at 1.5%. Although continued growth is expected in the services sectors, its growth is expected to remain stagnant.

Moreover, the growth of the agriculture sector is expected to be subdued. This downturn in growth prospects has followed a general trend of significant deceleration after several years of robust expansion following the multicurrency regime's adoption. Indeed, real GDP growth slowed from 3.8% in 2014 to 1.5% in 2015. The country faces debt distress and lacks a diversified export base exacerbated by the declining terms of trade. The robust growth of the construction sector (7%) and the finance and insurance sectors (6%) drove the larger trend. Conversely, contractions in the electricity and water sectors (-11%), agriculture (-3.6%), and mining (-2.5%) slowed the pace of expansion (World Bank, 2016).

Agriculture is the foundation of rural livelihoods among smallholder farmers, and these farms are home to two-thirds of Zimbabwe's population, as well as 79% of the poor and 92% of the extremely poor (Makate et al., 2017). Both cash and subsistence crops have important poverty implications; the production of cash crops such as tobacco, sugar, and cotton is a major source of employment for low-skilled workers, while food crops such as maize, groundnuts, and sorghum are critical to food security and the welfare of poor rural households (Khan & Akhtrar, 2015). Agricultural output appears to have contracted these smallholder farmers' economic capacity and increased the national headcount poverty rate by at least 1.5% age points in 2015. Recent developments in late 2015 and early 2016 suggest that poverty rates may increase further before declining should trend growth resume (World Bank, 2016).

Geographic Challenges Faced by Smallholders Farmers in Zimbabwe

Zimbabwe's total land area is approximately 391,000 square kilometers and has a population of close to 13 million people (Brown et al., 2012). Zimbabwe lies within the tropics, and most of the country experiences a subtropical climate. Murphree and Mazambani (2002) showed that one-fifth of Zimbabwe's terrain is 1,200 meters above sea level, whereas three-fifths lie between 600 and 1,200 meters above sea level. Agriculture environments are influenced by climate, soil, and secondary terrain factors (Brown et al., 2012). Zimbabwe has four seasons in a year: summer, autumn, winter, and spring. During normal weather conditions, summer goes from November to March and is generally warm and wet. Spring is considered a transitional season, April and May because it is very short and warm and cool. The Winter season, May to August, is generally cool and dry. August to October is the autumn season; the weather is warm and dry (Paulton, 2002). In Zimbabwe, generally, the altitude drives the reliability of rainfall. The soil is mostly sandy, with parches of heavily loamy clay across the country. According to Murphree and Mazambani (2002), granitic sandy soils are common in most communal areas. Muir (1997) argued that generally, the soils in most are sandy. Titonell and Giller (2013) argued that the soil organic matter in most sub-Saharan African countries, including Zimbabwe, is severely diminished and not suited for agricultural crop production. Nutrient depleted soil in Zimbabwe created a limitation for the country to improve food security.

Geographically, Zimbabwe is divided into five ecological zones, namely Natural Regions I, II, III, IV, and V. Region I lies on the high altitude, on the Eastern Highlands

of Zimbabwe, and covers 2% of the country. Region 1 receives reliable rainfall, above 1000 mm, and is suitable for afforestation, intensive livestock production, and intensive diversified agriculture (Manyeruke, Hamauswa, & Mhandara, 2013). The entire area of Region II is about 21% of the country, positioned on the northeastern of the country in the Mashonaland province. Richardson (2015) argued that this is the area where the bulk of large-scale farmers were located, and the majority of commercial farming was practiced in Region II. About 75% of Region II is suitable for farming. Region II received a rainfall of 750 to 1000 mm and is suitable for intensive cropping and livestock production (Paulton, 2002).

Mugandani et al. (2012) described Region III as lying in Zimbabwe's midlands and covers an area close to 18% of the country, and receives rainfall between 500 to 750 mm. Semi-intensive farming is mostly practiced in this region and is suitable for drought-resistant crops such as maize, groundnuts, cotton, tobacco, and wheat, including ranching (Manyeruke et al., 2013; Mugandani et al., 2012). Scholarly knowledge related to Regions IV and V described these regions as high risk for agricultural crop production, particularly where an irrigation system is not used (Murphree & Mazambani, 2002). Region IV cover an area of 37% of the country, which is approximately 155,707 square kilometers, and Region V covers 27% of the country, which is approximately 126,829 square kilometers of the country (Mugandani et al., 2012). Matebeleland North, Matebeleland South, Masvingo, and some part of Midland provinces constitute the location for Natural Regions IV and V. Natural Region IV receives an average rainfall of 450 and 650 mm a year and is mostly suitable for livestock production (Mugandani et al.,

2012). Region V receives erratic rainfall, mostly below 650 mm annually. Descriptive analysis of the region ascribes it as suitable for irrigated cropping and also dominated by cattle ranging. Approximately 80% of Zimbabwe live in Natural Regions III, IV, and V, which are heavily impacted by climate change and receive erratic rainfall during the rainy season (Nhundu et al., 2015). Zimbabwe is practically dependent on rain-fed agriculture. Nhundu et al. (2015) and Mupaso, Nyamutowa, Masunda, Chipunza, and Mugabe (2014) state that smallholder farmers in Zimbabwe need to learn to engage in drought-mitigating measures such as participating in irrigation development, agricultural training, and other cost-recovery strategies. In addition to these measures, smallholder farmers need to research and learn to participate in tolerable irrigation systems (sprinkler, flood, and drip) to be productive on their farms (Kahane et al., 2013).

Insufficient rainfall contributes to Zimbabwe's slowing growth rate in the agricultural sector, one primarily populated by smallholder farms in rural areas (Green, 2016). Although the growth of services remained strong through 2015, agriculture and industry are highly susceptible to macroeconomic shocks. The disruption of irrigation networks and input value chains caused by the FTLRP greatly increased agricultural production vulnerability (Stoeffler et al., 2016). The majority of households in Zimbabwe rely on rain-fed agriculture (Makate et al., 2017). Insufficient rainfall greatly increases agricultural production's vulnerability and gives rise to Zimbabwe's recurring food and nutrition insecurity. Several studies suggest a linkage between the agricultural and the manufacturing sectors: the agricultural sector supplies raw materials required by the manufacturing while acting as the biggest consumer for the industrial sector output

(World Bank, 2016). The repercussions of insufficient rainfall in Zimbabwe have the potential to increase poverty for the country. The failure of resettlement intervention due to poorly managed rangelands in drought-stricken areas resulted in many livestock losses and crop failures. However, to improve rangeland management and livestock and cropping sustainability, farmers need to explore other drought-coping strategies such as drought-tolerant crops and moving livestock to other favorable areas (Moyo, Dube, & Moyo, 2017).

Erratic rainfall in 2015 compounded several underlying structural issues in the agricultural sector, causing the output to contract by 3.6%. Zimbabwe's staple cereal, maize, was the most affected, though the production of tobacco and other export crops also fell sharply (Makate et al., 2019). This is in stark contrast to the sector's average annual growth rate of 13% between 2009 and 2014, which largely reflected tobacco cultivation expansion. The weak harvest in 2015 also caused a temporary increase in the poverty rate (Mushore et al., 2016).

Several studies have indicated that more than 70% of Zimbabweans depend primarily on agriculture for livelihood. Many research studies have focused on food security and livelihoods. However, the smallholder farmers face a wide range of challenges such as low agricultural productivity, low soil fertility, limited market access, limited irrigation systems, access to credit, and agricultural support services. The issues of climate change compound these problems. There is a wide gap between the impact of climate change and how smallholder farmers respond or adapt to climate variability. Gukurume (2013) wrote, "developing countries tend to suffer more from the impact of

climate change and variability, yet they are least able to adapt to new climate conditions" (p. 95).

The Consequences of Institutional and Government Policies

The country's agricultural risks are compounded by the institutional weakness, limited know-how of smallholder farmers, inadequate technical skills, scarce financial resources, incompetent land management skills, and extremely dubious agricultural policies (Makate et al., 2017). This portion of the discussion is focused on addressing the background of the country of Zimbabwe as it is facing a problem to design and promote sustainable practices to its smallholder farmers as a way to improve yields and the problems for climate change and adaptation strategies, policies, and institutional mechanisms needed in the country that impact success in the agricultural sector affected by climate variability (Phiiri, Egeru, & Ekwamu, 2016). Before turning to sustainable agriculture and climate change in Zimbabwe, there is a need to describe the country's history, weather pattern, and geography.

Between 2000 and 2008, Zimbabwe's economic performance declined sharply, triggered by the land reform policy's disruptions that took effect in 2000 (Brown et al., 2012). Large scale commercial farms were converted to smallholder plots and farms (A1 and A2) and distributed to natives (GoZ, 2013). Approximately 300,000 smallholder farmers received five to 10 hectares of land. Brown et al. (2012) stated that 11.5 million hectares of land from large commercial farms owned by Whites were provided to native smallholder farmers. The transformation brought about by FTLRP, the land reform program enacted in 2000, led to the collapse of the agricultural sector, manufacturing,

and human-made economic and land management (Zamchiya, 2014). Most economic actors were hamstrung by the issues that arose from the land reform program. Added to the major agricultural production, shifts were reflected when there were severe decreases in main crops output (maize, groundnuts, cotton, and small grains), plantation and exports crops, and LSCF field crops consisting of wheat, tobacco, soya beans, and sunflower (Moyo et al., 2019).

The time is ripe for Africa's sub-Saharan countries for a critical reappraisal of sustainable practice and understanding where science and technology can impact the success (Hill, Terry, & Woodlang, 2016). The key principles of conservation agriculture should address declining soil fertility issues by providing soil cover, introducing crop mixing and rotation, and high management techniques for all farming operations. These methods can increase yield without degradation, allowing for sustainable land use while maintaining biodiversity. Zimbabwe's agriculture investment and policy should involve strategies that benefit the use and management of natural resources, focusing on improving management and sustainable use of land, water, forestry, and wildlife resources (World Bank, 2014).

The Knowledge Gap in Sustainable Land Management for Smallholder Farmers

The sub-Saharan countries of Africa are grappling with the growing demand for food (Godfray, 2015). The majority of smallholder farmers in Africa, particularly in Zimbabwe, face land that has been continually cropped for many decades. The soil fertility has severely declined, and there is a clear recognition of the widespread constraint to crop production in the country (Godfray, 2015; Pretty & Bharucha, 2014).

Soil organic matter content in many communal areas of Zimbabwe has severely diminished and has affected cropping and livestock production. Nutrient depleted soil in sub-Saharan Africa creates a limitation for the continent to improve food security (Chartres & Noble, 2015; Pretty & Bharucha, 2014). Zimbabwe's soil lacks fertility and nutrients essential for improving crop agricultural productivity (Titonell & Giller, 2013).

The agricultural activity in Zimbabwe has resulted in ecosystem disservices; there is a loss of biodiversity, soil nutrient, and greenhouse gasses emissions (Reynolds et al., 2015). The country's problems are related to livestock and agricultural production, which have been compounded by increasing climate variability. Zimbabwe's economy has severely declined. The country is experiencing climate change effects: rainfall variability, extreme events such as tropical cyclones and drought, which have increased both in frequency and intensity (IPCC, 2012). Brown et al. (2012) wrote that

> these conditions, combined with warming trends, are expected to render land increasingly marginal for agriculture, which poses a major threat to the economy and the poor's livelihoods due to Zimbabwe's dependence on rain-fed agriculture and climate-sensitive resources. (p. ii)

Temperatures have risen by two degrees and have resulted in more arid environments in the country (Brown et al., 2012). IPCC (2012) projected climate change in the future would impact agriculture productivity, water resources, human health, forestry, and biodiversity, decrease rangelands, human settlement, and lower resilience of ecosystems for the entire country.

Vanlauwe et al. (2011) wrote that “attention should be shifted from extensive agricultural systems based on the assumption of abundant land and resources to the efficient and sustainable management of finite land, nutrients and soil fertility, water and energy resources” (p. 35). Sustainable land management and farmers’ livelihoods are promoted to simultaneously address the need for more food and environmental security (Chartress & Noble, 2015; Pretty & Bharucha, 2014). Pretty and Bharucha (2011) defined sustainable intensification as “the investment of inputs and capital to increase crop productivity over the long-term while protecting the underlying resource base” (p. 36). Droppelmann et al. (2017) indicated that the focus should be through the judicious application of sustainable land and water management practices that include integrated nutrient management with various organic matter inputs and mineral fertilizers to contribute to food production and supporting ecosystem services.

Delivery of Training in Sustainable Land Management Practices for Smallholder Farmers

Scholarly research evidence suggests that environmental degradation is the result of the current conventional agricultural systems of production. To enhance agricultural productivity and reduce poverty in rural areas, preventing and reversing land degradation is critical (Cordingley et al., 2015). The landscape necessary is adopting sustainable land management in sub-Saharan Africa (Cordingley et al., 2015; Scoones, 2015). Sustainable land management adoption will enable landholders to maximize the land resources' economic and social benefits while maintaining the ecological support functions of the land resources (Cordingley et al., 2015). Sustainable land management includes practices

such as (a) soil fertility, (b) crop management, (c) soil erosion control measures, (d) water harvesting, (e) grazing, and (f) forest management. However, many smallholder farmers in sub-Saharan countries in Africa, including Zimbabwe, do not seem to express alarm over environmental issues and the adoption level remains very low (Dicecca, Pascucci, & Conto, 2016).

The efforts to adopt sustainable land management by landholders in Zimbabwe are constrained by an array of ecological, social, economic, and political factors (Cordlingley et al., 2015). Social factors affecting most smallholder farmers in Zimbabwe include poverty, insecure land tenure, limited extension services, infrastructure, volatile or unreliable market prices for agricultural inputs and output, lack of access to credit, education, and skilled labor (Cordingley et al., 2015). The social factors affecting Zimbabwe farmers are compounded by the biological factors: poor soil fertility, pests, and erratic rainfall. The other threat hounding landholders in Zimbabwe is facing and coping with institutional challenges such as the government's conflicting agricultural policies, land of coordination in planning and implementation, struggling to change interactions amongst key factors (Cordingley et al., 2015; Scoones, 2015). The adoption of sustainable land management is an emergent property of farming systems in sub-Saharan countries of Africa. Managing food, water, energy at the landscape level is key to all landholders. There is a need for solutions to improve sustainable land management adoption for all countries of Africa in order to balance the economic, environmental, social, and political requirements of all stakeholders from farm to landscape scales (Cordingley et al., 2015; Scoones, 2015).

The government's support services have declined, and as a result, smallholder farmers in Zimbabwe lack centers with excellent agricultural science and technology. Landholders in Zimbabwe need training. Smallholder farmers need to learn new farming practices, learn how to utilize necessary nutrient management diagnostic tools available, mostly understand rural innovation processes, emphasize social networks' role, and complement conventional approaches to rural development (Hartwick & Scheidegger, 2010). In today's societies, the challenge for landholders in Africa is innovation. Smallholder farmers in Zimbabwe need to generate sufficient food, reduce agricultural costs, have agriculturally skilled labor, sufficient inputs for every planting season, improve the quality of crops, and have competitive markets. There is a need for landholders in Zimbabwe to find an alternative to obtain the needed knowledge and technology to improve their agricultural operation.

Some factors are prominent in influencing the adoption of innovation, including knowledge and technologies, access to an endowment with resources, sociodemographic factors, sociopsychological behavior, and communication (Hartwick & Scheidegger, 2010). Newer approaches to innovation suggest that farmers must learn about systemic setups characterized by agents that diffuse and use innovation. Landholders learn and understand the importance of networking as a new approach to innovation. Innovation occurs in a network-like structure where a great deal of interaction occurs, and there is continuous learning by participants (Hartwick & Scheidegger, 2010). The concept of farmers' social network would assure participants' access to resources needed to implement the farming innovation (Bertin et al., 2014; Hartwick & Scheidegger, 2010).

The emphasis is on interaction and collaboration by the change agents for innovation to influence new technologies and knowledge (Hartwick & Scheidegger, 2010).

The Rural Resource Center (RRC) concepts discussed by Bertin et al. (2014) encourage farmers to adopt sustainable land management practices. The RRC created participating communities that allow participating farmers to have access to (a) various training, (b) technical packages, (c) knowledge and skills, (d) inputs, (e) information on agroforestry-based land management practices, (f) marketing, and (g) other development issues. Thus, the RRC concepts' emphasis was on access to knowledge, interactive learning, and networking among farmers and other stakeholders (Bertin et al., 2014). Lack of training often limits landholders from learning transdisciplinary science of sustainability, the importance of framing different options such as transforming soils as part of integrating biophysical, social, economic, and political understandings (Scoones, 2015). Lack of training limits smallholder farmers in Zimbabwe from understanding the power of sustainable land management as the best way to combat land degradation and how sustainable land management enables land users to maximize the economic and social benefits (Cordingley et al., 2015).

Knowledge Dissemination of Sustainable Land Management Practices

Mudzonga (2011) expressed concern regarding the very low ability to adapt evident in smallholder farmers in Southern Africa, including Zimbabwe. Moyo, Dube, and Moyo (2013) described the failure of agricultural intervention under climate change as caused by poor management of rangelands in drought areas of Zimbabwe, which has resulted in many livestock losses and crop failures. Moyo et al. (2013) and Mudzonga

(2011) suggested that Zimbabwe smallholder farmers need to explore new adaptive strategies and changing farming practices such as plant drought-resistant varieties, more livestock, diversified livelihood, and farm network. Mudzonga (2011) wrote that "several studies reveal that farmers adapt to climate change in order to counter the negative impact of climate change on their farming activities" (p. 5). Gukurume (2013) argued that smallholder farmers in Zimbabwe should use various local indicators to adapt to climate change variability initiatives. Smallholder farmers in Zimbabwe are under pressure to achieve food security through agriculture when experiencing progressive climate change.

Moyo (2013) argued that the new landowners are poor and are heavily impacted by their lack of agricultural technical know-how, a weakness that led to the collapse of the agricultural productivity in the country. The future of agriculture is dependent on the new policy intervention to be instituted to support the new agrarian structure. Smallholder farmers in Zimbabwe can respond by initiating several strategies such as (a) adopting drought-resistant crops and conservation farming strategies, (b) harnessing indigenous knowledge systems and having the opportunity to build knowledge, skills, participation, and accountability about agricultural productivity and wildlife protection (Harrison et al., 2015; Matondi, 2012).

Enabling sustainable utilization of adaptive resources should feature enabling new agricultural policies that synergized environmentally sustainable production systems that could overcome shortfalls in agricultural production. For example, Harrison et al. (2015) described the benefits of the new environment and socially just CBNRM as compared to the doomed CAMPFIRE. The authors argued that the new CBNRM would benefit the

stakeholders because it is built on strong partnership and is reliable about the information exchanged between the government and the rest of the stakeholder farmers, and smallholder farmers will have the opportunity to build knowledge, skills, participation, and accountability about agricultural productivity and wildlife protection (Vermeulen et al., 2011).

Kahane et al. (2013) projected that in 2050 the world would increase in population to 9 billion, and governments are challenged to produce more food. Future research and new policy intention should be instituted to support the new agrarian structure. Simultaneously, smallholder farmers in Zimbabwe need to research and learn to participate in tolerable irrigation systems (sprinkler, flood, and drip) to be productive on their farms (Moyo, Dube, & Moyo, 2013). Smallholder farmers' understanding of the adaptation of sustainable livelihood policies is currently abysmal and can hardly be measured. Because of rising costs, smallholder farmers have not participated in farmer training, research, and extension resources, and competitive agricultural production has declined (GoZ, 2012).

The agricultural marketing system's efficiency has fallen, which implies that real producer prices have declined and eroded market competitiveness (WB, 2014). A cohesive multisectoral agricultural response to ensure food and nutritional security is needed. The World Bank (2014) noted that Zimbabwe's government neglects the importance of improving farmer training, agricultural research, and technology, and extension resources. Droppelmann et al. (2012) noted that the subsidies on farm input afforded to farmers in the 1990s have substantially declined. The WB (2014) suggested

that Zimbabwe's government needs to improve farmer credit to allow major changes in the agricultural sector.

Research Gaps in the Literature Align with Knowledge Gaps of Smallholder Farmers

Nhundu, Mushunje, Zhou, and Aghdasi (2015) argued that most people who live in Zimbabwe's rural areas are based on agriculture. Of these people, 80% live in Natural Regions III, IV, and V and are exposed to drought because they receive erratic rainfall during the rainy season, and agriculture is rain-fed. The scholars suggested a knowledge gap exists on how the smallholder farmers should learn to engage in drought-mitigating measures such as participating in irrigation development, training, and cost-recovery strategies (Kadzamira & Ajayi, 2019; Nezomba et al., 2017).

Although many farmers expressed ignorance of climate change and its impacts, the smallholder farmers in Zimbabwe report they no longer wish to remain passive or be victimized by their poor livelihoods (Gukurume, 2014). The current knowledge regarding climate change indicates that agriculture and food security are key sectors that require intervention (Vermeulen et al., 2011). There is much literature addressing the issues and threats of climate change and intervention benefits (Ryoo & Koo, 2013). Smallholder farmers need support to achieve food security through agriculture and climate change intervention (Ryoo & Koo; Swaim et al., 2014).

Vermeulen et al. (2011) and Mudzonga (2011) showed that options that could support agriculture and food security under climate change include integrated packages of technology, agronomy, and policy options for farmers' food systems, improved climate

information services, and safety nets. Harrison et al. (2015) described the benefits for information exchange between the government and the rest of stakeholder farmers as vital for agricultural intervention. The scholars noted that smallholder farmers would use the information to build knowledge, skills, participation, and accountability about agricultural productivity and wildlife protection. Mudzonga (2011) wrote that "such knowledge will help in designing policies that enhance farmers' adaptive capacity in order to reduce the impact of climate change, thereby ensuring the sustainability of food security of the farmers" (p. 6). Matondi (2012) suggested that smallholder farmers should not hesitate to employ the rich indigenous knowledge that has helped them to sustain their meager agricultural production over the years.

Summary and Conclusions

The literature review described the challenges that the smallholder farmers in Zimbabwe are facing related to land management and agricultural strategies that need to compete with environmental goals in order to sustain land, water, soil nutrients, and biodiversity (Nezomba et al., 2015). This chapter examined the gaps between climate change and variability and the smallholder farmers' response through adaptation. The chapter highlights the importance of agriculture as the backbone of Zimbabwe's economy. Along with the same thought, land underpins most people's economic, social, and political lives in Zimbabwe (Hakeen, 2015). The climate transformations are threatening the sustainability of subsistence agriculture in the country. Makate et al. (2017) argued that Zimbabwe's agricultural problems have also been contributed by weak agricultural institutions, lack of agricultural knowledge by smallholder farmers,

inadequate technical skills, lack of financial support, and incompetent land management skills, and extremely dubious agricultural policies.

Slater et al. (2007) quoted Gukurume (2013), arguing that "the ability to adapt and cope with climate variability hazards depends on economic resources, infrastructure, technology, and social safety nets" (p. 90). Zimbabwe, like most developing countries, does not have the requisite resources to adapt, and as a result, its people are ill-prepared to apply countermeasures for climate change and variability (Gukurume, 2013). Gukurume (2013) also argued that most smallholder farmers in Zimbabwe have no adaptive capacity due to poverty and reliance on relatively basic technologies. Besides, "the majority of smallholder farmers in Zimbabwe are dependent on agriculture for livelihood" (p. 91). These problems will continue to hound the smallholder farmers as they try to engage in some measure to guarantee food security and eradicate poverty.

Mudzonga (2011) stated that "risk of climate change to human and natural systems can be reduced by either mitigation or adaptive strategies" (p. 5). The Intergovernmental Panel on Climate Change (IPCC, 2001) defines adaptation to climate change as "the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects to moderate harm or exploit beneficial opportunities," mitigation "refers to the reduction of climate change through reduced emissions of GHG" (p. 5). Climate variability in Zimbabwe is severe, and without meaningful adaptation and mitigation strategies, the attainment of poverty eradication and food security will remain elusive (Gukurume, 2013).

Both Mudzonga (2011) and Gukurume (2013) identified some of the adaptation strategies used and have been beneficial to smallholder farmers in Africa's Southern countries. Sustainability of the agricultural activities can be attained if smallholder farmers can respond by changing farming practices, diversifying livelihoods, forming new agricultural networks, harnessing indigenous knowledge systems, enhancing information services. A solution can be achieved if smallholder farmers can receive suitable mechanisms for disseminating the available knowledge on sustainable land management, understand the innovation and sustainable adoption of viable land management techniques and receive training on sustainable land management techniques through climate change (Chagumaira et al., 2016). Mudzonga added by saying that "such knowledge will help design policies that enhance farmers' adaptive capacity to reduce the impact of climate, thereby ensuring the sustainability of food security of the farmers" (p. 6).

In the next chapter, the research method for qualitative, multiple case study is discussed, followed by the methodologies used to collect data. The data analysis will be addressed, and the connection of the study to other studies.

Chapter 3: Research Method

The purpose of this qualitative multiple case study was to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs (Kellner et al., 2018; Mutsvangwa-Sammie et al., 2016). I used semistructured interviews, archival data, and reflective field notes (Yin, 2017) to explore the specific knowledge gaps among seven smallholder farmers in Zimbabwe on sustainable land management practices. Chapter 2 identified a gap in the research literature on the land management practices and livelihood strategies of smallholder farmers in Zimbabwe. This research is important because its results address this gap in the scholarly literature on developing sustainable land management with a fragile livelihood system. The results and recommendations arising from this research may prove useful to policymakers and other local community leaders who seek to develop local-level policy and interventions or inform small farming communities in Zimbabwe on how innovative methods of ecosystem sustainability particular to their needs can strengthen their impoverished livelihoods.

This chapter provides detailed information on the research method and rationale for conducting an exploratory multiple case study and the central research question for this empirical investigation. This section also includes information and the rationale for the participant selection strategy and data collection and analysis processes. I also explain the participants' selection, data collection strategies and data analysis, the researcher's role, and ethical considerations. The chapter concludes with a summary of key points.

Research Design and Rationale

Browne and Keeley (2014) highlighted the need for a researcher to ask the right questions in qualitative research. Therefore, it becomes important to identify a relevant question to drive the research strategy. Consistent with this study's purpose, the central research question was, What are the specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices?

The lack of access and dissemination of indigenous land management practices of smallholder farmers in Zimbabwe remains a barrier to agricultural training and integration of sustainable land management practices that may reverse these farmers' fragile livelihood systems (Chagumaira et al., 2016; Mapiye, 2016). The documented barriers include economic capacity, information systems, technology development and dissemination, infrastructure/institutions, sociocultural perspectives, gender issues (Johnson et al., 2016), environmental issues, extension services, incentives and conflicts among different interest groups, and inadequate policies (Khan & Akhtar, 2015). Additionally, Zimbabwe's land management and agricultural strategies need to compete with environmental goals to sustain better land, water, soil nutrients, and biodiversity (Kadzamira & Ajayi, 2019; Nezomba et al., 2017).

The FTLRP in Zimbabwe, which was instituted in 2005, provided land to the landless and poor people who lived in rural areas (Moyo et al., 2019). These new smallholder farmers in Zimbabwe face enormous challenges, including climate change, drought, unpredictable market, unskilled labor, crop and animal pests and diseases, sickness and accidents, and changing agricultural policies and political influences

(Kellner et al., 2018). Should smallholder farmers not receive training in sustainable land management techniques, they will continue to experience factors such as the persistence of poverty, deteriorating living conditions, malnutrition, and diseases that challenge their fragile livelihoods (Helliker et al., 2018; Nyamadzawo, Wuta, Chirinda, Mujuru, & Smith, 2013; Scoones et al., 2018).

The nature of this study was qualitative. A qualitative methodology aligned with the purpose of the study to answer the central research question. Holloway and Wheeler (2002) stated that "qualitative research is a form of social inquiry that focuses on the way people interpret and make sense of their experiences and the world in which they live" and that "the basis of qualitative research lies in the interpretive approach to social reality and in the description of the lived experience of human beings" (p. 3). According to Copper and White (2012), qualitative researchers explore the world of a given context from the viewpoint of the people living in it and is associated with the interpretivist paradigm. Willis (2007) indicated that "interpretivists tend to favor qualitative methods such as case studies and ethnography" (p. 90). The interpretivist paradigm relies on naturalistic methods such as in-depth interviews, observation, and analysis of existing texts (Guba & Lincoln, 1994). The in-depth interview method that is the cornerstone of qualitative research approaches can bring forth new meanings and information of social groups living within a specific social context.

Qualitative researchers developed methodologies for the interpretivist paradigm to voice victims of oppression and their struggles with dominant institutions, organizations, and social groups for social change (Cooper & White, 2012). In this study, I used a

qualitative method to examine different smallholder farmers' perspectives in Zimbabwe regarding sustainable agriculture and climate change to develop shared meaning. Toloie-Eshlaghy et al. (2011) argued that the qualitative methodology allows researchers to explore issues from the people's perspective.

I chose the qualitative study method for this study because of the depth of understanding necessary in exploring the research question, which was subjective and, therefore, best served by using a qualitative design (see Noor, 2008). The method for this research, the multiple case study, aligns with the social phenomena explored. Noor (2008) argued that the case study design is "appropriate when dealing with a process or a complex real-life activity in great-depth" (p. 1602). The method was chosen because it is dependent on the nature of the research problem, the issues and insights embedded in smallholder farmers in Zimbabwe regarding their struggle to adopt sustainable agriculture, and the impact of climate variability as they threaten their livelihoods. Using a qualitative case study method, I obtained an in-depth understanding of the smallholder farmers' complex real-life activities in Zimbabwe.

Noor (2008) wrote, "case study becomes particularly useful where one needs to understand some particular problem or situation in great-depth, and where one can identify cases rich in information" (p. 1603). Qualitative researchers seek to understand the world or a particular setting through the perspectives of the people living in it. This method enables the researcher to explore differences within and between cases (Yin, 2017). Yin (2017) argued that the method is relevant for replication and allows researchers to address a complex social phenomenon relevant when comparing different

studies. In this research, I examined in detail smallholder farmers' experiences of sustainable agriculture and the impact of climate variabilities in Zimbabwe. A robust qualitative study is infused with "(a) worthy topic, (b) rich rigor, (c) sincerity, (d) credibility, (e) resonance, (f) significant contribution, (g) ethics, and (h) meaningful coherence" (Tracy, 2010, pp. 839–840).

The qualitative method was also appropriate, given the subjective nature of the research question and the nature of this study (see Noor, 2008). The qualitative research question is not testing knowledge as much as seeking individual and personal responses. Roll-Pettersson (2008) noted that "teacher efficacy has been related to teacher's classroom behaviors, their openness to new ideas, and their attitudes towards teaching" (p. 174). Because these personal responses inform behavior (Jerald, 2007; Roll-Peterson, 2008), it is best to explore these responses in an in-depth and detailed manner. Besides, because this research study explores information from in-depth interviews, a qualitative method was deemed the most appropriate. Rather than a quantitative approach, which might focus on account of events or behaviors, qualitative researchers attempt to explore how participants understand these events and how they lead to behavior (Maxwell, 2004). Lietz and Zayas (2010) argued that a qualitative researcher could explore the conditions of social practices, ideas, relationships, and evaluate messages from participants' points of view. Qualitative researchers navigate social problems through the experiences, meanings, and perspectives of individuals (Creswell et al., 2007). Therefore, the qualitative inquiry's depth and detail to answer the research question were best served by

the qualitative inquiry as qualitative studies are used to explore subjective events (Noor, 2008) in a holistic and in-depth manner (Baxter & Jack, 2008).

An exploratory multiple case study was used as the research design for this study. The study's purpose calls for a deeper understanding of the complex social phenomena of land management practices and livelihood strategies among smallholder farmers in Zimbabwe (Yin, 2017). Because case studies do not involve experimental controls or manipulation, the method is suitable for this study to dig deeper to understand the practical-based problems where smallholder farmers' experiences in Zimbabwe are important and the context of action is critical (Benbasat et al., 1987). Case studies are useful in examining events when behaviors cannot be manipulated (Yin, 2017). A case study is a research design focusing on a contemporary phenomenon within its real-life context (Yin, 2009). Under the same note, Benbasat et al. (1987) wrote, "a case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities" (p. 370).

Because case studies are based in natural settings with the intent of understanding the process of an under-examined area (Benbasat et al., 1987), a more holistic understanding of the phenomenon can thus be explored (Creswell et al., 2007; Eisenhardt, 1989). The hidden assumption hinged on the smallholder farmers' willingness to participate candidly in the case-oriented research. Because the study sought to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs (Dube

et al., 2014; Mutsvangwa-Sammie et al., 2016), a case study approach, which attempts to seek a greater understanding of an issue more holistically, was appropriate (Yin, 2017).

Case studies provide a framework to study complex issues within their contexts (Baxter & Jack, 2008). Several other designs within the qualitative research method were considered for this study, such as narrative inquiry or ethnography. However, a case-study design was applied to this study due to selecting approaches that could be used to answer the research question and the flexibility that the researcher has to research within context. Narrative inquiry (Clandinin & Connelly, 1990) or phenomenology designs (Norlyk & Harder, 2010) were not chosen due to the possibility of conflicting philosophies surrounding the data analysis. The researcher related Yin's (2014) recommendation that "the case study method is pertinent when your research addresses either a descriptive question (what happened?) or an explanatory question (how or why did something happen?)" (p. 112).

Phenomenology is often used to explore how a phenomenon is understood and experienced as it appears to the people involved (Marshall & Rossman, 2011). This research explores the participants' lived experiences and describes situations in detail from within that context. Meaning is derived from these descriptions and placed into universal themes, which encompass individual experiences. Because the study's goal is to explore knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices, lived experiences are not as meaningful as exploring the specific knowledge gaps among smallholder farmers in Zimbabwe sustainable land management practices to tailor sustainability training to their needs. The potential use of

phenomenology as a research method for this study was then ultimately discarded as a possibility. Grounded theory is used when the theories resulting from the study are grounded in the data from the field instead of beginning from a theory, which then gets explored (Leedy & Ormrod, 2005). This method of research was also deemed inappropriate for this study grounded in a conceptual framework consisting of the sustainable livelihoods framework (Ashley & Carney, 1999), and, second, the environmental entitlements framework (Leach et al., 1999), as a theoretical lens through which to view the study's topics that takes in-depth consideration of context (Bjornlund et al., 2019).

An inductive research approach using a multiple case study strategy can enable themes to emerge from the data and allow the data and smallholder farmers' perspectives to drive data analysis and recommendations for further research (Yin, 2017). Case study designs are useful in examining events when behaviors cannot be manipulated and seek a greater understanding of an issue (Yin, 2017). A multiple case study investigating a social phenomenon can involve individuals living within that social context as a separate unit of analysis (Yin, 2017). When the data focus is only on individuals in a multiple-case study design, the study's central phenomenon, in this case, smallholder farmers in Zimbabwe, is the context and not the target of the study (Eisenhardt & Graebner, 2007; Yin, 2017). The unit of analysis was the smallholder farmer in Zimbabwe. This design allows for investigating differences within and between cases (Yin, 2017). The goal of a case study design is to replicate findings across cases. The case study design allows linking the research study to the research question and the research conclusion. Because

comparisons are drawn, the cases are chosen carefully so that the researcher can predict similar results across cases or predict contrasting results based on the conceptual framework (Yin, 2017). Multiple cases notably lead to more robust outcomes when using inductive theory. However, it has to rely on arguments rooted in the methodological literature for any justification to be persuasive.

Role of the Researcher

The primary instrument used to collect focused and qualitative textual data were semistructured interviews. I was directly involved in the data collection process by conducting online and telephone interviews. I retained a complete and continuous dialogue with the selected participants who met all ethical standards. The selected participants were smallholder farmers who received land under the FTLRP in Zimbabwe in 2000. The smallholder farmers had experienced the real-life phenomenon explored in this study (Street & Ward, 2012). I had never met the participants previous to data collection. I live in North America. The last time I visited Zimbabwe was in 1997, before the introduction of the FTLRP. The participants were not paid or compensated in any way to participate in the interview, and no incentives were used to increase participation.

Stewart and Bruce (2011) maintain that qualitative research by its nature is exploratory, data-driven, fluid, flexible, and context-sensitive. Yin (2017) opines that a case study is appropriate when the study is trying to understand and explain a contemporary phenomenon within its real-life context and where the study seeks to answer “how” or “why” empirical research questions. On this basis, the case study was an appropriate and relevant research design for this study.

I interviewed the smallholder farmers who received land under the land reform program after Zimbabwe attained its independence from the British in 1980. In my interviews, I used probes to clarify and expand ideas to address critical interview questions relating to the facts, motives, present and past behaviors patterning to sustainable agriculture and climate change threats in Zimbabwe. Gray (2009) argued that interviews are conversations between a researcher and the participants. Interviews yield a great deal of useful information when a researcher asks questions relating to facts, people's beliefs, and perspectives about the facts, feels, motives, present and past behaviors, standards of behaviors, and conscious reasons for individual actions or feelings (Leedy & Ornmrod, 2010).

The aims and objectives of the research can determine the type of interviews. Gray (2009) indicated that semistructured interviews are suitable for qualitative research because their nature allows the researcher to probe and ask the participants to explain and clarify their responses. The use of open-ended questions guided the method of collecting lengthy and descriptive answers from participants. I avoided leading questions in an interview in order to avoid biases. Besides, I used terms the participants understood as well as avoiding two-in-one questions. In order to avoid bias, I avoided questions associated with strong positive or negative feelings.

The role I performed in the research was data collector and data analyst. The protection of all participants in this study, their real names, and the people's identity are confidential, and I maintained the ethical expectation of the university's Institutional Review Board (IRB) and the Natural Commission of the Protection of Human Subjects.

My experience with Zimbabwe's rural farming communities' traditions and customs could have been an added advantage to strengthen positive communication with the participants and allowed me to identify insights into the issue from the participants' perspective. Understanding the participants' culture and customs helped explore participants' cues in body language and clarify responses without ambiguities in the interview's broader context.

Denzin and Lincoln (2003) noted that apart from what words say, it is also essential to focus on what the words do. In the interview trends, I uncovered the farming environment and the issues of concern related to sustainable agriculture and the threat of climate change, and how smallholder farmers in Zimbabwe would respond. The whole process helped me focus on what evidence supports or disapproves of the data's validity and creditability (Heffernan, 2014).

Methodology

A qualitative multi-case study design was used to understand specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs (Dube et al., 2014; Mutsvangwa-Sammie et al., 2016). The qualitative multi-case study design was used to allow the in-depth study of holistic and meaningful characteristics of real-life events (Yin, 2014, p. 2). Yin (2017) proposed employing the case study approach, as it is most appropriate when asking how and why questions and when the study is bounded by time. Eisenhardt and Graebner (2007) recommend that researchers utilize a multi-case study approach that includes more than one case when the goal of the study is to make an original contribution to a theoretical or

conceptual framework and provide a rich, powerful picture of human interaction as compared to a single case study. As an analytic procedure, cross-case synthesis is recommended when analyzing data in a multiple case study to strengthen the data results' external validity and trustworthiness (Merriam & Tisdell, 2015).

Designing a case study protocol allows researchers to augment their study's reliability (Baxter & Jack, 2008; Yin, 2017). The method and research design delineate the process and system of conducting a multiple case study. The research design includes research questions and interview questions utilized to uncover the participants' experiences, participant selection logic, data collection and field procedures, an identified data analysis technique, and a template to follow for reporting the multiple case study (Noor, 2008). The research design for this study began with the participant selection logic.

Participant Selection Logic

Population. In this proposed research study, my goal as a researcher was to understand the perceptions of a sample of participants selected for this study from within the population of 141,000 smallholder farmers in Zimbabwe. The Government of Zimbabwe claimed that from 2000 to 2008, 300,000 plots were allocated to A1 smallholder farmers and 127,000 plots to A2 smallholder farmers. Matondi (2012) and Vitoria, Mudimu, and Moyo (2012) argued that the realistic figures from Utete (2003) were 127,000 plots for A1 and 14,000 plots for A2. Of the approximately 141,000 smallholder farmers located throughout Zimbabwe, approximately 80% are dependent on

land given to them in the government's Fast Track Reform Programme of 2003 to sustain theirs and their families' livelihoods (Matondi, 2012).

Sampling criteria. In discussing populations' sampling in qualitative research, sampling, and selection of the specific population addressed are critical to assure the integrity of the research (Tracy, 2010). This study utilized purposeful sampling for participant selection to maximize the usefulness of information because it allows the researcher to specifically identify a group of people with the most reliable information desired for the phenomenon being studied (Patton, 2014). In this study, those who received land during the land transformation brought about by the FTLRP between 2000 and 2008 have the best information on their specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs (Dube et al., 2014; Mutsvangwa-Sammie et al., 2016).

This study's smallholder farmers comprised the communal, old resettled, Model A1, and Model A2 smallholder farmers (Vitoria, Mudimu, & Moyo, 2012). Vitoria et al. (2012) noted that most Model A1 smallholder farmers had been selected from the former communal area farmers. Most smallholder farmers in Zimbabwe have first-hand knowledge and experience directly related to Zimbabwe's history of land management (Scoones, 2015). The participants selected in this study, individually or collectively, could share perspectives gained from the transformation of land brought about by the FTLRP in Zimbabwe. The participants' experience supported and enriched the data and substantiated the clear evidence of its occurrence (Robinson, 2014).

Participants for this case study were also recruited using criterion and snowball sampling strategies and screened with the following inclusion criteria: adults over the age of 18; smallholder farmer in Zimbabwe; acquired their farming from the FTLRP in Zimbabwe instituted in 2005; and possess knowledge regarding their experiences with the topic of the study (Patton, 2014). The participant selection logic ensured that participants fulfill the minimum recruitment requirements. Snowball sampling is the most common form of purposeful sampling and works by asking a few key participants who already meet the study's criteria to refer others who may also meet the criteria (Merriam & Tisdell, 2015).

Sampling selection. I gave preference to smallholder farmers who received land through the FTLRP that took place between 2000 and 2008 in Zimbabwe. Medium- and large-scale farmers were not included in the study. The ideal minimum units of analysis were seven smallholder farmers, a criterion size that assured saturation. The qualitative investigation aims for depth and breadth; there are no hard and fast rules when determining sample size as long as the criteria sample meets some predetermined criterion of importance (Flick, 2014). The minimum number of interviews required for a qualitative, multiple case study should be five participants, and I continued past this number until I reached data saturation, which was seven participants, with similar data noted from participants 5, 6, and 7 (see Halkias & Neubert, 2020; Schram, 2006).

Schram (2006) argued that a range of five to 10 participants for a qualitative investigation could be recommended as sufficient. Some researchers argued that an analysis of large numbers of in-depth interviews might thwart a deeper investigation of

the studied phenomenon. Yin (2017) suggested that six to 10 cases can be recommended as the right sample size when involving multiple case studies. In this study, the unit of analysis was the smallholder farmers in Zimbabwe. Researchers need to scrutinize the information desired, the purpose, reliability of resources, time, and cost when considering the sample size (Patton, 2014). As recommended by Yin (2017), each unit of analysis, in this case, the smallholder farmers in Zimbabwe, represents a single study, and the data from in-depth interviewing provide insight that can be used to perceive causal inferences based on theoretical propositions or to predict similar or contrasting results.

According to Yin (2017), a quantitative research method would not offer this study a meaningful output because its focus typically depends on larger sample sizes. Its primary goal is to generalize the findings and inferences of the study population's statistical sample. Quantitative researchers heavily rely on deductive reasoning focusing on certain premises or abstract ideas such as hypotheses or theories to draw logical conclusions. Qualitative research approaches deal with elucidation and comprehension, unlike quantitative approaches that focus on details, testing theories, and analyzing statistics (Flick, 2014). To understand the subject matter holistically and its significance to my study's population and sample, the qualitative research paradigm acknowledges the sensitivities that come into play during the collection and analysis of data contingent to social and cultural contexts (Eriksson & Kovalainen, 2015).

In contrast to quantitative research, Yin (2017) noted that case studies are focused on using small samples to enable in-depth analysis of the population and consideration of variability and reliability due to the replication logic and cross-case analysis. Qualitative

methods permit the researcher to add more participants until a saturation point is reached to ensure the phenomenon is adequately investigated. In this study, a qualitative research method was suitable for discovering the issues, opinions, and insights embedded in smallholder farmers' experiences regarding sustainable agriculture and the threat of climate change (Merriam & Tisdale, 2015). The exploration of smallholder farmers, their interactions, individual and collective issues, opinions, and insights provided variability and can ensure the process of replication is useful (Yin, 2017).

Sampling strategy. This study's scope is limited to the population of smallholder farmers who received land through the FTLRP between 2000 and 2008 in Zimbabwe, where agricultural productivity has worsened, and smallholder farmers are facing the most significant threat of climate variability. The range of ages of participants was from 26 to 55 years old. Only one 26-year old participant was below the age of 18 when smallholder farmers in Zimbabwe received land through the FTLRP between 2000 and 2008. Although the one participant was legally a minor, he clearly remembered the circumstances of the land reform period and eventually inherited the family farm at a young age due to his parents' untimely loss.

This study's data were gathered through a purposeful sampling technique based on individual in-depth, semistructured interviews. Purposeful sampling allowed the discovery of varieties of meanings and experiences from a sample of seven smallholder farmers in Zimbabwe (Patton, 2014). In-depth interviews allowed greater flexibility when questioning a participant and the strategy allowed questions to be addressed until a saturation point was reached and interviewing of participants, in this case, a small group

of smallholder farmers in Zimbabwe, helped to understand the process or their farming activities in greater detail (see Eriksson & Kovaleinan, 2015).

The resettlement issue is politically sensitive in Zimbabwe (Mapiye, 2016). The strength of in-depth interviews provides an opportunity that interviews can be conducted in private. Detailed exploration of a participant's experiences, opinions, and attitudes can be inquired until the saturation point is reached. An in-depth interview provided more information because it allowed the interpretation of data to be based on the participants' thoroughly articulated individual viewpoints, allowing the researcher to capture the phenomenon's lived realities and experiences (Rowley, 2012).

Most smallholder farmers received land through the FTLRP and were former communal farmers, having lived most of their lives involved in agricultural activities. The participants were seasoned farmers in their terms as considered in their communities where they live. Tracy (2010) pointed out that the saturation point would have to be reached with over 66% of smallholder farmers represented in the study. The participants were 18 years and older and have farming experience; this complies with the appropriate Zimbabwe local laws required for anyone who owns a farm. The choice of population and sample size is vital for the success of this research. As Rowley (2012) recommended, I used the proposed process to identify and select participants to gather information, attitudes, perceptions, and opinions about land and agricultural productivity and sustainable livelihood strategies in Zimbabwe. This researcher was actively engaged in selecting the most potentially data-rich participants and established rapport with the sample group to fully understand the phenomenon and enhance the probability that

participants will provide in-depth data (Rowley, 2012). The sampling strategy's focus was to choose participants that would offer a deep understanding of the central study topic and not generalize study findings (Baxter & Jack, 2008).

Instrumentation

The goal of using specific instrumentation in a case study is to gather data from multiple sources and provide sufficient data collection instruments that are valid and reliable to answer research questions (Yin, 2017). Considering the various forms of measurement and questions developed that relate to the research topic, it was essential to examine all of the responses and the characteristics and selection of participants in the data analysis process. Thus, it was essential to gather appropriate instrumentation protocols that aligned with the purpose of the study and could provide answers to gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs (Dube et al., 2014; Mutsvangwa-Sammie et al., 2016) and contribute original data to the conceptual framework. Appropriate choice of instrumentation produced themes to support insights by data collected through (a) a semistructured interview protocol whose items have been designed and standardized by previous researchers; (b) data triangulation (Guion et al., 2011); and (c) reflective field notes (Merriam & Tisdell, 2015) kept by the researcher throughout the data collection process.

The semistructured interview protocol. This study's interview protocol consists of semistructured questions developed and validated by scholars whose investigations on sustainability and livelihood strategies for smallholder farmers in Africa were the foundational material to develop first, the sustainable livelihoods framework (Ashley &

Carney, 1999), which "provides an understanding of the livelihoods of local communities being studied, what assets they have, and what they do/can do with these assets" (Yaro, 2004, p. 9), and, second, the environmental entitlements framework, which focuses in the broader influence and importance of diverse institutions operating at multiple-scale levels from micro to macro, which influence who has access to and control over what resources within a specific environment and that arbitrate contested resource claims (Leach et al., 1999).

The semistructured interview method is intended to enhance the researcher's ability to understand a phenomenon or phenomena from the participant's perspective (Kvale, 1995). Semistructured interview allows room for participants to have conversational freedom with responses during the interaction on questions determined by the researcher. Hence, in the case of this study, the standardized, semistructured interview questions addressed the purpose of the study and answered the research question on the phenomenon of identifying specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs.

The authors of sustainable livelihoods framework and the environmental entitlements framework who validated and standardized the interview protocol in studies ranging over 20 years (Bjornlund et al., 2019; Chagumaira et al., 2016; Yin, 2017) are recognized seminal scholars in the international development area: Caroline Ashley, Diana Carney, Melissa Leach, Robin Mearns, and Ian Scoones, all Research Associates and Fellows at the Institute of Developmental Studies at the University of Sussex in the United Kingdom. Items in this study's interview protocol were adopted from the Institute

of Developmental Studies research work from the previous two decades brought together initially in the Department of International Development's (UK) *Sustainable Livelihoods Guidance Sheets* (1999) and recently published by the World Bank Group in *Working with Smallholders: A Handbook for Firms Building Sustainable Supply Chains* (Dieter et al., 2016). More information on these defining theoretical frameworks can be found in the "Conceptual Framework" section in Chapter 2 of this Dissertation.

Archival data. Triangulation is a core part of case study research and an investigative approach used during field study and the subsequent detailed examination of data (Yin, 2017). The role triangulation plays during the qualitative research process is highly important: it contributes to giving depth to the data collected because it is a systematic approach for confirming or contradicting data (Guion et al., 2011). The outcome of the qualitative interviews was triangulated with a few archival documents. I examined archival data published in official reports from well-established NGOs on the smallholder farmer crisis in Zimbabwe and available on open access websites. I also collected information and archival data from databases relating to sustainable land management techniques for smallholder farmers in sub-Sahara Africa. These two archival data sources were utilized for triangulation and gave credibility and trustworthiness to the study's findings. Qualitative multiple case study research questions by Neubert (2016) and Komodromos (2014) have also been answered using archival data to triangulate interview data.

Reflective field notes. The third instrument used for data collection from research participants in this study were reflective field notes gleaned from online data sources, in

this case, the semistructured interviews conducted via Skype (Redlich-Amirav & Higginbottom, 2014). The interviews in this study were conducted through Skype. Skype enables the researcher to utilize participants in faraway locations, which aids replication. Similarly, Skype enables the interview interaction to avoid contextual information, which may help avoid personal reflexivity from the researcher and maintain a highly unbiased atmosphere (Deakin & Wakefield, 2014).

Online data collection, or netnography, may contain interviews, introspection, and interactions (Merriam & Tisdell, 2015). Because most online data collection interactions are recorded and saved as they occur, reflective field notes become far more salient than reflective field notes. In reflective field notes from online data collection, researchers record their observations regarding subtexts, pretexts, contingencies, conditions, and personal emotions occurring during their time online and relating to their online interactions and experiences (Morgan, Pullon, Macdonald, McKinlay, & Gray, 2017; Yin, 2017). Field notes often provide critical insights into how online social interactions function and transpire and help decipher the reasons behind cultural actions, rather than offer the more typical recording or description (Kozinets, 2015).

Drawing from their ethnographic work in virtual worlds, Boellstorff, Nardi, Pearce, and Taylor (2013) offer a range of practical suggestions regarding keeping field notes from online interactions. These include the following:

1) Jotting down interesting things that occurred while the researcher was engaged in online interactions and experiences and then typing up more extensive notes after the action subsides.

2) Taking screenshots of activity and making small ‘scratch notes’ soon after events occur, an effort is made to expand and refine these notes within 24 hours because memories can fade.
3) Using the approach of ‘two-boxing’ (a term borrowed from computer gaming) in which two computers, screens, or windows are open simultaneously, the netnographic engagement unfolds, while on the other screen notes are taken in real-time (Boellstorff et al., 2013).

Because qualitative data collection is emergent and inductive, it can be useful to take notes on many online social experiences, including intriguing information or sites, social groups, events, and resources that emerge from the process. The analysis of observational data will later inform the collection of other self-report data, such as in the semistructured interviews (Yin, 2017).

Procedures for Recruitment, Participation, and Data Collection

This study's methods for data collection were a demographic questionnaire, the semistructured interview, existing statistics and records, content analysis of the extant literature, and observation. The qualitative multiple case study's focus was to examine deeper understanding of knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs (Dube et al., 2014; Mutsvangwa-Sammie et al., 2016). The open-ended questions of the interview were aligned with the problem under research (Yin, 2017). The presented question captured the interviewees’ background, thoughts, ideas, opinions, behavior, and values (Patton, 2002; Yin, 2017). Responses to the interview were recorded and transcribed.

Zimbabwe is divided into five (I-V) agro-ecological zones. They are eight provinces: Manicaland, Mashonaland Central, Mashonaland East, Mashonaland West, Masvingo, Matebeleland North, Matebeleland South, and Midland provinces. Five provinces are made up of seven districts, Mashonaland East has nine, Matebeleland South has six, and Midlands has eight districts. I primarily engaged in producing the data related to the participants' experience in the phenomenon under study. The participants (the smallholder farmers) were selected from various districts of the seven provinces of Zimbabwe. Access to the smallholder farmers who participate in the study was obtained through Zimbabweans recruited through network sampling and residing in the United States of America, the researcher's permanent residence.

This approach facilitated confidence among research participants. Politically, the discussion of land and agriculture in Zimbabwe is a very sensitive issue. Access to participants through Zimbabwe communities residing in the United States of America helped to allay fears of smallholder farmers in Zimbabwe and, as a result, confirmed the reliability of answers given to questions by the participants. The land owned by smallholder farmers is on a 99-year lease. The government provides agricultural services for most smallholder farmers. The unstable political situation in Zimbabwe makes communication with participants very difficult. The relationship between the researcher and smallholder farmers may be seen as very suspicious. It was necessary to establish a trusting relationship with participants through Zimbabweans' communities residing in the USA (Lietz & Zayas, 2010).

The participants, in this case, the smallholder farmers, are experienced farmers. These were smallholder farmers who held land in the rural areas of Zimbabwe before the land redistribution. They were 18 years and older and obtained legal permits to operate as smallholder farmers as recorded by the local laws. The semistructured interview was designed to tap into more detailed participants' perceptions and attitudes (Gray, 2009). The interview's designed question thoroughly scrutinized information pertaining to the interviewee's background and disposition, allowing the researcher to investigate the interviewee's behavior, views, and values (Patton, 2002; Yin, 2017).

The purposive sampling chosen fits the data collection technique for this study. The sampling technique may facilitate the smallholder farmers' recollection of their past agricultural experiences. Besides, the sampling technique adequately reinforced quality assurance purposes (Leach & Onwuegbuzie, 2007). The smallholder farmers are better positioned to give reliable information. Both Model A1 and A2 smallholder farmers have been selected from the former communal area farmers; they had first-hand knowledge and experience directly related to their history and land management in Zimbabwe (Scoones, 2015). The smallholder farmers subsequently enhanced the study's validity as they make up a suitable participant group selected for the study. The smallholder farmers' livelihoods, economic, social, and professional orientation relate to natural resources activities, and they are positioned to give concrete accounts rather than generalization (Chenail, 2011).

The University's Institutional Review Board (IRB) granted study approval before the data collection segment began. Seven smallholder farmers from various seven

districts of the seven provinces of Zimbabwe were chosen for the data collection. The seven smallholder farmers received timely notification in advance about the study's purpose and met the participant inclusion criteria to be suitable for the collection of sufficient data for the multiple-case design (Rowley, 2012; Yin, 2017). The range is an adequate fit for necessary replication, essential for theoretical proposal (Yin, 2017). The selection of seven smallholder farmers to obtain an in-depth interview of the study should be adequate to attain data saturation of the study. Saturation (Mason, 2010; Yin, 2017) is achieved when further data collection does not yield new information from the interviewees. Qualitative samples should be large enough to ensure that most of the interviewees' important perceptions have been uncovered. Qualitative research principles generally follow the concept of saturation when collecting data to shed light on the issue under investigation. The saturation point is reached when no new themes emerge when performing in-depth interviews with participants (Glaser & Straus, 1967). The minimum number of interviews required for a qualitative, multiple case study should be five participants, and I continued past this number until I reached data saturation, which was seven participants, with similar data noted from participants 5, 6, and 7 (see Halkias & Neubert, 2020; Schram, 2006).

Selecting smallholder farmers from across the country enabled maximum variation sampling in this multiple case study. In general, this procedure increases efficacy in the replication process (Yin, 2017). Interviews were conducted using online, telephone, or Skype. Microsoft Excel software was used to record, document electronically, and analyze the data from the interview. When the interview began, I

introduced myself to smallholder farmers who had willingly accepted to participate in the interview. During interviews, I used handwritten reflective notes documenting interviewees' actions, behaviors, attitudes, beliefs, opinions, characteristics, expectations, self-classification, and knowledge (Katz, 2014; Neuman, 2011).

I transcribed from the interview notes to MS Word for individual participants and coded the responses into themes according to the research questions to form my database. Microsoft Excel electronic spreadsheet was used to analyze and categorize data as collected. Microsoft Excel is appropriate for storing data collected, documented interview schedules, recorded research themes, and coding and classification of information through numbering. At the end of each telephone or Skype interview, I thanked the participants and made them aware that I might contact them again to clarify responses that might be unclear.

In this study, the smallholder farmers constitute the sample of participants to establish a common understanding. The choice of the population and the sample, in conjunction with the recorded interviewees' actions, emotions, attitudes, and other behavioral actions, aid the research's reliability and construct validity (Yin, 2017). These procedures strengthen the data collected's trustworthiness to answer the research questions (Neuman, 2011; Yin, 2017). The development of a case study database and other research protocols linked to the research questions can aid in the research's reliability and construct validity (Gibbert et al., 2008; Rowley, 2012; Yin, 2017).

Participants were interviewed once, and there was no second interview after the completion of the first interview. Each participant received a transcribed response

through email. I assured the participants that their personal information and other written reports and materials related to this research's data collection would remain confidential for a minimum of five years. Access to the study's collected research data is passcode-protected in an electronic file on my computer

Data Analysis Plan

In a case study research, the researcher selects an appropriate sample size after determining the case studied. There must be adequate data from the detailed qualitative study to authenticate trends among the interviewees. The smallholder farmers who received land through the Land Reform Program of 2000 to 2008 make up the study participants. This can be linked to theoretical propositions, which can be a sound method in guiding "how" or "why" questions in analyzing case studies (Yin, 2014). In achieving this goal, interview questions were shaped in semistructured arrangements for collecting the interviewees' answers. Appropriate prompts were utilized to spur conversation about the interview questions. The data were categorized with additional information external to the semistructured questions and answers. Additionally, the data were changed to groups of findings to analyze the knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices.

In this study, thematic analysis was utilized in analyzing the contents of the interviews and documented data (Merriam, 2014). In developing a case study database, themes are identified, views, significant words, or analyses in the documented work are considered reliable, referred to, and attributable (Yin, 2017). The documented interviews were organized and analyzed through content analysis to developing themes from the

data (Hatch, 2002; Yin, 2017). The breadth or exclusion of emphasis of an analytical segment or alignment with theoretical suppositions was gauged via content analysis (Yin, 2017). Reflective field notes were among data sources utilized in triangulation, augmenting the triangulation of proof from several sources and enhance the research's reliability and validity (Katz, 2017).

Word tables were used in securing the findings from individual interviews because of the small sample size (Yin, 2017). Cross-case synthesis of the face-to-face via Skype interviews furnished strong proof of how specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices should be tailored towards their needs' sustainability training. Through this data analysis method, the researcher could garner cogent, impartial, and persuasive arguments based on the data (Yin, 2017). Any deviation in the accuracy of the data was delineated and documented as a component of the study.

I used manual coding to split up or categorize standard codes, phrases, and words within the participants' responses. I intended to use the cross-case synthesis analysis strategy (see Yin, 2017). I additionally applied content analysis techniques for primary data. The first step was to identify codes in the main content through in-depth interviews and then create categories from the identified codes. I continued to analyze content from primary and secondary data using a cross-case synthesis technique and then triangulation by exploring patterns of similarity or difference among themes generated by the analysis (Ojo, Halkias, & Neubert, 2020).

The identified themes represented recognized patterns, reasonable and practicable agenda of the researcher, commonalities as well as the research questions; these core elements aided in determining whether repetitive and nonrepetitive insights were examined for both within-case and cross-case analysis (Yin, 2017.)The results of the research were scrutinized in identifying recurring themes during the interviews. Non-recurring evidence was linked to the individual cases' composition. Once the data were coded from the interview questions, themes were linked to classifications grounded in the conceptual framework and scholarly literature reviewed in Chapter 2. The codes help identify common themes or categories that may emerge from interviewees' responses and personal journal notes. Triangulating multiple data sources—such as face-to-face interviews, transcription review, and reflective field notes—consolidated and broadened the research findings and improved the study's quality. Triangulation was utilized to corroborate the evidence and heighten the research's strength and reliability (Yin, 2017).

Issues of Trustworthiness

Credibility

Credibility determines whether or not the research findings represent believable and trustful information drawn from the participants' original data based on the correct interpretation of the participants' perceptions or views (Anney, 2014). The qualitative approach establishes rigor of the research study by adopting credibility strategies based on prolonged and varied field experience, the time spent on sampling, reflexing, triangulation, member checking, peer examination, interview techniques, establishing the authority of research, and structural coherence (Anney, 2014).

Qualitative research aims to understand the phenomenon experienced as viewed from the participants' eyes, in this context, the smallholder farmers in Zimbabwe. They are the only ones who can be a legitimate judge of credibility to the results. I explained to the participants that they might end the interview at any time. I wrote down and record their answers electronically. I sent every participant their transcribed responses for a transcription review. Triangulation was facilitated to make sure the participants could review both the data collected and the interpretation I made about the interview data. Saturation is an essential aspect of the study; this is a precision in which the study should have quality and validity (Fusch & Ness, 2015). Data saturation has an impact on the quality of the research conducted and hampers content validity. The collected data determines when data saturation is achieved (Fusch & Ness, 2015).

Transferability

Transferability refers to the degree to which the qualitative research results can be generalized to other situations and applications in other settings or groups (Anney, 2014). The researcher can enhance transferability judgment by describing the research context through thick, rich, and in-depth description of the results and purposeful sampling, where the researcher focuses on key assumptions central to the research (Houghton, Casey, Shaw, & Murphy, 2013). I provided a detailed description of the inquiry for readers to quickly determine if the research study results can be transferred to their context.

Dependability

Dependability refers to the stability of findings over time (Miles & Huberman, 2014). Dependability is established by using an audit trail, an examination of the inquiry process and product to validate the data, based on the researcher's research decisions to show how the data were collected, recorded, and analyzed. Dependability is when two or more researchers analyze the same data separately and compare the results, the outcome would be the same (Cohen et al., 2011), and the dependability of the inquiry is achieved (Ary, Jacobs, & Sorensen, 2010). Dependability can be shaken when inconsistencies arise from two or more separate analyses; thus, any inconsistencies were addressed to improve the dependability of the inquiry (Ary et al., 2010).

Confirmability

Confirmability is established when the results are neutral and accurate and free from the researchers' bias or reflexivity and corroborated by other researchers (Billups, 2014). Confirmability of a qualitative inquiry can be achieved using audit trail, reflexive journal, and triangulations (Billups, 2014). Confirmability is crucial in a rigorous qualitative study: the results reflect the truthfulness of the participants' perspectives; in this case, the smallholder farmers in Zimbabwe. According to Marshall and Rossman (2011), during data collection and analysis, I used coding to ensure consistency in both the codes' use and definition to enhance the trustworthiness of results.

Ethical Procedures

Walden University requires all students researching humans to obtain approval from Walden University's Institutional Review Board (IRB). In the IRB application,

most of the time, the approval is referenced by a number (No. XXXX), and the approval is used to gain access to participants. The IRB ID ensured that ethical research such as informed consent, undue burden on participants, minimizing harm, privacy, and confidentiality, these risks to participants are minimized (Jacob & Furgerson, 2012; Kendall & Halliday, 2014). The researcher and participants are personally interacting in different stages of the study. Their involvement can be ethically challenging in all stages of the study. These ethical challenges could include anonymity, confidentiality, informed consent, the researcher's potential impact on the participants, and vice versa (Kendall & Halliday, 2014). Qualitative research on humans has raised concerns for researchers to be mindful of avoiding approaches that place an undue burden on participants, overburdening participants with a lengthy interview or group discussions (Kendall & Halliday, 2014). The research on humans requires institutional permissions, including approval from Walden University's Institutional Review Board (IRB).

To avoid any issues of participants' privacy and confidentiality, all research materials and processes were carefully stored. Data collection did not take place until approval was received from the University's IRB. Participants were reminded that if they desired to withdraw from the study, they were free to do so at any stage of the research study and that there was no penalty or risk for withdrawing from participating. I made the participants aware that their responses were confidential, and their privacy was protected. The data are stored in a private and secure place. I am the only person with access to the data. The data will be kept for five years in a password-protected file and will be destroyed after this.

Summary

The purpose of this qualitative multiple case study was to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe in order to tailor sustainable land management training to their needs. Semistructured interview questions served to frame the discussion in this study. The interview protocol allowed participants to provide their understanding of the livelihoods of smallholder farmers in Zimbabwe. Data collection occurred through telephone and Skype interviews with the participants. Ethical standards for researching human subjects were complied with in order to have legal access to participants.

The themes identified described the specific knowledge gaps among smallholder farmers in Zimbabwe. As expanded upon in Chapter 4, the study results explored the need for smallholder farmers in Zimbabwe to adopt sustainable agricultural practices to counter severe barriers, such as land degradation, soil infertility, climate change, and lack of knowledge on sustainable land management practices. Transcript review and triangulation were conducted to ensure the trustworthiness of the data and to reduce bias. Chapter 4 describes the data collection and data analysis processes and presents the research findings and results in detail. Findings from each data source, detailed data analysis, and procedures of coding will also be covered in this chapter and justified answers to the research question with a comprehensive evaluation of the findings through the cross-case synthesis method.

Chapter 4: Results

The purpose of this qualitative multiple case study was to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs. I utilized the central research question to investigate the study's central phenomenon and study it within an empirical setting. By analyzing the specific knowledge gaps among smallholder farmers in Zimbabwe concerning sustainable land management training, I gained a deeper understanding of the implications of participants' lack of land management training to sustain their family's daily livelihoods. This study's central research question was as follows: What are the specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices?

After identifying gaps in previous literature regarding how sustainability measures for smallholder farms in Zimbabwe remain mostly dependent on farmers' decision-making abilities, level of knowledge, and available information (Mutsvangwa-Sammie et al., 2016). Scholars indicate that the dissemination of innovative agricultural training will reduce the level of land management problems among smallholder farmers in Zimbabwe (Tatsvarei, Mushunje, Matsvai, & Ngarava, 2018). At the same time, the delivery of training in sustainable land management practices can be accomplished only if farmers accept trainers in their existing social networks (Dicecca, Pascucci, & Contò, 2016). Should smallholder farmers in Zimbabwe not receive training in sustainable land management techniques, the persistence of poverty and deteriorating living conditions will continue to challenge smallholder farmers' fragile livelihoods (Scoones et al., 2018).

The results of this multiple case study on sustainable land management practices and barriers to innovative agricultural practices (Moyo et al., 2019) may benefit impoverished other sub-Saharan African countries by formulating connections between participants' real-life experiences, theory, academia, and professional practice.

This study was framed, first, by the sustainable livelihoods framework (Ashley & Carney, 1999), which "provides an understanding of the livelihoods of local communities being studied, what assets they have, and what they do/can do with these assets" (Yaro, 2004, p. 9), and, second, by the environmental entitlements framework, which focused in the broader influence and importance of diverse institutions operating at multiple-scale levels from micro to macro (Leach et al., 1999). In Zimbabwe, upon gaining independence in 1980, lawmakers realized that land reform represented a powerful means for righting the country's natives' wrongs in both social and economic spheres. Land reform policies were deemed instrumental in tackling poverty for disadvantaged populations, a case in point being rural dwellers, for whom subsistence farming was critical to their livelihoods (Helliker et al., 2018; Scoones et al., 2018).

Participatory research such as this multiple case study may affect positive social change directed at understanding the smallholder farmer experience in sub-Saharan Africa, which is burdened by low agricultural productivity, long-term droughts, and widespread food insecurity (Mutsvangwa-Sammie et al., 2016). This collection and analysis of data through research is important because its results will address the gap in the scholarly literature on developing training protocols for sustainable land management within fragile livelihood systems. Before such training can address the smallholder

farmer's needs, qualitative research needs to be conducted to explore the experiences of smallholder farmers in Zimbabwe to tailor sustainable land management training to their particular needs (see Dube et al., 2014; Mapiye, 2016). I also conducted this study to contribute original data to the conceptual framework and scholarly literature.

In this chapter, I describe the results of this multiple-case study research. The chapter is divided into two main parts. The first is a thematic analysis of the study's data multiple sources: (a) semistructured interviews featuring items that were designed and standardized by previous researchers; (b) archival data (Guion et al., 2011); and (c) reflective field notes (Merriam & Tisdell, 2015) I kept throughout the data collection process. The second part includes a cross-case analysis in which I synthesize the findings of the initial thematic analysis of data to answer the study's central research question. According to Boyatzis (1998), it is possible to adopt different approaches in using thematic analysis and yet obtain the same rigor. All the approaches differ in what they offer to qualitative data analysis; "thematic analysis is flexible and what researchers do with the themes once they uncover them differs based on the intentions of the research and the process of analysis" (Boyatzis, 1998, p. 63).

In a multiple case study, the case itself may be a person, event, entity, or other unit of analysis (Halkias & Neubert, 2020). When people are the unit of analysis, a single case focuses on one individual, whereas a multiple case study focuses on more than one person (Yin, 2017). The multiple case study has often been used in business and management studies such as in Brown (2017) with airport managers, Komodromos (2014) with university employees, and Neubert (2016) with tech firm owners. An

inductive research approach using a multiple case study strategy can enable themes to emerge from the data and allow smallholder farmers' perspectives to drive data analysis and recommendations for further research (Yin, 2017). When the data focus is only on individuals in a multiple-case study design, the study's central phenomenon, in this case, smallholder farmers in Zimbabwe, is the context and not the target of the study (Eisenhardt & Graebner, 2007; Yin, 2017). The unit of analysis for this study was the smallholder farmer in Zimbabwe.

A multiple case study design allows for investigating differences within and between cases (Yin, 2017). A multiple case study design aims to replicate findings across cases, strengthening the alignment of the study purpose to the research question and conclusion. Because I wanted to draw comparisons, I chose the cases carefully to predict similar results across cases or predict contrasting results based on the conceptual framework. Multiple cases notably lead to more robust outcomes when using inductive theory. However, for any justification to be persuasive, it has to rely on arguments rooted in the methodological literature (Halkias & Neubert, 2020). Researchers have considered replication logic an essential tool in multiple case study results because one single observation cannot be trusted as it may not reflect a regularity that can be found again. Multiple cases tend to be sampled because they can fill theoretical categories, extend emergent theory, exemplify polar types, or even replicate previously selected cases. This study provides replicable evidence and extends the results of previous studies in new and considerable theoretical directions (see Bonett, 2012). Researchers have suggested a limited number of cases ranging from five to 10, stating that a larger sample size could be

a barrier to an in-depth understanding of the phenomena under study (Fusch & Ness, 2015; Merriam & Tidsdell, 2015; Schram, 2006).

In this chapter, I present the recurrent themes and main coding categories in detail with support provided by the participants' voices. Chapter 4 is also organized around the following sections: coding categories and themes, tables summarizing demographics of the study's sample population, and a cross-case synthesis of themes across cases following Yin's (2017) recommendations for the rigorous data analysis process.

Research Setting

I collected data for this study via semistructured interviews with seven smallholder farmers, each from one of Zimbabwe's seven provinces. Zimbabwe has eight provinces. No participant from Mashonaland Central was interviewed for this study. The participants received land through the FTLRP instituted in 2005. The participants have operated the farms even to this day and, as a result, met the inclusion criteria for this study: adults over the age of 18, lived most of their lives involved in agricultural activities, and are seasoned farmers as considered in their communities where they live. Participants were recruited using the snowball technique strategy. Personal e-mails, WhatsApp, and telephone were the primary mode of communication during the selection process. After participants were recruited, a consent form was sent to each participant, which included each participant's confidentiality agreement. An interview date and time was agreed upon via WhatsApp. Recorded phone interviews were conducted with participants on the mutually agreed time and date and participants' choice of private settings with minimal interruptions.

Primary information was obtained by administering the study's interview protocol to the participants. The semistructured interview protocol was structured in such a way to allow participants to freely and openly engaged in the discussion. Responses to the questionnaire format, used as a guideline, were transparent with the needed information to answer the research question. The resettlement issue is politically sensitive in Zimbabwe. As was expected, several participants were reluctant to divulge information regarding corruption and favoritism by the extension offices and political representatives. Some expressed concern that any disclosure of the government's involvement in agricultural corruption could be detrimental to ownership of the land, resulting in their eviction from the land. The semistructured interview protocol was structured such that participants were fully engaged throughout the interview process and openly expressed their views on the phenomenon of discussion without incident.

Demographics

I interviewed the seven participants in person using a mobile phone. Each of the participants was from the seven Provinces of Zimbabwe; Mashonaland Central, the eighth Province of Zimbabwe, was excluded. The interviews were recorded using a voice recording software, "Tami" installed on an iPhone8 mobile telephone device, with permission, to avoid loss of data.

The interview dates and times were scheduled with giving ample advanced notice to the participants. The interviews ranged from 30 to 40 minutes long, three participants took more than 90 minutes to finish, and they felt they had more to contribute. The ages of the participants ranged from 26–66. The smallholder farmers are Zimbabweans, adults

over the age of 18, and have received land through the FTLRP instituted in Zimbabwe in 2005. The smallholder farmers have experienced the real-life phenomenon explored in the study. Most smallholder farmers in Zimbabwe have first-hand knowledge and experience directly related to Zimbabwe's land history.

I considered location, age, gender, the total number of households, the farm's size, and the understanding of the phenomenon explored in this study, given that these demographic variables were never addressed in the defining conceptual framework. The given pseudonyms are in an XY format so that X is presented by the generic letter P symbolizing for “participant,” and Y is the numerical identifier assigned to each participant. The full demographics follow in Table 1.

Table 1

Participants' Demographics and Characteristics

Participant	***Location***	***Age***	***Gender***	***Total No of household members***	***Highest grade attained by adults in household***	***Ability to read and write***	***Predominant language(s) spoken/written in household***	***Type of housing***	***Size of farm***	***Member in farmer community association***
P1	Midleland Province	26	Male	11	First Degree	Yes	Ndebele/ Shona	Both hatched and metal roof and soil and cement floor.	Small, close to 15 hectares	No
P2	Mashonaland East Province	54	Male	8	Ordinary Level	Yes	Shona	Both thatched and metal roof and soil and cement floor.	Small, close to 14 hectares	Yes
P3	Masvingo Province	53	Female	4	College Degree	Yes	Shona	Both thatched and metal roof and soil and cement floor.	Small, close to 10 hectares	No
P4	Manicaland Province	44	Male	7	10^{th} Grade	Yes	Shona	Both, the house has metal roof and cement floor, the hut is thatched and has soil floor.	Small, approximately to 13 hectares	No
P5	Matebeleland South Province	63	Male	9	College Degree	Yes	Ndebele	Both thatched and metal roof and soil and cement floor.	Small, close to 12 hectares	No

P6	Mashonaland West Province	45	Male	7	Graduate degree	Literacy in Shona and English.	Shona	Both thatched and metal roof and soil and cement floor and walls	Small (approximately 14 hectares).	No
P7	Matebeleland North Province	66	Male	9	College Degree	Yes	Ndebele	Both thatched and metal roof and soil and cement floor.	Small, close to 15 hectares	No

Data Collection

Approval to begin collecting data came from the Walden IRB (approval # 06-10-20-0250519) on June 10, 2020. My IRB approval expires on June 9, 2021. Data collection began almost immediately, with the first contact made within five days. Data collection continued until July 25, 2020, as seven participants were interviewed through WhatsApp, a commonly used online platform in Zimbabwe. Data saturation became apparent upon completion of seven interviews. The minimum number of interviews required for a qualitative, multiple case study should be five participants (Schram, 2006). I continued the interview process past this number until I reached data saturation, which was at seven participants, with similar data noted from Participants 5, 6, and 7 (see Halkias & Neubert, 2020). Data triangulation corroborated facts found within the multiple data sources (Guion et al., 2011).

The Interview Process

The semistructured interviews consisted of open-ended questions specific to the dissertation topic meant to evoke answers based on the participants' experiences (see Yin, 2017). The interviews centered on seven well-chosen questions grounded in the conceptual framework and the reviewed literature presented in Chapter 2 (see Derman, 2019). The participants were asked about their availability for an interview via a recruitment letter (Appendix C) informing interviewees of the research's fundamental nature and purpose. A consent form was provided to potential participants, and I utilized a semistructured interview format (Appendix D). Each participant met the study’s inclusion criteria and consented to participate.

After consent was documented, an interview was scheduled with the participants. The semistructured questions were used as a guideline to correspondence in this respect included their challenges to issues such as cultivation methods, innovative methods for soil fertility, innovative methods to access water resources, managing changing weather patterns, inter-cropping techniques, access to local markets, farmers' associations, land tenure rights, access to credits, education on literacy and numeracy, legal rights and policies, legislation that impacts livelihood, and financial service organizations. To reach data saturation and collect a desired number of interviews, fifteen individuals were contacted, with seven completing an interview. Snowball sampling enabled fifteen individuals to be contacted out of the target population, with seven completing an interview.

Halkias and Neubert (2020) stated that a well-designed multiple case study research requires data, and interview questions should be presented in a repetitive format to align the foundational elements of the study. The participants' questions were semistructured questions that were completed in about 10–30 minutes (Appendix D). None of the questions were modified, nor were any dismissed for bias or prejudice. Furthermore, all questions were presented in the same order and a similar format to each participant to enrich the data's trustworthiness and transferability. A compelling multiple case study relies on maintaining rigorous research design processes to sustain data's trustworthiness (Stake, 2013).

Transcript Review

After the transcription, I listened to the audio multiple times, made corrections, and added reflective field notes. The transcribed data were sent to the participants to confirm that their interview responses represented their views during the interview. After receiving the validated transcribed data from each participant, I erased participants' names and applied pseudonyms. I organized each of the participants' transcribed data in ascending order of pseudonyms (P1, P2, P3, …, P10) across each interview question into a single Microsoft Word document to prepare for manual coding. Overall, there were 36 pages of validated transcribed interview data. Data saturation was manifested in themes related to sustainable land management activities favored by smallholder farmers, unfavorable farming conditions, and new land strategies needed by farmers. At the count of seven participants planned for the study, I found that I had reached data saturation because no new additional interview data emerged after Interview 5. There were no hard copies for any of the transcribed data nor any pieces of information that could link the participants' names with their pseudonyms. All data were electronically saved on my personal computer and were fully encrypted with a password. I did not encounter any unusual circumstances during the collection of these data.

After each interview, I completed the interview data transcription and forwarded a copy of the transcript to the individual participant through email for data source triangulation. The process of asking participants to check and validate transcribed data is known as a transcript review, a process within member checking (Merriam & Tisdell, 2015). I did this to assure the accuracy of the content and underlying social behavior,

which helped confirm the interview data's overall accuracy. Transcript review through member checking helped improve the accuracy and trustworthiness of this research of the data analysis process, as any thoughts that participants felt were not clearly expressed were cleared and corrected as appropriate (Yin, 2017).

All of the participants' responses to the interview transcripts were returned to me within 72 hours. Five of the participants confirmed the content as consonant with the interview. In contrast, the remaining two participants confirmed their responses with minor changes that did not impact the content or meaning. I compiled all of the verified transcribed data into a secured file and stored the data following the data security plan established for the study in Chapter 3. I used the confirmed transcribed data for manual hand-coding and data analysis.

Reflective Field Notes and Journaling

The detailed and accurate reflective telephone interview notes helped me track how many individuals were contacted, how they were contacted, who did not participate, and how many interviews were conducted. The reflective interview notes started with the first individual contacted and ended with the last participant interviewed. The notes were written in longhand in short sentences and phrases, but legible for someone to understand the interview process's details. My field notes reflect how difficult it was to interview despairing people in developing countries lacking access to basic survival infrastructures such as water (see Derman, 2019). The expansion into snowball sampling produced more participants than anticipated. Plus, snowball sampling allowed the inclusion of individuals I may not have had access to (Bernard, 2013). The responses gathered were

very detailed and very knowledgeable about the topic. They came from provinces that are described by others as being knowledgeable about smallholder farming in Zimbabwe. Out of the seven participants who were interviewed, six of them were located using snowball sampling.

Observational data were kept in the reflective field notes and played a crucial part in the data collection process. I observed the Zimbabwean smallholder farmers' emotions in assertively expressing their specific knowledge gaps among sustainable land management practices. The participants expressed that the problem was the party-political control of access to land. The smallholder farmers are concerned because resettlement was carried out so rapidly, short-circuiting legal procedures and the lack of certainty to their title to the land. The participants were frustrated about the absence of legal security and the lack of government assistance. The participants were disappointed because the absence of government assistance left them vulnerable to hunger and displacement.

Data Analysis

A descriptive coding strategy discussed by Saldana (2016) was used to develop the data analysis in this study. I adopted a descriptive coding strategy to give meanings to raw data. I used emerging words and phrases for categorization and thematic analysis. The raw data obtained from the transcripts (collected from the semistructured interviews) contained all seven participants' experiences. The detailed information collected from the data provided a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs.

Coding drives the process of data collection in a multiple case study (Stake, 2013). How data coding, theme identification, and cross-case analysis work within this multiple-case study is designed to capture specific management themes within the study's central phenomenon. This shaping of thematic analysis occurred during the data collection process in this multiple case study, which led to themes that emerged from the participant sample's experiences. Given that qualitative exploratory studies are used to explore real-world issues to understand the processes behind an under-researched area, the data analysis process begins with the initial data collection process (Eisenhardt, 1989; Stake, 2013). This approach enables the researchers to explore, compare, and contrast research results across cases (Yin, 2017).

Comparing and contrasting cases can lead to robust results when using inductive theory, where methods and design are rooted in the methodological literature (Halkias & Neubert, 2020). An inductive research approach was used as part of the multiple case study strategy. It allowed themes to emerge from the data so that smallholder farmers' knowledge and experiences in Zimbabwe could drive data analysis and recommendations for further research (see Yin, 2017). A multiple case study approach is best utilized for qualitative studies aimed at theory extension. The multiple case study design relies on *replication logic* where the researcher does not pool cases together and use pooled logic (i.e., combine cases) as in traditional theory-testing research; instead, the researcher analyzes each case as a stand-alone experiment. I attempted to understand the central research question within each individual case and then to replicate these insights across each case. This analysis of one or more cases is done to detect patterns in the data that

offer theoretical insights in constructs, theoretical relationships among those constructs, and researcher propositions (Eisenhardt, 1989).

Thematic analysis is driven by the standardized method of identifying, analyzing, and reporting patterns (coding raw data), typically from conducted interviews (Yin, 2017). The process of providing meaning to a description of participants' social reality is done by creating a theme (Stake, 2013). I conducted my thematic analysis by hand-coding the data and systematically mapping out the codes in a descriptive approach (Saldana, 2016, p. 102). This descriptive coding method was used to assign meanings to the identified blocks of data forming a data set of words or phrases used to index and categorize data (Saldana, 2016). Identifying patterns and themes among triangulated data can prove challenging. However, the triangulated data is considered robust when a researcher reads, hears, and observes consistent data across multiple evidence sources. While there is no rule on its application, archival data is especially helpful in addressing the facts of a case, or the who, what, where, and when. Data coding, theme identification, and cross-case analysis within the multiple-case study design can capture specific management themes in ongoing scholarly investigations, including those in the area of driving sustainability and doing business in a conflict zone (Halkias & Neubert, 2020)

I organized the individual data collected from the smallholder farmers in Zimbabwe and transcribed the interviews into Microsoft Word. I coded the transcripts linking each interview question to each smallholder farmer interviewed. I organized codes into appropriate themes. The themes were cross-checked to identify commonalities across the interviews. The constructs which were coded into themes were transferred into

a Microsoft Excel spreadsheet for analysis. The triangulation of data and word coding also allowed the recognition of several patterns that also increased dependability by drawing attention to common relationships between cases (Yin, 2017). The interview discussions served as the base for thematic analysis using pattern recognition. The themes and the patterns were set apart as content analysis progressed, and those considered nonrecurring evidence were associated with individual case compositions.

The *ground-up* data analysis strategy was used to identify codes from raw data (Yin, 2017). The sentences that were considered relevant to answering the study's research question were extracted from each participant's transcribed interview data. The extracted blocks of data were evaluated, and consequently, codes were assigned to them. The codes were recorded according to each interview question. More coding analysis of the interviews resulted in categorizing various themes as the relationships between cases were distinguished (Yin, 2017). Following is a description of the finalized categories and themes as per this multiple case study, illustrating how coding was done for each of the identified categories and themes.

In total, five conceptual categories enclosing a total of 15 themes were identified for this study. The categories are (a) relationship with trainers, (b) materials provided by trainers for sustainable land management, (c) land management strategies needed by farmers, (d) sustainable land management activities favored by farmers, (e) unfavorable conditions for smallholder farmers. I highlighted keywords and phrases which I considered consonant to answer the interview questions as soon as the data were entered, and my thematic analysis was carried out by recognizing, identifying, and recording

patterns from the interview discussion. Words and phrases considered pertinent to answer the study's central research question were highlighted from each participant's transcribed interview.

Being a novice researcher, the descriptive manual coding method was more comprehensible for me to use than Computer Assisted Qualitative Data Analysis (CAQDAS) software programs for my study's data analysis process. The data analysis considered all data obtained from the study's archival data (reports from well-established NGOs on the smallholder farmer crisis in Zimbabwe and white papers on sustainable land management techniques for smallholder farmers in sub-Sahara Africa) and my reflective field notes that were kept throughout the data collection process to reflect on during the within-case and cross-case data analysis. I identified themes and patterns while conducting content analysis and attributed nonrecurring evidence to their respective individual case compositions. Codes were assigned to extracted and evaluated data segments and recorded against each interview question. Codes were further accrued into themes by identifying and distinguishing similarities across cases (Yin, 2017). Finalized conceptual categories and themes for this multiple case study are further presented and described below to exemplify each category's coding process and theme.

Coding: Relationships with trainers

Themes: 1) Few face-to-face interactions; 2) Distant agricultural trainers

Coding: Materials provided by trainers for sustainable land management

Themes: 1) Written materials such as manuals and brochures; 2) Radio programs on farming; 3) Mobile messaging

Coding: Land management strategies needed by farmers

Themes: 1) Land tenure and legal rights; 2) Access to credit; 3) Innovative methods to access water resources; 4) Innovation methods for soil fertility; 5) Modern cultivation methods

Coding: Sustainable land management activities favored by farmers

Themes: 1) Updated agricultural education and technology; 2) Modernize cultivation practices 3) Financial services tailored to smallholder farmer needs

Coding: Unfavorable conditions for smallholder farmers

Themes: 1) Unjust farming policies; 2) Lack of land tenure rights

The five conceptual categories are grounded in the study's conceptual framework. This includes two conceptual models: first, the sustainable livelihoods framework (Ashley & Carney, 1999), which "provides an understanding of the livelihoods of local communities being studied, what assets they have, and what they do/can do with these assets" (Yaro, 2004, p. 9), and, second, the environmental entitlements framework, which focused in the broader influence and importance of diverse institutions operating at multiple-scale levels from micro to macro, which influenced who had access to and control over what resources within a specific environment and that arbitrate contested resource claims (Leach et al., 1999).

In previous studies, the sustainable livelihoods framework has been promoted as a valuable framework for analyzing how farmers could acquire and maintain resources for their work (Nikolakis & Grafton, 2015). Researchers using the sustainable livelihoods framework and then the environmental entitlements framework as a theoretical lens have

gathered farmers' information, such as who gained what, what assets the farmers accumulated, gender and distribution of assets, and how assets have improved their livelihoods. In this study, the conceptual framework was used as a theoretical lens to understand the specific knowledge gaps among smallholder farmers in Zimbabwe (see Dube, Homann-Kee Tui, Rooyen, & Rodriguez, 2014). Further elaboration on the logical connections among critical elements of the framework to the study's purpose and its relation to the study approach, research questions, and research method was provided in Chapter 2.

Presenting case study research findings can be done in different styles according to the work's purpose, the kind of analysis undertaken, and the intended readership. In this case, participant quotes' personation of category and themes considering that the research goal was to give voice to a previously unheard population through this purposive sample (Corden & Sainsbury, 2006). The following is a description of this multiple case study's finalized categories and themes, along with respective examples of participant quotations (Table 2) to represent each of those categories and themes.

Table 2

Category and Theme Examples

Participant	Interview excerpt	Coding category	Themes
Participant 6	"Agricultural officers live very far away from the majority of the smallholder farmers. They government does not have money for officers to make those necessary trips. "	Relationships with trainers	1. Few face-to face interactions. 2. Distant agricultural trainers
Participant 3	"When the agricultural officers come to our area, they bring manuals and brochures."	Materials provided by trainers for sustainable land management	1. Written materials such as manuals and brochures; 2. Radio programs on farming; 3. Mobile messaging
Participant 4	"we need to change our methods of cultivation in order to boost crop productivity. We need cultivation method that can help farmers to produce more. We need to learn other methods of cultivation that are compatible with variation of weather and climate change. We need to learn the methods of cultivation that preserve moisture, and maintain soil fertility. We are using the cultivation methods that has been passed on from generation after generation. The cultivation methods we are currently using is not helping us anymore. We need the government to help. The extension offices are encouraging us to use other methods of cultivation."	Land management strategies needed by farmers	1. Land tenure and legal rights; 2. Access to credit; 3. Innovative methods to access water resources; 4. Innovation methods for soil fertility; 5. Modern cultivation methods

Participant	Interview excerpt	Coding category	Themes
Participant 1	"I totally believe that educating farmers to be environmentally sustainable is very important because it promotes improved productivity among smallholder farmers. Our experience so far is that smallholder farmers, we do not have access to literacy, agricultural resources and information that is critical for farming development. It is important for smallholder farmers, especially woman to learn the sustainable technology skills and productivity outcomes. There are no programs like that in the country."	Sustainable land management activities favored by farmers	1. Updated agricultural education and technology; 2. Modernize cultivation practices 3. Financial services tailored to smallholder farmer needs
Participant 2	"The land belongs to the government. The government pronounce what it means by legal rights, the policies and legislation. Whatever the government say impact our decisions as smallholder farmers. The legal rights are on paper, however, the truth is that we do not have the legal rights to the land. This impact our lives as smallholder farmers because we live at the farm and we have no other home. The action by the government determine that we have a place to live. Evictions takes place on daily basis. We are living in fear because the farm is also our home."	Unfavorable conditions for smallholder farmers	1. Unjust faring policies; 2. Lack of land tenure rights

Participant	Interview excerpt	Coding category	Themes
Participant 7	"Financial Services Organizations do not help smallholder farmers. They tend to help big commercial farmers who grow tobacco, cotton, and soya beans."	Sustainable land management activities favored by farmers	1. Updated agricultural education and technology; 2. Modernize cultivation practices; 3. Financial services tailored to smallholder farmer needs
Participant 5	"Legal rights are on paper only but it is correct to say that no one owns land in Zimbabwe. Land is on lease for 99 years. Past independence land reforms have largely failed to address the fundamental issues of equitable land distribution. The land was distributed in a way that reinforce the threats to social, economic and environmental sustainable. The skewed distribution of land and resources, insecure rights, and the marginalization and restriction of livelihood system have persisted. I think that under a more secure tenure system, as farmers, we are likely to have some long-investments, likely to influence us to invest in property investment, and likely to influence us to invest in permanent housing facilities. The land lease policy is a constraint in farming communities. "	Unfavorable conditions for smallholder farmers	1. Unjust faring policies; 2. Lack of land tenure rights

Evidence of Trustworthiness

Credibility

Credibility is established when there is confidence placed in the qualitative research findings (Anney, 2014). Qualitative research aims to understand the phenomenon experienced as viewed from the participants' eyes, in this context, the smallholder farmers in Zimbabwe. They are the only ones who can be a legitimate judge of credibility to the results. I interviewed seven participants individually for 30 to 50 minutes over the phone or Skype. I explained to the participants that they might end the interview at any time. I wrote down and record their answers electronically. I sent every participant their transcribed responses for a transcription review. Triangulation was facilitated to make sure the participants could review both the data collected and the interpretation I made about the interview data. The minimum number of interviews required for a qualitative, multiple case study should be five participants, and I continued past this number until I reached data saturation, which was seven participants, with similar data noted from participants 5, 6, and 7 (see Halkias & Neubert, 2020; Schram, 2006).

Transferability

Transferability refers to the degree to which the qualitative research results can be generalized to other situations and applications in other settings or groups (Anney, 2014). To ensure transferability, I provided a detailed and thick description of the study results. My final report has extensive detail and explicit descriptions of field notes, observations, sample characteristics, data collections, and interpretation so that the reader can

determine that the conclusions made by the researcher are transferable to other settings, situations, or groups (Houghton et al., 2013).

Dependability

I ensured detailed documentation of all the participants' selection procedures, contacting participants, interview recordings, interview transcription, and data analysis. With my Dissertation Committee serving as external auditors, the dependability of the findings was such that one might predict they could be replicated with similar participants under similar conditions (Cohen, Manion, & Morrison, 2011; Koch, 2006). I further ensured dependability of this study's results by grounding the conceptual framework in widely accepted theoretical foundations supporting: a) the sustainable livelihoods framework (Ashley & Carney, 1999), which "provides an understanding of the livelihoods of local communities being studied, what assets they have, and what they do/could do with these assets" (Yaro, 2004, p. 9), and, b) the environmental entitlements framework, which focused in the broader influence and importance of diverse institutions operating at multiple-scale levels from micro to macro, which influences access to and control to resources within a specific environment (Leach et al., 1999). This theoretical grounding ensured alignment between the study's outcomes and other existing knowledge in the literature regarding the specific knowledge gap among smallholder farmers in Zimbabwe on sustainable land management practices and presented a barrier to training these farmers on innovative agricultural practices tailored to their needs. All data used or obtained during this study were securely and adequately preserved.

Confirmability

Confirmability is the degree to which an inquiry's results could be confirmed or corroborated by other researchers (Anney, 2014). The results must remain free from the researchers' bias or reflexivity and corroborated by other researchers (Billups, 2014). Confirmability of a qualitative inquiry can be achieved using audit trail, reflexive journal, and triangulations (Billups, 2014). Confirmability is crucial in a rigorous qualitative study. The results reflect the truthfulness of the participants' perspectives, in this case, the smallholder farmers in Zimbabwe. The audit trails supported the participants' perspectives in contrast to reflexivity, representing offsetting preconceived notions about the researcher's research (Billups, 2014). The strategy to use participants to validate the responses is a valid technique to establish trustworthiness in a qualitative study (Kornblush, 2015).

Study Results

Extant theories can be expanded and enhanced with a multiple-case study design where the researcher gathers data to answer a qualitative research question (Yin, 2017). Extension of theory using a multiple-case study design can further define the original theory's boundaries. Multiple cases are like multiple experiments; the previously developed theory can be compared and extended to account for the study's novel results (Halkias & Neubert, 2020). By recording specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs, a more in-depth understanding was provided to answer the research question. The central research question that led as a guide for this study was as follows: "What are the specific

knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices?"

This multiple-case study revealed the participants' ideas, perceptions, and experiences from the data analysis in related themes and patterns presented in the study results. The data analysis techniques to produce the study's results are presented in this section in a two-step procedure: (a) thematic analysis of the textual data and (b) cross-case synthesis analysis (see Yin, 2017). The primary intention behind the two-step process in the data analysis phase was to develop thick, rich descriptions emerging from each smallholder farmer in Zimbabwe that could further unveil their experiences and views on specific knowledge gaps with sustainable land management training and practice (see Stake, 2006).

The cross-case analysis is utilized when the unit of analysis is a case, a bounded unit just as an individual, artifact, place, event, or a group (Yin, 2017). The data evaluation approach was centered around a cross-case synthesis to merge the primary outcomes of within-case analysis and further develop themes for a multiple case analysis (see Halkias & Neubert, 2020). Studies involving many cases often use meta-analysis to identify cross-case sequences, but this study made use of Microsoft Excel because of the relatively low number of cases involved in this study. The issues of complexity and difficulty in identifying links and patterns associated with the investigation of real-life experiences can be controlled by carrying out a cross-case correlation that enhances the study's validity and generalization (Yin, 2017). Using a cross-case technique helps achieve an organized analysis of the reasoning connecting the research data to the study's

concept. The trustworthiness of data was strengthened by using fact-based logical reasoning based on data homogenization, reduction, and clarification (Cooper & White, 2012; Yin, 2017)

First Phase: Thematic Analysis of the Textual Data

I followed the seminal methodology literature that recommends how to conduct a relevant and rigorous thematic analysis (Nowell, Norris, White, & Moules, 2017). The thematic analysis's written narrative provides "a concise, coherent, logical, nonrepetitive, and interesting account of the data within and across themes" (Nowell et al., 2017, p. 1). In this study, thematic analysis was utilized in analyzing the contents of the interviews and documented data (Merriam & Tisdell, 2015). In developing a case study database, themes are identified, views, significant words, or analyses in the documented work are considered reliable, referred to, and attributable (Yin, 2017). The transcribed interviews were organized and analyzed through content analysis to developing themes from the data (Hatch, 2002; Yin, 2017). Reflective field notes were among data sources utilized in triangulation, augmenting the triangulation of proof from several sources and enhance the research's reliability and validity (Katz, 2017).

A thematic analysis consists of a clear presentation of the logical processes that depict how the findings were developed overall, so the implications of the study results are considered trustworthy (Boyatzis, 1998). The thematic analysis that I conducted for this study followed Gummesson's (2017) suggestion to include direct quotes from participants as a foundational element of the final report. Supported by key insights from

the seven in-depth interviews, this section presents the 15 themes that emerged and are analyzed and presented, providing answers to the central research question

Few face-to-face interactions. This theme refers to face-to-face interactions between the training staff and Zimbabwe smallholder farmers as one of the best practice strategies in farmer training on sustainable land management issues. Smallholder farmers in Zimbabwe must have access to personnel and the services they offer, such as disseminating sustainable land management strategies and breaking down barriers to sustainable livelihoods for these farmers and their families (Bjornlund et al., 2019; Chagumaira et al., 2016). Participants discussed they face various challenges in having personal time to discuss or receive advice from government personnel assigned to support their sustainable land management protocols.

Participant 6: "Agricultural officers live very far away from the majority of the smallholder farmers. They government does not have money for officers to make those necessary trips. They agricultural offices visit smallholder farms between two and four times the whole year. The meetings are very short and they leave without addressing all the questions that the smallholders have".

Participant 7: "Here in Matebeleland North, …we never see extension officers here at all. If you want information about agriculture, you have to go to the district office to get some brochures and manuals written in English. The district office is very far. You need to take a bus…We don't have any training at all."

Distant agricultural trainers. The theme focuses on agricultural extension officers' role as they look for possible ways to intervene and support smallholder farmers

on sustainable land management in Zimbabwe. Food production and food security could be improved if smallholder farmers receive appropriate training and support (Cordingley et al., 2015; Muchesa et al., 2019). The participants have a negative perception of government-backed extension support. The reason for such a negative perception is that the extension officers are hardly available, they live far away from the smallholder farmers who need them, and they are not knowledgeable enough, and they do not offer a practical solution (Muchesa et al., 2019).

Participant 6: "Agricultural officers live very far away from the majority of the smallholder farmers. They government does not have money for officers to make those necessary trips. They agricultural offices visit smallholder farms between two and four times the whole year. The meetings are very short and they leave without addressing all the questions that the smallholders have."

Participant 7: "Here in Matebeleland North, all we know is having political meeting. We never see extension officers here at all. If you want information about agriculture, you have to go to the district office to get some brochures and manuals written in English. The district office is very far. You need to take a bus. At the agriculture office, you can ask any question. We don't have any training at all."

Written materials such as manuals and brochures. The theme refers to the appropriate communication strategies that can achieve the desired result at an appropriate period when training smallholder farmers. Written and electronic training materials, such as manuals, posters, calendars, videos, are useful training tools tailored to smallholder farmers' needs, and using local languages will enhance their frequent use among the rural

population. The participants face challenges in obtaining written training materials from extension officers and have difficulties transferring their learning into their fields.

Participant 3: "When the agricultural officers come to our area, they bring manuals and brochures. They do not bring enough for everyone. They bring just few. Their argument is that they do not have money to print more. They encourage us to share the materials. These brochures and manuals are written in English. If you are a smallholder farmer who does not read and understand English, these manuals and brochures are useless. I never attended the meetings. "

Participant 6: "When they come to visit the smallholder farmer, agricultural offices bring few written manuals and brochures mostly written in English and majority of smallholder famers are not educated enough to read and understand English without help. The reason agricultural offices bring very few brochures and manual is because the government does not have money to pay printing expenses."

Radio programs on farming. The theme refers to state radio use to communicate agricultural information and training to smallholder farmers in Zimbabwe. Radio is a powerful communication tool and can improve agricultural information sharing by remote rural farming communities. Smallholder farmers in Zimbabwe must have a community radio service to serve as a preferred medium of communication on agricultural information, and their language and accents can be used and contribute to the program content (Nyareza & Dick, 2012). Smallholder farmers who live in remote rural farming communities can benefit from rural radio when used as a tool for agricultural extension and development concerning the dramatically changing technology

environment currently influencing information and communication processes worldwide. The participants have discussed a need for extension officers to develop national communication techniques and media strategies that can be employed to train and support agricultural extension efforts, mainly using local languages and rural radio that can communicate directly to smallholder farmers. All the smallholders who participated in the interview were aware that the government was too broke and, at the same time, very disorganized to set up a radio station predominantly for agricultural clientele in the remote area of Zimbabwe.

Participant 4: "Radio and cellphone are widely used. There are farming programs on the national radio on Saturdays and Sundays. Farmers with radios benefit from those radio programs. Many smallholder farmers do not have radios."

Participant 5: "The state radio station has agricultural programs every Sunday mornings. The programs involve teaching about how to take care of the land, how to cultivate, planting techniques, how to take care of the soil both out of season and farming season. The programs are very helpful but majority of smallholder farmers have no opportunity to learn from the programs because very few smallholder farmers have radios as home."

Mobile messaging. The theme refers to mobile phones and mobile information and new communication technologies that transform how people interact. Mobile messaging can be an essential tool that can be used by extension officers and remote farmers to share agricultural information and training on sustainable land management strategies. Several studies have indicated that mobile phone is the only technology

accessible to many inhabitants in rural Africa and therefore, across social strata, urban and rural divides, and rich and poor divides, it is facilitating the connection between people, access to information, access to markets, and access to service (Musungwing, 2018). In most cases, the respondents stated that information is asymmetrical, and information absence is a significant impediment to smallholder agriculture development. Fundamental causes cited for these difficulties were the government's weak agricultural support and the extension officers' distance training.

Participant 3: "Radio and cellphone are widely used. There are farming program on radio on Saturdays and Sundays. These programs are only useful for farmers who own a radio. Majority of smallholder farmers do not own a radio and they will never benefit from the radio programs. A good size of smallholder farmers have cellphone. The cellphone are only useful for immediate information and to relay messages. There are no internet kiosk, computers video or radio to aid in agricultural development."

Participant 4: "Radio and cellphone are widely used. There are farming programs on the national radio on Saturdays and Sundays. Farmers with radios benefit from those radio programs. Many smallholder farmers do not have radios."

Land tenure and rights. The theme refers to the value and ownership of land as the fundamental asset for social, political, and economic sustainability, which provides ecosystem services, generates livelihood, and accumulates wealth for rural communities in developing countries like Zimbabwe. Land tenure and rights are defined as the sum of rules recognized in law underlying land ownership, allocation of land rights, the substantive content of those rights, their protection in law, their disposal and extinction,

as well as their regulation. There is a strong relationship between tenure security farm investments by smallholder farmers and sustainable agriculture and rural development. Lack of tenure security in the farming sector constrains farmers' access to credit, farming investment, technology adoption, and sustainable agricultural development and productivity. When land tenure is secure, land can be a cornerstone for economic growth and investment (Chirisa et al., 2014). Participants have perceived that in large segments of rural societies, they have been denied equitable access to land, the land belongs to the government, they do not own the land, the result is the unanticipated cost to their livelihoods such as dependence, social instability, and extreme poverty, civil unrest, and conflict.

Participant 1: "As smallholder farmers, we have been advocating for the security of tenure in the agriculture sector for many years. Lack of tenure security in the farming sector constraints us from borrowing the money we need for our agricultural development, particularly in technology adaptation, sustainable agricultural development, and productivity. The financial market need us to show them assets we can use for collateral. We are considered as bad and risky customers. We cannot use the land because the land is not ours. We are leasing the land from the government. The land is not ours."

Participant 2: "Let us not forget that the land belongs to the government. No one owns lands. All smallholder any diseases or other problems that are likely to cause national problems. The idea of leasing farmers have been given land, they are leasing the land from the government. They land is on lease for 99 years. I think that this is what need to be fixed. The government is not helping smallholder farmers with money to buy

farming equipment, inputs, or education how to do well in farming. They have very few extension officers to come to farmers at sporadic times to see if there are the land confuses a lot of smallholder farmers. It is hard for them to invest in the land which is not theirs. Eviction is taking place on daily basis. In actual fact, the smallholder farmers have no rights to the land. As such, the effort to do well in agriculture is hampered this issue of land tenure and rights."

Access to credit. The theme refers to the ability of smallholder farmers in Zimbabwe to borrow money in order to increase the purchasing power for better farm inputs and agricultural technology for high crop productivity as a vital role to reduce poverty and hunger, food security and also support the economic gross domestic product of the country. Access to financial services is critical to provide funds for farm investments in productivity, improve post-harvest practices, smooth household cash flow, enable better access to markets, promote better risk management, manage climate change and capacity to make farm-related investments as well as risk behavior in technology choice and adoption (Dube, Mariga, & Mrema, 2015; Herald, 2013; Mago et al., 2013). Despite all the potential positive contribution of agricultural finance, participants discussed significant problems accessing credit with formal institutions. Credit is not readily available to smallholder farmers due to the institutions' lending policies that make access difficult through complicated application procedures and credit restriction, particularly lack of collateral, high-interest rates, liquidity problem, and lack of insurance can be used as a guarantee.

Participant 1: "We need credit to increase productivity and efficiency in agriculture. We need money to buy input goods such as fertilizer, farming machines, and improve inputs needed for agricultural needs. We need assets that we can use as collateral. Land is not ours, land is being leased to us for 99 years and we cannot use it. Because of this reason that we are poor and have no assets to use as collateral, we are blocked to approach banks to apply for loans. We literally have no access to credit."

Participant 2**: "**Banks and all finance houses do not want to deal with smallholder farmers. They regard us smallholder farmers as bad customers. In order to get money from the bank or finance houses, you need to have collateral. We cannot use land as collateral because land belongs to the government. Even if you have a house with a value of a million dollars, when the house is on the farm, they know you do not own the house. The government is not helping us to get money for farming. In brief, we do not have access to credit."

Innovative methods to access water resources. The theme refers to innovative approaches and solutions needed to sustainably increase the productive use of water resources to enhance smallholder farmers' livelihoods, such as sand river aquifers that can provide nature-based water storage within easy reach are shallow. Jayne et al., 2014; Duker et al., 2020). Extreme weather is becoming more common in sub-Saharan Africa. Droughts and accelerating climate change impact the lives of smallholder farmers in Zimbabwe to the extent that small-scale irrigation is emerging as a top priority to boost food security, eradicate poverty and build resilience against climate change impacts. However, respondents stated that a successful irrigation system requires funding. Access

to credit through formal institutions is nonexistent due to the inability to provide collateral for loans, and all of the seven participants did not have credit. All the participants did not have the credit needed to finance imports for land improvement, including irrigation schemes. Almost all participants did not have bank accounts.

Participant 5: "There is a need to discuss conserving and reusing water because of drought. We have not received water for the last three years. Our livestock perished. We think that the government is seeing the situation and think that they can come up with something. We ask extension officers what they think. The government is silent, and our smallholder farmers' community, we have no knowledge of what we should do to restore water. We would want to build dams but it requires money and labor. We would want to build underground water storage tanks, but it require us to have money and good technology for that. We are poor smallholder farmers. The challenges we face is beyond our reach."

Participant 7: "I have already talked about the new farm owners, majority of us here are uneducated and even lack basic knowledge of farming. While there is a need to learn new ideas related to innovative methods to access water resources, the ideas are not gaining tracks in the farming areas. To make things change, we need to go back to farming school. The government is not supporting anyone in our areas. The government does not have any plan to finance the smallholder farmers. Nothing is being suggested for smallholder farmers. We do not have the ideas, tools and money. Nothing is happening here in Matebeleland North."

Innovative methods for soil fertility. The theme refers to the new approaches smallholder farmers in Zimbabwe must consider regarding the health of the soil as it provides the foundation for the productivity of farming systems, the food and nutrition security of societies, and the improvement of livelihoods and alleviation of poverty in the world (Heger et al., 2018). Zimbabwe's soil is unhealthy and, in its current state, cannot provide adequate crops for the country's smallholder farmers mainly due to years of crop nutrient-mining and limited organic or inorganic resupply(Zachary et al., 2020; Jayne et al., 2014). To improve soil fertility, smallholder farmers must overcome limiting soil fertility factors such as nitrogen deficiency, low soil organic carbon content, phosphorus deficiency, acidity, micronutrient deficiency, and low water-holding capacity (Zachary et al., 2020). Respondents identified socioeconomic limitation to enhance soil fertility in their farming area such as access to financial resources, availability/capacity of public sector extension, suitable information on the composition of manures and other C-rich soil amendments, availability of private sector service providers, access to mechanization and the issue of land tenure (Jayne et al., 2014; Zachary et al., 2020)

Participant 2: "The smallholder farmers have been given land that has been farming for many years. The old farmers were whites, and they were very experienced in farming. They knew many methods to restore soil fertility. They used many methods, such as mulching, composite manure, cow manure, and fertilizer. They had tractors and other farm equipment to aid them in accomplishing their objectives. We inherited farms that needed extra work to restore soil fertility. When we were given the land, we did not have the means to maintain the soil. We don't have help from the government or from

abroad. This is our life. The other problem is that the land is not ours, we are leasing. Many people do not want to invest in the land because it is not ours and we have witnessed the government evicting people from the land."

Participant 4: "The only way we know how to keep soil fertile is using of cow dang. Fertilizer is too expense for many smallholder farmers. Many smallholder farmers cannot afford it. Many farmers do not have cows. We are quite aware that the soil is tired and needs our attention. Most smallholder farmers, we are ignorant as to what we should do to increase soil fertility. All the methods we know, they require us to own cows or have transportation. We need to learn how to retain nutrients for the soil apart from cow manure. These are the things that we expect that the extension officers should teach us."

Modern cultivation practices. The theme refers to agricultural mechanization and other modern cultivation practices and crucial input for smallholder farmers in Zimbabwe. It can facilitate increased output of higher value products while eliminating the drudgery associated with human muscle-powered agricultural production. As one of the modern cultivation practices, agricultural mechanization should be environmentally compatible, economically viable, affordable, adapted to local conditions, and, given the current developments in the weather pattern, climate-smart. There is no doubt that the application of farm power top appropriate tools and machines are essential agricultural inputs in sub-Saharan Africa with the potential to transform the lives and economies of millions of rural families (Bouldron et al., 2013; FAO, 2016). The participants acknowledged the importance of agricultural mechanization and expressed their

challenges to purchase costly imported farm machinery, combined with training, machine parts, and repair costs.

Participant 6: "We have been using the traditional approach that has been used a long ago. For example, the use of donkey and cows to pull the plow. Every smallholder farmer in Zimbabwe, if not all of Africa use this method. We depend on rain in order to plough the land. We can't plough when the land is dry. The only better method of cultivation is using the modern technology, like using tractors. The smallholder farmers don't have money to invest into modern cultivation methods. We would need the training to use the modern technologies. Even if we are given a tractors and all the cultivation tools, we do not know how to service the tractor or buy a part if the tractor happens to have a broken part. Parts are bought overseas. I believe if there was other ways of cultivation the land that that will improve our output, I am sure we would look at it. That means, other ways of cultivation can help maintaining our soil fertility and moisture and in turn increase our crop productivity. The traditional method of cultivation is not protecting the soil's fertility, it is adding in destroying the land. We cannot practicing sustainable land management when we continue to use the same method of cultivation. The problem we have is that we can change from the traditional method because we do not have the resources to do so."

Participant 3: "The only benefit we have is to understand that there are other ways of cultivating land. However, as smallholder farmers in Zimbabwe, the only method we have known for centuries is the traditional method, using cows and donkey to pull the plough and for those with no cows or donkeys, they use hoes to dig the land. The

government is poor and the farmers are poor. The cost of modern methods of cultivation is beyond smallholder farmers' reach in Zimbabwe and probably most of Africa as a continent."

Financial services tailored to smallholder farmer needs. The theme refers to Zimbabwe's agricultural problems as contributed by the lack of financial support and total neglect by banks and other financial service organizations. The key stakeholders, the financial services organization in Zimbabwe, should have a more holistic understanding of smallholder farmers' financial services needs and should have an enhanced understanding of designing and launching customized financial products for the smallholder farmers. Financial service organizations should tailor financial models specifically for smallholder farmers such that with training and access to finance, smallholder farmers can purchase livestock, crop production, and farm inputs (Makate et al., 2017). Participants discussed they have a long history of financial exclusion since the pre-independence period. This financial exclusion is due to a lack of faith in smallholder farmers' loan repayment. It is complicated to qualify for a loan. The collateral terms require smallholder farmers to provide information for title deeds, land tenure information, immovable property, and bank accounts' financial records. More than 80% of the smallholder farmers interviewed had no bank accounts.

Participant 4: "Both formal and informal segments characterize financial services in Zimbabwe. There is a very low level of interaction among the operators. Unfortunately, smallholder farmers are not included in the financial system. With that view, the smallholder farmers take the view that they are not in existence in Zimbabwe.

They do not want to deal with us. They think we are uneducated and very poor, we lack the necessary knowledge and skills required in farming and how to handle issues of money for development purposes."

Participant 3: "There are almost 26 operational banking institutions regulated by the Reserve Bank of Zimbabwe (RBZ). The supply of financial services has been significantly affected by the economic collapse. The shortage of funds in the market has limited the provision of services and make them generally expensive. Contact farming companies are a significant source of funding for smallholder farmers and have a knock-on effect on rural economies. Collateral available for credit purposes was significantly diminished as a result of the land reform program. This has greatly affected the willingness of most commercial providers to provide services to many potential clients. Government involvement as a supplier of finance to the agricultural and rural sectors remains limited due to a lack if allocation of resources. Donors continue to be an important source of finance for rural development and for the development of the agricultural sector."

Unjust farming policies. The theme is focused on agricultural risks compounded by the Zimbabwe government's extremely dubious agricultural policies and the policies that fail to promote sustainable agricultural practices to the smallholder farmers to improve yields and reduce poverty in the country. Agricultural policies should involve strategies that improve management and sustainable use of land (World Bank, 2014). Smallholder farmers interviewed discussed that the government faces a problem designing agricultural policies that promote sustainable practices to its people as land

ownership is politicized. The land is leased to the government's supporters and controlled by the political party associated with the government.

Participant 1: "The land is attached to the government, it is the property of the government. Any discussion about legal rights and policies, legislation, and regulation that impact your livelihood is a constraint to smallholder farmers. These small parcel of land distributed to us by the government, this is where we grow our food, and this is the place where we live. The government continue to evict people from these farms. Leasing the land to you for 99 years is only on paper, smallholder farmers don't own any land. This idea scares many smallholder farmers to invest and develop the farms because they can be evicted."

Participant 2: "The land belongs to the government. The government pronounce what it means by legal rights, the policies and legislation. Whatever the government say impact our decisions as smallholder farmers. The legal rights are on paper, however, the truth is that we do not have the legal rights to the land. This impact our lives as smallholder farmers because we live at the farm and we have no other home. The action by the government determine that we have a place to live. Evictions takes place on daily basis. We are living in fear because the farm is also our home."

Lack of land tenure and rights. The theme focuses on one of the significant challenges involving government informal land deals, limited and acceptable land tenure, and Zimbabwe citizens. Security in land tenure rights is essential because the tenure system hinders smallholder farmers from investing in land and poses a critical barrier to accessing credit loans (Chirisa et al., 2014). Participants discussed considerable

challenges to accessing agricultural loans because they lack collateral term requirements information such as providing information for title deeds, information related to land tenure, immovable property, and financial bank records.

Participant 3: "Legal rights are on paper only but it is correct to say that no one owns land in Zimbabwe. Land is on lease for 99 years. Even if you have been allocated land, there is no guarantee that you can use the land for the 99 years mandated by the government. So many people have been evicted from the land they were given. The government and politics is heavily involved."

Participant 6: **"**No one owns land in Zimbabwe. The land belong to the government. The land that smallholder farmers have has been leased to them by the government. The duration of lease is 99 years. The government gave us the land based on our support to the ruling political party. What is surprising is that there are many smallholder farmers who are being evicted these years because the government thinks they don't support them politically. The one thing is very critical to smallholder farmers in Zimbabwe. There is no security to the land. As a result, there is nothing to motivate you to develop and invest in the farm. Smallholder farmers want this to be changed because this is not giving you security. We desire to discuss the issue so we can have full ownership of land."

Second Phase: Cross-Case Synthesis and Analysis

I utilized the cross-case synthesis analysis technique to incorporate critical findings across individual cases and arrange themes across the seven cases in this study to identify patterns across cases instead of the meta-analysis associated with large numbers

of case studies (Yin, 2017). Real-life can be complicated, and participants' experiences may not be immediately observable through a one-stage thematic analysis of the study's textual data. To this end, I utilized the cross-case synthesis method to strengthen the data's trustworthiness and allowed the transferability of results to groups similar to the study sample (Eisenhardt, 1989; Stake, 2006). By consolidating and interpreting, I established an evidence-based argument to be analyzed through the study's conceptual framework (Cooper & White, 2012).

Theory extension from case studies represents an important research strategy (Bonett, 2012). It can contribute theoretical insights that are both rich and weighted on under-theorized phenomena and yet inadequately explored. Entailing extensive immersion into a focal phenomenon, case research is appropriate for answering research questions regarding "how." Rigorous research projects engender new theoretical insights related to "big picture" research questions that seek to fill critical gaps and dilemmas in theory. Comparing multiple cases makes it possible to "test" the theory emerging in each successive case using replication logic (Yin, 2017). Approaches used in comparing and contrasting cases (e.g., A to B, A to C, and B to C) compel the researcher to investigate and treat the data from more than one perspective and utilizing various combinations (Halkias & Neubert, 2020). For example, relevant constructs can be identified by distinguishing differences and similarities across the cases. Measures of constructs can be summarized in tables (Miles, Huberman, & Saldaña, 2014).

The cross-case analysis was an iterative process, and I first analyzed each of the seven cases separately. Recurrent themes were identified across the data to meet the

study's purpose of understanding specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs. The cumulative frequencies of occurrence for each theme are illustrated in Figure 3, in which I combined the data analysis from each case while analyzing the convergent and divergent data across the seven cases. Figure 3 presents a multiple case study cross-case synthesis graph as a visual representation of smallholder farmers' views in Zimbabwe on how to tailor sustainable land management training to their needs.

Using cross-case synthesis, I systemically identified the convergent and divergent data across cases and removed any minor data unrelated to the study (see Yin, 2017). The cumulative theme frequencies of occurrence by the participant are illustrated in Figure 3, in which I combined the thematic analysis results from each case to graphically provide the reader with an idea of how many themes converged across cases based on the findings of this multiple-case study.

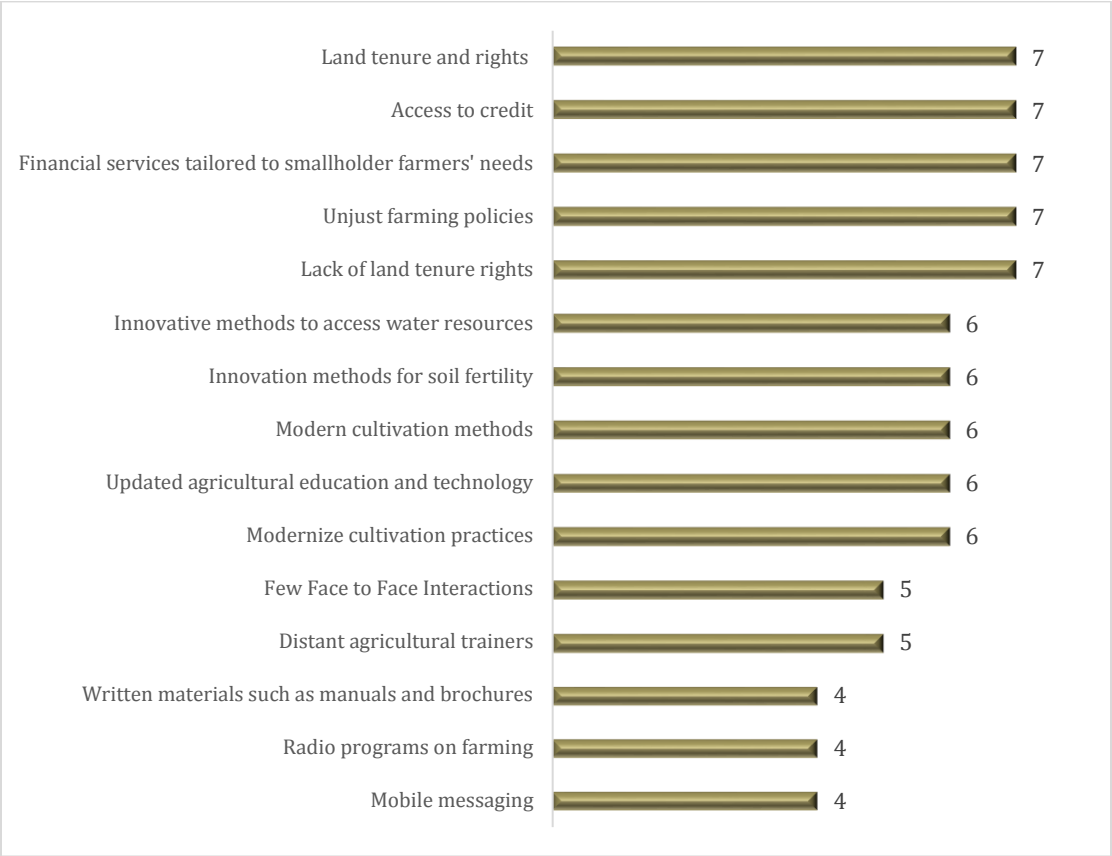


Figure 3. Multiple case analysis (theme frequency of occurrence by participant).

The cross-case analysis was an iterative process, and I first analyzed each of the seven cases separately. The cumulative frequencies of occurrence for each theme are illustrated in Figure 3, in which I combined the data analysis from each case while analyzing the convergent and divergent data across the seven cases. To apply these results to tenure extension within my study, I looked deeper into the themes that figured prominently across the data collected from all seven cases. These themes were expanded on through the interviews by either six or seven out of the seven participants.

All seven participants provided detailed interview data on the following themes: land tenure and rights, access to credit, financial services tailored to smallholder farmer

needs, unjust farming policies, and lack of land tenure rights. All of the themes mentioned above surround the critical issue of inadequate legal and regulatory protection for smallholders' farmlands in rural Zimbabwe. The issues represented by the study's themes remain part of daily challenges that will not allow Zimbabwean smallholder farmers to have active participation in developing appropriate land management strategies to support their fragile livelihoods. Since the Fast Track Land Reform Programme measures were enacted in Zimbabwe, ethnographic and auctioning learning researchers have been in the field documenting barriers to the adoption of sustainable land management practice by smallholder farmers (Scoones, 2015).

The barriers impacting both delivery and adoption of sustainable land management practice reported by these smallholder farmers include economic capacity, weak information technology development, lack of knowledge dissemination (Johnson et al., 2016), inadequate irrigation systems and water delivery, degraded soils (Nezomba et al., 2017), conflicts among different interest groups, and inadequate government policies (Bertin et al., 2014; Kellner et al., 2018; Khan & Akhtar, 2015). Due to these barriers, smallholder farmers in Zimbabwe are undermined and disempowered in building economic and social capital towards long term agricultural suitability, including lack of timely access to affordable agricultural inputs, volatile output markets, lack of access to climate information, and lack of access to land and improved production technologies. These factors add to the myriad of problems leading to smallholder farmers' vulnerability to build sustainable livelihoods primarily from rain-fed agriculture (Khan & Akhtar, 2015).

The following themes figured prominently in the interview data across six out of the seven cases: innovative methods to access water resources, innovative methods for soil fertility, modern cultivation methods, updated agricultural education and technology, and modernize cultivation practices. These six participants emotionally expressed the stress and despair faced by smallholder farmers in Zimbabwe exposed to different stress factors associated with climate change, economic and sociopolitical change processes, and the limited response capacities of these farmers (Casale et al., 2010; Khan & Akhtar, 2015). Unfavorable weather conditions compounded by the "El Nino" weather, power shortages, insufficient liquidity in agricultural markets, and limited access to agricultural credit will continue to threaten agricultural production over the projected period (Green, 2016). Arid environments compounded by climate change have adversely impacted agricultural production, water, health, forestry and biodiversity, rangelands, human settlement, and tourism (Brown et al., 2012).

Rainfall is also critical to Zimbabwe's water utilities and hydroelectric power subsector. Power, water, and agriculture all have direct implications on poverty trends (Makonese, 2016). The continued impact of the drought caused agricultural output to contract in 2016 (World Bank, 2016). Traditional farming practices by most landholders in Zimbabwe are barriers to adopting sustainable techniques (Scoones, 2015). In most developing countries, particularly in sub-Saharan countries of Africa, farming practices are not easy to change (Dicecca et al., 2016). Landholders have to continually deal with agricultural practices that hamper their ability to adapt and develop innovation. As in many developing countries, landholders in Zimbabwe have neither the knowledge,

guidance or economic capacity to generate new technologies to meet their agricultural challenges(Cordingley et al., 2015)

Triangulation

Collecting data from specific populations requires that the researcher acquires community knowledge that will make the process culturally sensitive and appropriate (Scoones, 2015). Thus, it is crucial to gather appropriate instrumentation protocols that align with the purpose of the study and can provide answers to gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs (Dube et al., 2014; Mutsvangwa-Sammie et al., 2016) and contribute original data to the conceptual framework. Appropriate choice of instrumentation produced themes to support insights on specific knowledge sources of data used in this study: (a) a semistructured interview protocol (see Appendix D) whose items have been designed and standardized by previous researchers; (b) data triangulation (Guion et al., 2011); and (c) reflective field notes (Merriam & Tisdell, 2015) kept by the researcher throughout the data collection process.

Important themes and practical applications can be identified through triangulated data from a purposive sampling of five to 15 participants, given that a larger sample size can become an obstacle for an in-depth investigation (Merriam & Tisdell, 2015; Schram, 2006). The final sample size of seven cases was determined in this multiple-case study by data saturation (Eisenhardt, 1989). Multiple data collection methods from multiple sources of evidence can be gathered to provide a study's research questions, such as interviews, reflective journaling, and analysis of archived data such as government

reports and media reports on current issues challenging the fragile livelihoods of smallholder farmers in Zimbabwe (see Guion, Diehl, & McDonald, 2011). In addition to binding data sources, the codes bridged themes across various methodologies, including interviews, field notes, historical literature, and archival data (Stake, 2013). This data source triangulation strengthened this multiple case study's quality to formulate a more aggregate consideration of the data (Halkias & Neubert, 2020 Yin, 2017).

Handwritten reflective field notes were a valuable component of the data collection process. The handwritten notes supplemented the audible data recorded in the interview tape, which were translated literally; notes provided a contextual report of nonverbal behaviors such as fears and uncertainty for a more comprehensive participant interaction documentation. I provided each study participant with a copy of the transcript and requested they read and verify the accuracy of their responses; the transcripts were also useful to review researcher reflexivity (Merriam & Tisdell, 2015).

I used an interview protocol for the semistructured interviews to standardize the data collection process (see Appendix D). The research record audit trail is a synthesis of reports for member checking, coding structure, and memos on a research study's progress. I used an audit trail and data triangulation to enhance the dependability of the study results (Guion, Diehl, & McDonald, 2011). For triangulation methods during the data analysis, I referenced data from my reflective journal notes and analyzed archival data such as Zimbabwean government reports, United Nations, World Bank, NGO reports, and media articles.

After I conducted semistructured interviews with the participants, I continued the data triangulation process to answer the research question. I read and annotated peer-reviewed scholarly papers from approximately 100 scientific journals. Over the past three years, I discovered approximately 300 articles that included government, business, company, media reports, white papers, and popular media relevant to the study. These reports were not substantive for the literature review but were a source to complement the overall data collection process. This reading helped me critically analyze the meaning of recurring experiences reported by the sample to generate complete, accurate, and credible themes. This triangulation type can ensure the data are rich and provided essential information for future scholars to replicate the study design (Yin, 2017). I analyzed and interpreted study results within the conceptual framework and illustrated how the study's findings added to the body of knowledge related to specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs.

Summary

A case by case analysis was conducted and presented in the chapter with a total of seven separate cases, leading to a cross-case analysis and synthesis process to answer the central research question of this multiple case study: What are the specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices? Based on this multiple case study's findings, five conceptual coding categories that enclose a total of 15 themes were identified for this study, leading to thick, rich data on the study participants' experiences. The five coding categories are grounded in the

study's conceptual framework consisting of first, Ashley and Carney's (1999) sustainable livelihoods framework and, second, Leach et al.'s (1999) environmental entitlements framework. These coding categories were (a) relationship with trainers, (b) materials provided by trainers for sustainable land management, (c) land management strategies needed by farmers, (d) sustainable land management activities favored by farmers, (e) unfavorable conditions for smallholder farmers.

The cross-case synthesis technique was the data analysis technique used to compare and contrast individual case studies' critical findings. Once themes were arranged across the multiple cases in this study, the 15 themes gleaned from the raw data include the following: (a) few face-to-face interactions, (b) distant agricultural trainers, (c) written materials such as manuals and brochures, (d) radio programs on farming, (e) mobile messaging, (f) land tenure and rights, (g) access to credit, (h) innovative methods to access water resources, (i) innovation methods for soil fertility, (j) modern cultivation methods, (k) updated agricultural education and technology, (l) modernize cultivation practices, (m) financial services tailored to smallholder farmer needs, (n) unjust farming policies, and (o) lack of land tenure rights. In addition to binding data sources, I enhanced the trustworthiness of the study's data by employing data triangulation of three data sources: interviews, journaling/reflective field notes, and archival data. I analyzed and interpreted the multiple case study results through the lens of the conceptual framework.

Chapter 5 will further interpret the study findings regarding how they compare to the literature described in Chapter 2. I will demonstrate the significance of the research for theory, practice, and social change. This multiple case study addresses a gap in the

literature identified by scholars on documenting and describing the land management practices and livelihood strategies among smallholder farmers in Zimbabwe. Finally, I will also describe how future scholarly researchers can replicate this study.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this qualitative multiple case study was to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs. To address this gap, I used a multiple case study methodology to address the research problem. Semistructured interviews, archival data, and reflective field notes (see Merriam & Tisdell, 2015) were used to explore the specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practices. Triangulation of data sources was conducted to establish the credibility of the data analysis results (see Guion, Diehl, & McDonald, 2011; Merriam & Tisdell, 2015).

Qualitative research methodologies used within the constructivist paradigm helped give a voice to the participants, Zimbabwean smallholder farmers who have limited knowledge and information to make good decisions regarding land management practices (Mutsvangwa-Sammie et al., 2016; Scoones et al., 2018). Should smallholder farmers in Zimbabwe not receive training in sustainable land management techniques supported by the public and private sector, they will continue to face poverty and deteriorating living conditions (Gadziray et al., 2020). This study's specific problem is that smallholder farmers in Zimbabwe have knowledge gaps on sustainable land management practices, presenting a barrier to training these farmers on innovative agricultural practices tailored to their needs (Makate et al., 2019; Moyo et al., 2019).

I used two validated frameworks: (a) the sustainable livelihoods framework (Ashley & Carney, 1999), which "provides an understanding of the livelihoods of local

communities being studied, what assets they have, and what they do/can do with these assets" (Yaro, 2004, p. 9), and (b) the environmental entitlements framework, which focuses on the broader influence and importance of diverse institutions operating at multiple-scale levels from micro to macro (Leach et al., 1999). These institutions influence who has access to and control over what resources within a specific environment and who arbitrate contested resource claims (Leach et al., 1999). Using a multiple case study approach was particularly useful here because it gave me the flexibility required to iterate and extend knowledge in my conceptual framework (Halkias & Neubert, 2020; Stake, 2006). New theoretical knowledge may emerge from recognizing patterns in a multiple case study's collected data and the logical arguments upon which they are founded (Eisenhardt et al., 2016).

Thematic analysis and cross-case synthesis and analysis of the study's qualitative data from individual semistructured interviews with seven participants revealed the following 15 themes: (a) few face-to-face interactions, (b) distant agricultural trainers, (c) written materials such as manuals and brochures, (d) radio programs on farming, (e) mobile messaging, (f) land tenure and rights, (g) access to credit, (h) innovative methods to access water resources, (i) innovation methods for soil fertility, (j) modern cultivation methods, (k) updated agricultural education and technology, (l) modernize cultivation practices, (m) financial services tailored to smallholder farmer needs, (n) unjust farming policies, and (o) lack of land tenure rights.

Interpretation of Findings

This multiple case study's findings confirm or extend current knowledge in the discipline, with each case presenting examples from scholarly studies discussed and critically analyzed in Chapter 2. In this section, I present the study's findings and review them in the context of the coding categories that emerged from the data analysis. I compare each of these five categories with relevant concepts from the conceptual framework and the extant literature review presented in Chapter 2. I provide evidence from the seven semistructured interviews to support how the study's findings confirm or disconfirm existing knowledge or extend it. The term *extension* simply refers to using multiple case studies to develop a more complicated theory (Eisenhardt, 1991). Extension studies, such as this multiple case study, provide not only replication evidence but also support extending prior research results by offering new and critical theoretical directions (Bonett, 2012). Theory extension from case studies represents a vital research strategy that may contribute theoretical insights that are both rich and weighted on theorized phenomena that remain inadequately explored in the extant literature (Eisenhardt, 1991; Halkias & Neubert, 2020).

Relationship with Trainers

Scholars indicate that the dissemination of innovative agricultural training has been integral in solving sustainable land management problems in developing economies (Stoeffler et al., 2016; Tatsvarei et al., 2018). My study results confirmed that although smallholder farmers in Zimbabwe seek this relationship with trainers, they are not receiving adequate training in sustainable land management techniques and that poverty

continues to challenge their fragile livelihoods. Study participants confirm that they have a few face-to-face contacts with trainers, and many trainers are located at a distance too great to which to travel. This study result aligns with Bjornlund et al.'s (2019) conclusion that the absence of knowledge, skills, training, and farming experience has led to declining agricultural productivity in Zimbabwe, increased poverty, and other livelihood shocks in the country. The study results extend knowledge based on the works of Dube et al. (2014), Mapiye (2016), and Stoeffler et al. (2016) on how qualitative research can offer reasons for smallholder farmers' knowledge gaps with sustainable land management practices in Zimbabwe.

Materials Provided by Trainers for Sustainable Land Management

Many research studies have indicated that lack of training often limits landholders from understanding the power of sustainable land management as the best way to combat land degradation and how sustainable land management enables land users to maximize the economic and social benefits (Cordingley et al., 2015). My study results confirm that the participants face challenges in obtaining written training materials from extension officers and have difficulties transferring their learning into their fields.

The study results align with Bertin et al.'s (2014) conclusions that farmers must have access to (a) various training, (b) technical packages, (c) knowledge and skills, (d) inputs, (e) information on agroforestry-based land management practices, (f) marketing, and (g) other development issues so that land users can maximize the economic and social benefits. The study results extend knowledge from the works of Bertin et al. (2014) and Cordingley et al. (2015) on how qualitative research result may offer concepts that

emphasize the power of sustainable land management as the best way to combat land degradation and how sustainable land management enables land users to maximize the economic and social benefits.

Land Management Strategies Needed by Farmers

Land tenure and legal rights, access to credit, innovative methods to access water resources, innovation methods for soil fertility, and modern cultivation methods compose key constructs representing the key elements for sustainable land management (Bharucha, 2011; Vanlauwe et al., 2011). My study results were consistent with scholars' viewpoints that attention should be shifted from extensive agricultural systems based on the assumption of abundant land and resources. More policy focus is needed on the efficient and sustainable management of finite land, nutrients and soil fertility, water, and energy resources and that sustainable land management and farmers' livelihoods are promoted to simultaneously address the issues of the need for more food and environmental security (Chartress & Noble, 2015; Pretty & Bharucha, 2014).

The study results confirmed Pretty and Bharucha's (2011) perception of sustainable intensification as "the investment of inputs and capital to increase crop productivity over the long-term, while protecting the underlying resource base" (p. 36). Droppelmann et al. (2017) indicated that the focus should be on the judicious application of sustainable land and water management practices. Sustainable practices may include integrated nutrient management with various organic matter inputs and mineral fertilizers to contribute to food production and support ecosystem services.

Sustainable Land Management Activities Favored by Farmers

Specific topics considered as sustainable land management activities favored by farmers are the following: updated agricultural education and technology, modernize cultivation practices, and financial services tailored to smallholder farmer needs in a developing country like Zimbabwe. My results extend Hartwick and Scheidegger's (2010) argument that there are prominent factors in influencing the adoption of innovation, including knowledge and technologies, access to an endowment with resources, and sociodemographic factors, sociopsychological behavior, and communication. Newer approaches to innovation suggest that farmers must learn about systemic setups characterized by agents that diffuse and use innovation. My research finding confirmed that innovation occurs in a network-like structure where a great deal of interaction occurs, and there is continuous learning by participants (Hartwick & Scheidegger, 2010). The study's finding is also consistent with Hartwick and Scheidegger's (2010) study on interaction and collaboration by the change agents for innovation to influence new technologies and knowledge.

Unfavorable Conditions for Smallholder Farmers

The concept of unfavorable conditions for smallholder farmers in Zimbabwe exposes unjust farming policies and lack of land tenure rights. Makate et al. (2017) proposed that there are agricultural risks in Zimbabwe compounded by the institutional weakness, limited know-how of smallholder farmers, inadequate technical skills, scarce financial resources, incompetent land management skills, and extremely dubious agricultural policies in the country. My results confirmed Phiiri, Egeru, and Ekwamu's

(20160) argument that the country of Zimbabwe is facing a problem to design and promote the sustainable practice to its smallholder farmers as a way to improve yields and the problems for climate change and adaptation strategies, policies and institutional mechanisms needed in the country that impact success in the agricultural sector affected by climate variability.

The study's finding aligns with World Bank's (2014) view that conservation agriculture's fundamental principles should address declining soil fertility issues by providing soil cover, introducing crop mixing and rotation, and using high management techniques for all farming operations. These methods can increase yield without degradation, allowing for sustainable land use while maintaining biodiversity. Zimbabwe's agriculture investment and policy should involve strategies that benefit the use and management of natural resources, focusing on improving management and sustainable use of land, water, forestry, and wildlife resources.

Land Tenure and Rights

The underlying assumption is that the value and ownership of land as the fundamental asset for social, political, and economic sustainability, which provides ecosystem services, generates livelihood, and accumulates wealth for rural communities in developing countries, is dependent on the right of ownership of land by smallholder farmers. Chirisa et al. (2014) suggested that land tenure is secure when land can be a cornerstone for economic growth and investment. My research results confirmed Chirisa et al.'s (2014) conceptualization of Zimbabwe's land tenure and rights. My study

confirmed that in Zimbabwe, where land is on lease for 99 years, smallholder farmers do not own land and do not have rights to the land they grow every year.

Land tenure and rights are defined as the sum of rules recognized in law underlying land ownership, allocation of land rights, the substantive content of those rights, their protection in law, their disposal and extinction, as well as their regulation. The study was consistent with previous research conducted by Chirisa et al. (2014) confirming the effect of lack of land tenure rights by smallholder farmers in Zimbabwe and the role the lack of land tenure rights played on the access to credit, farming investment, technology adoption, and sustainable agricultural development and productivity. The study confirmed that participants have perceived that in large segments of rural societies, they have been denied equitable access to land, the land belongs to the government, they do not own the land, the result is the unanticipated cost to their livelihoods such as dependence, social instability, and extreme poverty, civil unrest, and conflict (Chirisa et al., 2014).

Limitations of the Study

Limitations, a characteristic of every research study, are elements of the study that are out of the researcher's control and can sometimes impact the study results (Golafshani, 2003). The study's first limitation was that the researcher being a Zimbabwean might inadvertently contribute to cultural bias. Motivations and influences based on a personal cultural lens can create ethnocentrism in judging research participants and their responses solely by their own culture's values and standards (Chenail, 2015). To minimize culture bias, a peer debriefer not belonging to the

Zimbabwean culture and skilled in qualitative research methods rechecked the data analysis with all discrepancies discussed until a consensus was established (Creswell & Miller, 2000).

The study's second limitation was that the case study method received scholarly criticism for not offering statistical generalization, limiting the transferability of data results, or the general population (Yin, 2017). The multiple case study method is not used for this purpose but to augment external validity and guard against observer bias, cross-case comparison, and advancing theory generation (Stake, 2013). While the researcher used the multiple-case study to gain a deep understanding of specific knowledge gaps among smallholder farmers in Zimbabwe on sustainable land management practice, the primary data collection process was limited to seven participants, based on saturation of the data (O'Reilly & Parker, 2013). The minimum number of interviews required for a qualitative, multiple case study should be five participants, and I continued past this number until I reached data saturation, which was seven participants, with similar data noted from participants 5, 6, and 7 (see Halkias & Neubert, 2020; Schram, 2006).

This study's scope, which also relates to data transferability, was limited to the population of smallholder farmers who received land through the FTLRP between 2000 and 2008 in Zimbabwe, where agricultural productivity has worsened. Smallholder farmers are facing the most significant threat of climate variability. The range of ages of participants was from 26 to 55 years old. Only one 26-year old participant was below the age of 18 when smallholder farmers in Zimbabwe received land through the FTLRP between 2000 and 2008. Although the one participant was legally a minor, he clearly

remembered the land reform period's circumstances and eventually inherited the family farm at a young age due to his parents' untimely loss.

Participants' willingness to answer the interview questions straightforwardly and honestly contributed to the third research limitation, although it was assumed that participant responses to interview questions by the researcher would be truthful and transparent (Rubin & Rubin, 2011). Lack of willingness could originate from uncertainty or fear of being disloyal to the participants' indigenous community (Lancaster, 2017). Patton (2014) noted that the political atmosphere, anxiety, and personal bias could limit the interview process and potentially distort participants' responses. Consequently, the researcher depended on their commonality and the participants' shared cultural background to ease them.

Recommendations

A PhD-level research study addresses the need to fill a literature gap, extend theoretical knowledge, and make recommendations for future studies (Merriam & Grenier, 2019). In Africa, over 80% of farmers are smallholders, producing 70% of the continent's food. Legislators and policymakers in impoverished countries of sub-Saharan Africa often ignore smallholder farmers' voices in need of support to strengthen their fragile livelihoods. This multiple case study is significant because it may lead to a better understanding of the phenomena being studied and provide information-rich data and recommendations for future studies and policy initiatives (see Yin, 2017). The study's findings may also provide public and private sector stakeholders and governing

institutions with information to improve knowledge gaps among smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs.

Recommendations for Practice and Policy

Smallholder farmers in Zimbabwe operate in an environment characterized by multiple risks and uncertainties, limiting their participation in agricultural value chains and continuing the cycle of poverty (Gadzirayi et al., 2020). Stakeholders such as NGOs, government institutions, policymakers, research institutions, input suppliers, donors, and other social service organizations can do much to prevent and intervene in the cycle of poverty for smallholder farmers and their families, such as improving access to credit, land, plows, seeds of suitable variety and other inputs. These stakeholders may also help farmers identify appropriate priorities and strategies for risk aversion and risk management to improve efficiency and provide market access and stability of prices, including demand for cash crops. They may also help improve the timely dissemination of climate information and facilitate diversification of farm and off-farm income generation.

Zimbabwean smallholder farmers need training, technology, and social support to make informed, short-, medium-, and long-term sustainable land management decisions. Such decisions may revolve around choice of crop and livestock breeds, time for planting, adoption of sustainable soil and water management techniques, identification of the optimum mix of production enterprises, use of chemical or organic-based inputs, and when to participate in the market (Gadzirayi et al., 2020). Activation of these strategies

may bring the farmers closer to improved livelihoods, reduced vulnerability to climate challenges, and improved food security.

The world is now being inundated by the events of the Fourth Industrial revolution. As stated by the study's participants, updated technology and access to fast Internet is urgently needed to connect smallholder farmers to new resources, information, knowledge, social media, and markets. If this "digital divide" were closed, smallholder farmers could access information and knowledge related to weather, rainfall, or market demand, allowing them to grow and harvest food more efficiently. Timing has increasingly become a key source of competitiveness, and access to real-time information is crucial. To be genuinely transformational, internet access must be reliable, affordable, and secure (Business Fights Poverty, 2020).

Many of these innovations already exist, yet stakeholders have yet to find ways to scale them up in inclusive ways while navigating the inevitable challenges that will accompany their uptake among impoverished smallholder farmers. The United Nations (2020) and the World Food Programme (2020) have brought to light several such innovations for delivery to smallholder farmers in sub-Saharan Africa, many of which are taken for granted in developed nations. These recommendations include:

1. Improved access to electricity to increase efficiency and reduce food loss
2. Increased internet connectivity to access information and knowledge to improve productivity on their farms
3. Mobile devices and platforms connect smallholder farmers to markets
4. Unique identifiers improve data about farmers, for farmers

5. Geospatial analysis to help farmers make informed decisions

Recommendations for Scholarly Research

My research's purpose was the long-term goal of improving the income of smallholder farmers to improve the quality of their fragile livelihoods. A social scientist studying poverty in emerging nations needs to go beyond the research goals of training, Internet access, and farming equipment. In most rural Zimbabwe, farmers have yet to meet basic and essential public services such as water, electricity, and primary healthcare. In future scholarly studies, researchers must seek collaboration with governments, donors, and civil society, to bring about the systemic changes needed to support smallholder farmers in Zimbabwe to tailor sustainable land management training to their needs (Moyo et al., 2019; Scoones et al., 2020).

Scholarly research needs to be conducted across communal areas, resettlement schemes, large-scale estates, and smallholder farms in Zimbabwe. To remain a smallholder farmer excluded from a national, regional, or global market may just continue the cycle of poverty, food insecurity, and legal challenges for land tenure rights. As scholars, we need to research how to bring smallholder Zimbabwean farmers to the commercial market to raise their income and, consequently, their quality of life and transition from smallholder farmers to commercial farmers. However, the road from being a smallholder farmer to becoming a commercial farmer is a long one; it calls for researchers also working towards disseminating their findings to intervene in economic, social, and political processes.

Implications

Implications for Positive Social Change

This research addressed a knowledge gap among smallholder farmers in Zimbabwe on sustainable land management so that the integration of new ideas and training may strengthen their fragile livelihood system. This research study may contribute to social change by providing a platform for the voices of valuable smallholder farmers in Zimbabwe to be heard by agricultural trainers and educators, social scientists, policymakers, and NGO stakeholders. In turn, these stakeholders can disseminate this knowledge through training and innovative methods of sustainable land management practices to smallholder farmers in Zimbabwe, aiming at mitigating food insecurity and livelihoods, viable crop-livestock systems, and market participation.

Scholars and practitioners must embrace change in their research protocols to drive positive social change in a society so burdened with complex problems. Social, economic, political, technological, and environmental relationships across an ecosystem must create synergy to effect change. Such change must be actively negotiated across stakeholder groups. Social scientists researching in Zimbabwe may begin the effect of social change through a combination of historical and ethnographic methods to explain the complex social relations within the country by taking a local perspective in my study on interviewing smallholder farmers on challenges with their fragile livelihoods.

Similar research would be most useful in bringing smallholder farmers into the commercial agriculture food chain supply when using in-depth interviews, biographical interviews, focus group discussions, tracking surveys, and longitudinal analysis of

satellite imagery of farms and their geographical challenges as extensive archival data research. Scoones et al. (2020) remarked on the state of research needs in rural Zimbabwe farmers: “This is not a linear evolution, only driven by economic incentives, but a political process, heavily influenced by state intervention. Particular moments influence what paths are taken, by whom, and who becomes a ‘commercial farmer’” (p. 5).

Implications for Practice and Policy

Understanding the combination of soil, water, climate, and biodiversity is necessary for all smallholder farmers to be successful in agricultural productivity. Involvement in soil health management intervention is essential in all farming systems, and this will essentially help improve soil through different pathways to achieve high agricultural productivity (Scoones, 2015). The success and failure of smallholder farmers in Zimbabwe cannot be adequately explained without understanding the role and involvement of state institutions and politics in Zimbabwe’s agricultural activities. More needs to be studied in order to understand the importance of the drivers in the rural differentiation in the country, as well as to explain the impact of political patronage networks and the access to all factors of agricultural production in Zimbabwe such as climate factors, political involvement, access to agricultural inputs, and other social networks (Zamchiya, 2013).

The smallholder farmers in Zimbabwe are rich with indigenous knowledge that has helped them to sustain their meager agricultural production over the years. More needs to be known about what and how smallholder farmers in Zimbabwe have learned about land management through trial and error experimentation and what needs to remain

to integrate new ideas that may strengthen their fragile livelihood system (Matondi, 2012). Based on its position in the world, Zimbabwe is a subtropical country, and, as such, rainfall is erratic and unreliable, making it very hard for smallholder farmers to be successful agriculturally. The smallholder farmers need to accept training and learn to participate in tolerable irrigation systems (sprinkler, flood, and drip) to be productive on their farms (Mupaso et al., 2014).

Compounding the already complicated issue of rural land-use change, the different ways people experience these changes present a further challenge to understanding the broader socio-economic impacts of sustainable land management in Zimbabwe. This has been highlighted in studies by Slootweg, Vanclay, and van Schooten (2001) and Vanclay (2002), who argued that "to understand the impact of any change one must identify both the social and biophysical changes occurring and the felt experience, or impact, of these changes" (Williams & Schirmer, 2012, p. 539). Such an approach acknowledges that social change processes can change in response to changes in how land is used in practice by the smallholder farmer to build a stable livelihood and raise the living standards for its agrarian citizens.

Understanding and addressing the social impacts of land-use change calls for a multifaceted approach to policy that can be transformed into practice in smallholder farmers' daily lives (Sonneveld et al., 2016). One such example is the land reform change that took place in Zimbabwe in 2005 and which changed the lives and livelihoods of smallholder farmers dramatically by plunging most into poverty: the associated impacts vary depending on the nature and extent of land-use change as well as how people

experience the resulting and related social changes (Gwandu et al., 2014). Participatory research and learning approaches may hold the greatest promise in effecting social change directed at understanding the smallholder farmers in sub-Saharan Africa involved in managing their agricultural resources and who face low agricultural productivity and widespread food insecurity (Mutsvangwa-Sammie et al., 2016).

Implications of COVID-19 on Smallholder Farmers' Livelihoods in Zimbabwe

No discussion set in today's global market would be complete without mentioning the coronavirus global pandemic's impact within various contexts, particularly within marginalized demographic groups. A common observation across Southern Africa regions is that the measures imposed in response to COVID-19 highlighted and partly exacerbated existing socioeconomic inequalities among food system actors. Strict lockdowns in Zimbabwe significantly restricted small-scale farmers' production capacity in the informal economy and created more food insecurity for them (Pagnini et al., 2020). When 46 cases of COVID-19 and four deaths were confirmed on May 2020, Zimbabwe placed the country on lockdown; borders, formal and informal businesses were affected. The lockdown was relaxed after four weeks to allow formal businesses to operate under strict measures. Informal businesses outside of agriculture and farmers' market and some manufacturing businesses remain on lockdown (Price, 2020). The COVID-19 lockdown measures put in place by the Zimbabwe government had an impact on small-scale and informal domestic and cross-border traders. The informal sector sustains many families' livelihoods. The COVID-19 lockdown news came when the country faced a severe

hunger crisis in 2020, with a significant deterioration in acute food insecurity expected (Price, 2020).

Many Zimbabweans make a living in the informal sector. In this study, Zimbabwe's informal economy contributed an average of 61% of the country's GDP in 1991–2015, making it one of the world's largest informal economies. Many traders are subsistence traders and are mired in extreme poverty even though the country has a history of cracking down on informal traders. Many informal traders and businesses in sub-Saharan Africa operate out of necessity and desperation and cannot survive without their extensively daily trade and cannot afford to isolate for an extended period (Pricve, 2020).

Informal traders and businesses across sub-Saharan Africa have high-risk factors for COVID-19; their business often involves close person-to-person contact and cash-based transactions (Price, 2020). The government's lockdown due to the outbreak of COVID -19 harmed the local food system and supply chains. Many smallholder farmers encountered difficulties in growing, harvesting, and selling their goods. The COVID-19 measures imposed exacerbated existing socioeconomic inequalities among food system actors, particularly the informal business, which dominates the agricultural sector, and almost 45% of workers are employed in this sector (Paganini et al., 2020).

The COVID-19 measures restrict the movement of individuals and goods within a region. With the COVID-19 pandemic and the lockdown measures put in place, hunger and unemployment became more severe. In Zimbabwe, the country is predominantly semiarid and experiences erratic rainfall and frequent droughts, poverty, and food

insecurity. The land distribution program implemented two decades ago contributed to poverty and food insecurity; as a result of the COVID-19 measures, many smallholder farmers did not receive permits to continue their farming activities, which, as a result, impacted many farmers' eating habits (Paganini, 2020). Land and land access remain the most critical issue in sub-Saharan countries of Africa, with the key goals to increase agricultural productivity and reduce poverty.

Due to the inevitable effect of COVID-19 on smallholder farmer families' food security, the government must increase its support towards smallholders and all the vulnerable households that directly depend on the land and agriculture-related activities, both for livelihood development and incomes (Betrami, 2020). Zimbabwe's government should expand the fiscal space by giving massive subsidies to smallholders in loans or inputs and equipment (Mhlanga, & Ndhlovu, 2020). This action in practice can sustain and support smallholder farm operations and, thus, increase farmers' food security.

The World Health Organization has recommended social distancing as one of the most effective strategies for COVID-19 prevention. However, given the nature of livelihoods and local cultural patterns where villagers collectively meet and mourn, fetch water, gather firewood, work on community gardens, observe cultural taboos, and practical social distancing, observance becomes problematic Zimbabwe. The culture and the country's strong social cohesion threaten the country with the spread of COVID-19 (Musarandenga & Chitongo, 2020).

Zimbabwe's government should put measures in place to safeguard smallholder farmers' activities in the country. COVID-19 can be catastrophic to the smallholder

farmers in Zimbabwe the same way the Ebola disease was in West Africa. The activities of subsistence smallholder farmers sustain the food system in Zimbabwe. Although COVID-19 is a health problem, it will harmfully affect smallholder farmers, the poor, and all the marginalized categories if it explodes in Zimbabwe. COVID-19 will disrupt production, farmer sustenance income, and access to food for personal consumption (Mhlanga & Ndhlovu, 2020). To avoid the impact of COVID-19, Zimbabwe's government must increase its support towards smallholder farmers and all households depending on land and agricultural related activities. Support with massive subsidies in loans, inputs, and equipment can stimulate and sustain agricultural activities, thereby increasing smallholder farmers' food security. Supporting smallholder farmers as part of policy and development designs can enable Zimbabwe to protect its vulnerable population from the catastrophic consequences of COVID-19 (Mhlanga & Ndhlovu, 2020).

Implications for Theory

Scholars have identified a gap in the research literature on documenting and describing the land management practices and livelihood strategies among smallholder farmers in Zimbabwe. This research study was critical because its results will address this gap in the scholarly literature on developing sustainable land management with a fragile livelihood system. In the sub-Saharan continent of Africa, agriculture is the backbone of the economy. In Zimbabwe, land underpins most people's economic, social, and political lives (Hakeem, 2015; Moyo et al., 2019). There is evidence that the lack of suitable mechanisms for disseminating the available knowledge on sustainable land management

from researchers to smallholder farmers in Zimbabwe presents a barrier to innovation and sustainable adoption of viable land management techniques (Chagumaira et al., 2016; Murisa, 2011).

Eisenhardt and Graebner (2007) recommended that researchers utilize a multiple case study approach that includes more than one case when the goal of the study is to make an original contribution to a theoretical or conceptual framework and provide a rich, powerful picture of human interaction as compared to a single case study. This research design approach is supported by extending knowledge within my conceptual framework to explicitly link the outcomes (i.e., capabilities) to livelihood strategies (Harrison et al., 2015). Extending theoretical knowledge in a context with complex social and political relations embedded deeply within its ecosystem must bring together the interconnectedness and causational links between the assets available to smallholder farmers in Zimbabwe and the livelihood strategies that can be undertaken (Bjornlund et al., 2019; Chagumaira et al., 2016).

Finally, my conceptual framework consisting of the sustainable livelihoods framework (Ashley & Carney, 1999), and, second, the environmental entitlements framework (Leach et al., 1999) can be employed as a theoretical lens for qualitative and participatory research on the topics that take an in-depth consideration of context (Bjornlund et al., 2019). In deploying a multiple case study approach for my research, I followed methodologists' recommendations that data analysis results using the multiple case study design are commonly used to build or extend theory (Eisenhardt & Graebner, 2007). An inductive research approach using a multiple case study strategy can enable

themes to emerge from the data and allow the data and smallholder farmers' perspectives to drive recommendations for further theoretical research (see Yin, 2017).

Conclusion

This research addressed a knowledge gap among smallholder farmers in Zimbabwe on sustainable land management so that the integration of new ideas and training may strengthen their fragile livelihood system. The individuals in this study played a pivotal role in understanding smallholder farmers' perceptions of specific knowledge gaps in Zimbabwe's sustainable land management practices. The study participants provided in-depth insight into the challenges they face related to adopting innovative agricultural practices that may reverse their fragile livelihoods.

Although the decision to improve agricultural practices through the adoption of land management can significantly benefit most of the poor in sub-Saharan Africa in the form of social change, barriers impact both delivery and adoption of sustainable land management practices by these smallholder farmers. Such systemic barriers to modernizing agricultural practices include economic capacity, weak information technology development, lack of knowledge dissemination (Johnson et al., 2016), inadequate irrigation systems and water delivery, degraded soils (Nezomba et al., 2017), conflicts among different interest groups, and inadequate government policies (Kellner et al., 2018).

There is a need for agricultural transformation in Zimbabwe to call for structural nd process change in knowledge systems, technology development, delivery, institutions, and policies (Hakeen, 2016). However, governments of sub-Saharan African countries

have often ignored the impoverished rural populations' plea and neglect the goals of innovation and adoption for sustainable agricultural practices (Dieter et al., 2016). The study participants' viewpoints offer recommendations for future research and policy in support of innovation, which include knowledge and technologies that will enable the impoverished rural populations to maximize the economic and social benefits from the land while maintaining the ecological support functions of the land resources (Cordingley et al., 2015).

Future research should promote new suitable mechanisms for disseminating the available knowledge on sustainable land management, understand the innovation and sustainable adoption of viable land management techniques and receive training on sustainable land management techniques through climate change (Chagumiara et al., 2016). The proud smallholder farmers of Zimbabwe are rich with indigenous knowledge that has helped them sustain their meager agricultural production over generations of drought, war, and poverty. More needs to be known about what and how smallholder farmers in Zimbabwe have learned about land management through trial and error experimentation and what needs remain to integrate new ideas to strengthen their fragile livelihood system.

References

Anney, V. N. (2014). Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria. *Journal of Emerging Trends in Educational Research and Policy Studies*, *5*(2), 272–281. Retrieved from http://hdl.handle.net/123456789/256

Ary, D., Jacobs, L. C., & Sorensen, C. (2010). *Introduction to research in education* (8th ed.). Belmont, CA: Wadsworth.

Ashley, C., & Carney, D. (1999). *Sustainable livelihoods: Lessons from early experience*. London, UK: Department for International Development.

Baudron, F., Andersson, J. A., Corbeels, M., & Giller, K. E. (2013). Failing to yield? Ploughs, conservation agriculture and the problem of agricultural intensification. An example from the Zambezi Valley. *Journal of Development Studies*, *48*(03), 393–412. doi:10.1080/00220388.2011.587509

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implantation for novice researchers. *The Qualitative Report*, *13*(4), 544–559. Retrieved from http://nsuworks.nova.edu/tqr

Beltrami, S. (2020). *How to minimize the impact of coronavirus on food security: Avoiding protectionism, monitoring prices and supporting the vulnerable through social safety nets can limit the impact of the outbreak*. Retrieved from the World Food Programs' Insight website: https://insight.wfp.org/how-to-minimize-the-impact-of-coronavirus-on-food-security-be2fa7885d7e

Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies

of information systems. *MIS Quarterly*, *11*(3), 369–386. doi:10.2307/248684.

Bernard, H. R. (2013). *Social research methods: Qualitative and quantitative approaches*. Thousand Oaks, CA: Sage.

Bertin, T., Zacharie, T., Ann, D., Ebenezar, A., & Alain, T. (2014). Scaling-up sustainable land management practices through the concept of the rural resource center: reconciling farmers' interests with research agendas. *The Journal of Agricultural Education and Extension*, *20*(5), 463–483. doi:10.1080/1389224X.2014.913984

Billup, F. (2014). Trustworthiness and the quest for rigor in qualitative research. *The NERA Researcher, 52,* 10-12. Retrieved from https://www.nera-education.org/the_nera_researcher.php

Bjornlund, H., Zuo, A., Wheeler, S. A., Parry, K. Pittock, J., Mdemu, M., & Moyo, M. (2019). The dynamics of the relationship between household decision-making and farm household income in small-scale irrigation schemes in Southern Africa. *Agricultural Water Management*, *213*, 135–145. doi:10.1016/j.agwat.2018.10.002

Boellstorff, T., Nardi, B., Pearce, C., & Taylor, T. L. (2013). *A handbook of ethnographic methods for virtual worlds*. Princeton, NJ: Princeton University Press.

Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.

Brazier, A. (2015). *Climate change in Zimbabwe: Facts for planners and decision makers*. Harare, Zimbabwe: Konrad Adenauer Stifinity.

Brown, A. D. (2017). Identify work and organizational identification. *International*

Journal of Management Review, 19(3), 296-317. doi:10.1111/ijmr.12152

Brown, D., Chanakira, R. R., Chatiza, K., Dhliwayo, M., Dodman, D., Masiiwa, M., Muchadenyika, D., Mugabe, P., & Zvigadza, S. (2012). Climate change impacts, vulnerability, and adaptation in Zimbabwe. International Institute for Environment and Development (IIED), Climate change paper3.

Browne, M. N., & Keeley, S. M. (2014). *Asking the right questions: A guide to critical thinking* (8th ed.). Boston, MA: Pearson.

Bryant, A., & Charmaz, K. (2007). *The Sage handbook of grounded theory*. Thousand Oaks, CA: Sage.

Business Fights Poverty. *(2020) Enabling Smallholder Farmers to Improve their Incomes*. *Retrieved* from: https://businessfightspoverty.org/articles/download-centre

Campbell, B. M., Clarke, J. M., & Gumbu, J. J. (1991). Traditional agroforestry practices in Zimbabwe. *Agroforestry Systems*, *14*(2), 99–111. doi:10.1007/BF00045726

Carter, N., Bryant-Lukosius, D., Di Censo, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum, 41*(5), 545–547. doi:10.1188/14.ONF.545-547

Chagumaira, C., Rurinda, J., Nezomba, H., Mtambanengwe, F., & Mapfumo, P. (2016). Use patterns of natural resources supporting livelihoods of smallholder communities and implications for climate change adaptation in Zimbabwe. *Environment, Development and Sustainability, 18*(1), 237–255. doi:10.1007/s10668-015-9637-y

Chambers, R., & Conway, G. (1992). *Sustainable rural livelihoods: Practical concepts for the 21st century*. Brighton, UK: Institute of Development Studies.

Chapagain, T., & Raizada, M. N., (2017). Agronomics challenges and opportunities for smallholder terrace agriculture in developing countries. *Front Plant Science*, (2017), 8–331. doi:10.3389/fpls.2017.00331

Chartres, C. J., & Noble, A. (2015). Sustainable intensification: overcoming land and water constraints on food production. *Food Security*, *7*(2), 235–245. doi: 10.1007/s12571.015-0425-1

Chenail, R. J. (2011). Interviewing the investigator: Strategies for addressing instrumentation and researcher bias. Concerns in Qualitative Research. *The Qualitative Report, 16*(1), 255–262. Retrieved from http://nsuworks.nova.edu/tqr/vol16/1551/16

Cheesman, S., Andersson, J. A., & Frossard, E. (2017). Does closing knowledge gaps close yield gaps? On-farm conservation agriculture trials and adoption dynamics in three smallholder farming areas in Zimbabwe. *Journal of Agricultural Science, 155*(1), 81–100. doi:10.1017/S0021859616000095

Chirisa, I. E., W., Kawadza, S. T., & Bandauko, E. (2014). Answering to the domesticity of exotic options and strategies in managing Africa's urban land-scapes for sustainability beyond 2015. Springerplus, 3–241. doi:10.1186/2193-1801-3-241

Chitiga, M., & Mabugu, R. (2011). Evaluating the impact of land redistribution: ACGE microsimulation application to Zimbabwe. *Journal of African Econolomies, 17*(4), 527–549. doi:10.1093/jae/ejmo39

Christensen, B. V. (2016). Challenges of low commodity prices for Africa. Bank for International Settlements

Cohen, L., Manion, L., & Morrison, K. (2013). *Research methods in education* (7th ed.). New York, NY: Routledge.

Connelly, F. M., & Clandinin, D. J. (1990). Stories of experience and narrative inquiry. *Educational Researcher*, *19*(5), 2–14.

Cooper, K., & White, R. E. (2012). *Qualitative research in the post-modern era: Contexts of qualitative research*. London: Springer.

Corden, A. & Sainbury, R. (2006). Explaining 'quality': Research participants' perspectives on verbatim quotations. International Journal of Social Research Methodology, 9(2), 97-110. doi.10.1080/136455706005264

Cordingley, J. E., Snyder, K. A., Rosendahl, J., Kizito, F., & Bossio, D. (2015). Thinking outside the plot: Addressing low adoption of sustainable land management in Sub-Saharan Africa. *Current Opinion in Environmental Sustainable*, *15*, 35–40. https://doi.org/10.1016/j.cosust.2015.07.010

Creswell, J. W., & Miller, D. C. (2000). Determining validity in qualitative inquiry. *Theory Into Practice*, *39*(3), 124–130. http://dx.doi.org/10.1207/s15430421tip3903-2

Creswell, J. W., Hanson, W. E., Plano, V. L. C., & Morales, A. (2016). Qualitative Research Designs: Selection and implementation. *The Counseling Psychologist*, *35*(2), 236–264. doi: 10.1177/0011000006287390.

Deakin, H., & Wakefield, K. (2014). Skype interviewing: Reflections of two PhD

researchers. *Qualitative Research, 14*(5), 603–616. doi:10.1177/1468794113488126

De Haan, L., & Zoomers, A. (2005). Exploring the frontier of livelihoods research. *Development and Change, 36*(1), 27–47. doi:10.1111/j.0012-155X.2005.00401.x

Dekker, M., & Kinsey, B. (2011). Coping with Zimbabwe's economic crisis: Small-scale farmers and livelihoods under stress. African Studies Centre, ASC Working Paper 93/2011

Derman, W. (2019). Informant interviewing in the international social impact assessment. In Finsterbusch, K (ed), Methodz for social analysis in developing countries (pp 107 -124). Routledge.

DFID. (1999). *Sustainable livelihoods guidance sheets*. London, UK: Author.

Dicecca, R., Pascucci, S., & Contò, F. (2016). Understanding reconfiguration pathways of agri-food value chains for smallholder farmers. *British Food Journal, 118*(8), 1857–1882. http://dx.doi.org/10.1108/BFJ-05-2016-0194

Dieter, F., Diaz, S., Mccaslain, K., Anna, A., Mehnaz, H., Bottriell, K., Queirolo, S. P., & Robinson, S. S. (2016). *Working with smallholders: a handbook for firms building sustainable supply chains*. Washington, DC: World Bank Group. http://documents.worldbank.org/curated/en/284771480330980

Dinh, T. P., Cameron, D., & Nguyen, X. T. (2015). Rural livelihood adoption framework: A conceptual and analytical framework for studying adoption of new activities by small farmers. *International Journal of Agricultural Management, 4*(4), 163–172. doi:10.5836/ijam/2015-04-163

Djurfeldt, D., Larsson, R., Holmquist, B., Jirstrom, M., & Andersson, A. (2008). African farm dynamics and the sub-continental food crisis-the case of maize. *Journal of Food Economics*, *5*(2), 75–91. http://dx.doi.org/10.1080/16507540903064243

Downey, C. A., & Clandinin, D. J. (2010). Narrative inquiry as reflective practice: Tensions and possibilities. A Handbook of reflection and reflective inquiry, (383–397), Springer, USA.

Dube, L., Mariga, T. & Mrema, M. (2015). Determinants of access to formal credit by smallholder tobacco farmers in Makoni District, Zimbabwe. Greener Journal of Agricultural Science, 5(1), 34-42, http://doi.org/10.15580/GJAS.2015.1.011515003

Dube, T., Homann-Kee Tui, S., Rooyen, A. V., & Rodriguez, D. (2014). *Baseline and situation analysis report: Integrating crop and livestock production for improved food security and livelihoods in rural Zimbabwe*. Socioeconomics Discussion Paper Series, Series Paper Number 29, International Crop Research Institute for the Semi-Arid Tropics (ICRISAT). Retrieved from http://oar.icrisat.org/8410/

Dube, T., Moyo, P., Ncube, M., & Nyathi, D. (2016). The impact of climate change on agro-ecological based livelihoods in Africa: A review. *Journal of Sustainable Development, 9*(1), 256–267. doi:10.5539/jsd.v9n1p256

Dube, T., Moyo, P., Ndlovu, S., & Phiri, K. (2016). Towards a framework for the integration of traditional ecological knowledge and meteorological science in seasonal climate forecasting: The case of smallholder farmers in Zimbabwe. *Journal of Human Ecology, 54*(1), 49–58. Available at

https://ssrn.com/abstract=2772960

Duker, A., Cambaza, C., Saveca, P., Pongalane, Mawoyo, T. A., Hulshof, M., Nkomo, L., Hassey, S., Van den Pol, B., Vuik, R., Stigler, T. & van der Zaag, P., (2020). Using nature-based water storage for smallholder irrigation agriculture in Africa dryklands: Lessons from frugal innovative pilot in Mozambique and Zimbabwe. Journal of Environmental Science and Policy, 107, 1-6, http:doi.org/10.1016/j.envsci.2020.02.010

Droppelmann, K. J., Snapp, S. S., & Waddington, S. R. (2017). Sustainable intensification options for smallholder maize-based farming systems in Sub-Saharan Africa: A review. *Food Security*, *9*(1), 133–150. doi:10.1007/s12571-016-0636-0

Eisenhardt, K. M. (1989). Building Theories from case study research. *The Academy Of Management Review, 14*(4), 532–550. doi: 10.5455/amr.1989.4308385

Eisenhardt, K. M. (1991). Better stories and better constructs: The case for rigor and comparative logic. Academy of Management Review, 16(3), 620-627. Https:??doi.org/10.5465/amr.1991.4279496

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, *50*(1), 25–32. doi:10.5465/AMJ.2007.24160888

Eisenhardt, K. M., Graebner, M. E., & Sonenshein, S. (2016). Grand challenges and inductive methods: Rigor without rigor mortis. Academy of Management Journal, 59, 1113-1123.doi:10.5465/amj.2016.4004

Erickson, P., & Kovalainen, A. (2015). *Qualitative methods in business research: A practical guide to social research*. Thousand Oaks, CA: Sage.

Flick, U. (2014). *An introduction to qualitative research* (5th ed.). Los Angeles, CA: Sage.

Fursch, P. I., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *The Quality Report*, *20*, 1408–1416. doi:10.1080/08941920.2014.888791

Gadzirayi, C. T., Manatsa, D. & Mutandwa, E. (2020). Tailoring conservation farming to climate change in the smallholder farming sector: Case of Lowveld areas in Zimbabwe. African Journal of Scvience, Technology, Innovation and Development, 12(5),581-590,doi:10.1080/20421338.2020.1800242

Garibaldi, L. A., Gemmill-Herren, B., D'Annolfo, R., Graeub, B. E., Cunningham, S. A., & Breeze, T. D. (2016). Farming approaches for greater biodiversity, livelihoods, and food security. *Trends in Ecology & Evolution*, *32*(1), 68–80. http://dx.doi.org/10.1016/j.tree.2016.10.001

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, *18*(1), 59–82. doi:10.1177/1525822X05279903

Gibbert, M., Wicki, B., & Ruigrok, W. (2008). What passes as a rigorous case study? *Strategic Management Journal*, *29*(13), 1465–1474. doi:10.1002/smj.722

Glaser, B. G., & Straus, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York, NY: Aldine.

Godfray, H. C. J. (2015). The debate over sustainable intensification. *Food Security*, *7*(2), 199–208. doi:10.1007/s12571-015-0424-2

Golafshani, N., (2003). Understanding reliability and validity in quantitative research. *The Qualitative Report*, *8*(4), 597–606. Retrieved from http://nsuworks.nova.edu/tqr/vol8/1554/6

Gore, C., Katerere, Y., & Moyo, S. (1992). The case for sustainable development in Zimbabwe: Conceptual problems and contradictions. Environment and Development Activities. Harare Zimbabwe.

GoZ, Ministry of Agriculture and Rural Development, (2013). Zimbabwe agriculture investment plan: A comprehensive framework for the development of Zimbabwe's agriculture sector.

Gray, D. E. (2009). *Doing research in the real world* (2nd ed.). London, UK: Sage.

Green, A. (2016). Severe drought in Zimbabwe triggers food crisis. *The Lancet*, *387*(10022), 931–932. doi: 10.1016/s0140-6736(16)00633-4

Gwandu, T., Mtambanengwe, F., Mapfumo, P., Mashavave, T. C., Chikowo, R., & Nezomba, H. (2014). Factors influencing access to integrated soil fertility management information and knowledge and its uptake among smallholder farmers in Zimbabwe. *The Journal of Agricultural Education and Extension*, *20*(1), 79–93. doi:10.1080/1389224X.2012.757245

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Thousand Oaks, CA: Sage.

Guion, L. A., Diehl, D. C., & McDonald, D. (2011). *Triangulation: Establishing the validity of qualitative studies*. Department of Family, Youth and Community Sciences Series Paper FCS6014, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Retrieved from http://edis.ifas.ufl.edu/fy394

Gukurume, S. (2013). Climate change, variability and sustainable agriculture in Zimbabwe's rural communities. *Russian Journal of Agricultural and Socio-Economic Science, 14*(2), 89–100

Gummerson, E. (2017). Case theory in business and management: reinventing case study study research. Sage Publications

Halkias, D., & Neubert, M. (2020). Extension of theory in leadership and management studies using the multiple-case study design. *International Leadership Journal*, 12(2), 48–73. http://dx.doi.org/10.2139/ssrn.3586256

Hakeem, K. R. (Ed.). (2015). *Crop production and global environmental issues*. doi:10.1007/978-3-319-23162-4

Harrison, E. P., Dzigirai, V., Gandiwa, E., Nzuma, T., Masivele, B., & Ndlovu, H. T. (2015). *Progressing community-based natural resource management in Zimbabwe*. Institute of Poverty, Land, and Agrarian Studies Policy Brief Series, 35. South Africa: Sustainability Research Institute.

Harch, A. J. (2002). *Doing qualitative research in education settings*. Albany, NY: Suny Press.

Hartwich, F., & Scheidegger, U. (2010). Fostering innovation networks: The missing

piece in rural development. *Rural Development News, 1*(2010), 70–75. Retrieved from http://www.jdb.uzh.ch/view/type/journal/Rural_Development_News.html

Heffernan, G. (2014). The phenomenon happiness: Prolegomena to a phenomenological description. *The Humanistic Psychologist, 42*(3), 249–267. doi: 10.1080/08873267.2014.929873

Heidi-Ottosen, S. (2014). *The ageing of rural populations: Evidence on older farmers in low and middle income countries*. London. UK: Help Age International.

Helliker, K., Chiweshe, M. K., & Bhatasara, S. (2018). *The political economy of livelihoods in contemporary Zimbabwe* (1st ed.). Routledge.

Herald (2013, April). Zimbabwe: Lack of collateral hinters SMEs. Retrieved from http://allafrica.com/stories/201304170660.html

Hill, J., Terry, A., & Woodland, W. (2016). *Sustainable development: National aspirations, local implementation*. New York, NY: Routledge.

Holloway, I., & Wheeler, S. (2002). The nature of qualitative research: Development and perspectives (2nd ed.). Qualitative Research in Nursing, Blackwell Science Ltd, USA

Houghton, C., Casey, D., Shaw, D., & Murphy, K. (2013). Rigor in qualitative case study research. *Nurse Researcher, 20*(4), 12–17. doi:10.7748/nr2013.03.20.4.12.e326

Hulme, D., Moore, K., & Shepherd, A. (2001). *Chronic poverty: Meanings and analytical frameworks* (Chronic Poverty Research Centre Working Paper No. 2). http://dx.doi.org/10.2139/ssrn.1754546

International Monetary Fund (2015C). The commodities rollercoaster: a fiscal framework

for uncertain times. Fiscal Monitor, October

IPPC. (2012). *Summary for policymakers: In managing the risks of extreme events and disasters to advance climate change adaptation*. New York, NY: pp1-20.

Jacob, S. A., & Furgerson, S. P. (2012). Writing interview protocols and conducting interview: Tips for student new to the field of qualitative research. *The Qualitative Report, 17*(42), 1–10. Retrieved from http://nsuworks.nova.edu/tgr/vol17/iss42/3

Jayne, T. S., Chamberlin, J., & Headey, D. D. (2014). Land pressures, the evolution of farming systems, and development strategies in Africa: A synthesis. *Journal of Food Policy, 48*, 1–17. https://doi.org/10.1016/j.foopol.2014.05.014

Jerald, C. D. (2007). *Believing and achieving* (Issue Brief). Washington, DC: Center for Comprehensive School Reform and Improvement.

Jiri, O., Mafongoya, P., & Chivenge, P. (2015). Smallholder farmer perceptions on climate change and variability: A predisposition for their subsequent adaptation strategies. *Journal of Earth Science & Climatic Change, 6*(5), 277–284. doi:10.4172/2157-7617.1000277

Johnson, N. L., Kovarik, C., Meinzen-Dick, R., Njuki, J., & Quisumbing, A. (2016). Gender, assets, and agricultural development: Lessons from eight projects. *World Development, 83*, 295–311. doi:10.1016/j.worlddev.2016.01.009.

Kadzamira, M. A., & Ajayi, O. C. (2019). Innovative partnerships to scale up climate-smart agriculture for smallholder farmers in Southern Africa. The Climate-Smart Agriculture Paper, 289–299, Springer, Charm. doi:10.1007/978-3-319-92798-5-

25

Kahane, R., Hodgkin, T., Jaenicke, H., Hoogendoorn, C., Hermann, M., Hughes, J. D. A., ... & Looney, N. (2013). Agrobiodiversity for food security, health and income. *Agronomy for Sustainable Development, 33*(4), 671–693. doi:10.1007/sl3593-013-0147-8

Kassie, M., Jaleta, M., Shiferaw, B., Mmbando, F., & Mekuria, M. (2013). Adoption of interrelated sustainable agricultural practices in smallholder systems: Evidence from rural Tanzania. *Technological Forecasting and Social Change*, *80*(3), 525–540

Katz, J. (2014). Situational evidence strategies for causal reasoning from observational field notes. *Sociological Methods & Research*, 0049124114554870

Kendall, S., & Holliday, L. E. (2014). Understanding ethical qualitative research in public health: are current ethical processes sufficient? *Australia Journal of Journal of Public Health*, *38*(4), 306–310. doi: 10.1111/1753-6405.12250

Kellner, K., von Maltitz, G., Seely, M., Atlhopheng, J., & Lindeque, L. (2018). Southern Africa arid lands: Current status and future prospects in climate variability impacts on land use and livelihood in drylands. Springer, Cham.

Khan, M. A., & Akhtar, M. S. (2015). *Agricultural adaptation and climate change policy for crop production in Africa*. Cham, Switzerland: Springer International Publishing.

Komodromos, M. (2014). Employees' perceptions of trust, fairness, and the management of change in three private universities in Cyprus. Journal of Human Resources,

2(2), 35-54. Doi.10.1504/ijtcs.2013053413

Kornbluh, M. (2015). Combatting challenges to establishing trustworthiness in qualitative research. *Qualitative Research in Psychology*, *12*, 397 – 414. doi:10.1080/14780887.2015.1021941

Kozinets, R. V. (2015). *Netnography: Redefined* (2nd ed.). Thousand Oaks, CA: Sage.

Kusagaya, S., Warburton, M. L., van Gardeten, E. A., & Jewitt, G. P. W. (2013). Impact of climate change on water resources in Southern Africa: A review. *Journal of Physics and Chemistry of the Earth*, (67–69), 47–54. doi:10.1016/jpce.2013.09.014

Kvale, S. (1995). The social construction of validity. *Qualitative Inquiry*, *1*(1), 19–40

Lancaster, K. (2017). Confidentiality, anonymity and power relations in elite interviewing: Conducting qualitative policy research in a politicized domain. *International Journal of Social Research Methodology, 20*(1), 93–103. http://dx.doi.org/10.1080/13645579.2015.1123555

Leach, M., Mearns, R., & Scoones, I. (1999). Environmental entitlements: Dynamics and institutions in community-based natural resource management. *World Development, 27*(2), 225–247. doi:10.1016/s0305-750x(98)00141-7

Leech, N. L., & Onwuegbuzie, A. J. (2007). An array of qualitative analysis tools: A call for data analysis triangulation. *School Psychology Quarterly*, *22*, 557–585. doi:10.1037/1045.3830.22.4.557

Leedy, P. D., & Ormrod, J. E. (2010). Practical research: Planning and design (9th ed.). Boston, MA: Pearson Education.

Leedy, P. D., & Ormrod, J. E. (2005). Practical Research: Planning and design (8th ed.), Upper Saddle River, NJ: Prentice Hall.

Legesse, B. A., Jefferson-Moore, K. & Thomas, T. (2017). Impact of land tenure and property rights on reforestation intervention in Ethiopia. Journal of Land Use Policy, Vol.70, 494-499, http://doi.org/10.1016/j.landusepolil.2017.11.018

Lietz, C. A., & Zayas, L.E. (2010). Evaluating qualitative research for social work practitioners. *Advances in Social Work*, *11*, 188–202. Retrieved from http://journals.iupui.edu/index.php/advances

Lincoln, Y. S., & Denzin, N. K. (2003). Turning points in qualitative research: Tying knots in a handkerchief. Rowman Altamira.

Mago, S., Hofisi, C., & Mago, S. (2013). Microfinance institutions and operational risk management in Zimbabwe: Insights from Masvingo urban. *Mediterranean Journal of Social Science*, *4*(3), 159–168. doi:10.5901/mjss.2013.v4n3p159

Makate, C., Wang, R., Makate, M., & Mango, N. (2016). Crop diversification and livelihoods of smallholder farmers in Zimbabwe: Adaptive management for environmental change. *SpringerPlus, 5,* Article no. 1135, 18 pages. doi:10.1186/s40064-016-2802-4

Makate, C., Wang, R., Makate, M., & Mango, N. (2017). Impact of drought tolerant maize adoption on maize productivity, sales, and consumption in rural Zimbabwe. *Agricultural Economics Research, Policy and Practice in Southern Africa*, *56*(1), 67–81. doi: 10.1080/03031853.2017.1283241

Makate, C., Makate, M., Mango, N., & Siziba, S. (2019). Increasing resilience of

smallholder farmers to climate change through multiple adoption of proven climate-smart agriculture innovations: Lessons from Southern Africa. *Journal of Environmental Management*, (231), 858–868. doi:10.1016/j.envman.2018.10.069

Makonese, T. (2016). Renewable energy in Zimbabwe. Domestic use of Energy (DUE). 2016 International Conference on the IEEE, 1–9. doi:10.1109/DUE2016.7466713

Mapaso, N., Nyamutowa, C., Masunda, S., Chipunza, N., & Mugabe, D. (2014). Characterization of smallholder irrigation schemes in Chirumanzu District, Zimbabwe. *Journal of Agricultural Science*, *6*(2), 189–199. doi:10.5539/jas.v6n2p189

Mapfumo, P., Mtambanengwe, F., & Chikowo, R. (2014). Building on indigenous knowledge to strengthen the capacity of smallholder farming communities to adapt to climate change and variability in southern Africa. *Climate and Development, 8*(1), 72–82. http://dx.doi.org/10.1080/17565529.2014.998604

Mapiye, M. (2016). *Livelihoods after land reform resettlement programme: A critical appraisal of the Nyahukwe resettled farmers, Rusape, Zimbabwe* (Master's thesis). Retrieved from University of the Western Cape Electronic Theses and Dissertations Repository. URI: http://hdl.handle.net/11394/4931

Marongwe, L. S., Kwazira, K., Jenrich, M., Thierfelder, C., Kassam, A., & Friedrich, T. (2011). An African success: the case of conservation agriculture in Zimbabwe. *International Journal of Agricultural Sustainability*, *9*(1), 153–161. doi:10.3763/ijas.2010.9121

Marques, M. J., Schwilch, G., Lauterburg, N., Crittenden, S., Tesfai, M., Stolte, J., …

Doko, A. (2016). Multifaceted impacts of sustainable land management in drylands: A review. *Sustainability, 8*(2), 177–211. doi:10.3390/su8020177

Marshall, C., & Rossman, G. B. (2011). *Designing qualitative research* (5th ed.). Thousand Oaks, CA: Sage.

Mashavave, T., Mapfumo, P., Mtambanengwe, F., Gwandu, T., & Siziba, S. (2013). Interaction patterns determining improved information and knowledge sharing among smallholder farmers. *African Journal of Agricultural and Resource Economics, 8*(1), 1–12. Retrieved from http://www.afjare.org/vol-8-no-1.php

Masikati, P., Descheemaeker, K., & Crespo, O. (2019). Understanding the role of soil and management on crops in the face of climate uncertainty in Zimbabwe: A sensitivity analysis. The Climate-Smart Agriculture Papers, 49–64, Springer, Cham

Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. Forum Qualitative sozialforschung/forum: Qualitative Social Research, 11(3), Art.8. Retrieved from http://www.qualitative-research.net/index.phd/fqs/article/view/1428/3027

Matondi, P. B. (2012). *Zimbabwe's Fast Track Land Reform (Africa Now)*. London: Zed Books Ltd.

Matsa, M. (2011). Fast-track to prosperity or poverty? An assessment of Zimbabwe's Fast-Track Resettlement programme on beneficiaries' lives at Beacon Kop farm in Shurugwi District. *Journal of Sustainable Development in Africa, 13*(4), 197–212. https://www.researchgate.net/publication/288181984

Mawere, M., Madziwa, S., & Mabeza, C. M. (2013). Climate change and adaptation in the Third World Africa: A quest for increased food security in semi-arid Zimbabwe. *The International Journal of Humanities and Social Studies*, *1*(2), 14–22.

Maxwell, J.A. (2004). Casual explanation: Qualitative research and scientific inquiry in education. *Scientific Research in Education*, *33*(2), 3–11

Mburu, S. W., Koskey, G., Kimiti, J. M., Ombori, O., Maigi, J. M., & Njeru, E. M. (2016). Agrobiodiversity conservation enhances food security in subsistence-based farming systems of Eastern Kenya. *Journal of Agriculture and Food Security*, (2016), 5–19. doi:10.1186/s40066.016-0068-2

McAllister, G. (2012). *Unlocking Zimbabwe's organic potential: The case of smallholder farmers in Mashonaland East*. Harare, Zimbabwe: Garden Africa.

Merriam, S. B. (2014). Qualitative Research: A guide to design and implementation. John Wiley & Sons.

Merrian, S. B. & Greiner, R. S. (2019). Qualitative research in practice: Examples for Discussion and Analysis, (2nd ed.) Jossey-Bass Publication

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation* (4th ed.). San Francisco, CA: Jossey-Bass Publishing.

Mhlanga, D., & Ndhlovu, E. (2020). Socio-economic implications of the COVID-19 pandemic on smallholder livelihoods in Zimbabwe, Preprints 2020,2020040219.doi:10.20944/preprint202004.0219.v1

Miles, M., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods*

sourcebook. Thousand Oaks, CA: Sage.

Morgan, S. J., Pullon, S. R., Macdonald, L. M., McKinlay, E. M., & Gray, B. V. (2017). Case study observational research: A framework for conducting case study research where observation data are the focus. *Qualitative Health Research, 27*(7), 1060–1068. doi: 10.1177/1049732316649160

Moyo, P. (2013). Urban livelihoods after the fast track land reform programme in Bulawayo, Zimbabwe. *Journal of Human Ecology, 42*(1), 25–32, doi:10.1080/09709274.2013.11906578

Moyo, B., Dube, S., & Moyo, P. (2013). Rangeland management and drought coping strategies for livestock farmers in the semi-arid savanna communal areas of Zimbabwe. *Journal of Human Ecology, 44*(1), 9–21, doi:10.1080/09709274.2013.11906638

Moyo, M., van Rooyen, A., Moyo, M., Chivenge, P., & Bjornlund, H. (2017). Irrigation development in Zimbabwe: Understanding productivity barriers and opportunities at Mkoba and Silalatshani irrigation schemes. *International Journal of Water Resources Development,* 33(5) 740–754. Online publication. http://dx.doi.org/10.1080/07900627.2016.1175339

Moyo, S. (2011). Three decades of agrarian reform in Zimbabwe. *Journal of Peasant Studies, 38*(3), 493–531. doi:10.1080/03066150.2011.583642

Moyo, S., Chambati, W., & Yeros, P. (2019). Land and natural resources in Zimbabwe: Scramble and Resistance. In Reclaiming Africa, 225–253, Springer, Singapore.

Moyo, S., O'keefe, P., & Sill, M. (2013). The Southern African Environment: Profiles of

the SADC Countries. London, Earthscan.

Mtambanengwe, F., & Mapfumo, P. (2005). Organic matter management as an underlying cause for soil fertility gradients on smallholder farms in Zimbabwe. *Nutrient Cycling in Agroecosystems, 2005*(73), 227–243. doi:10.1007/s10705-005-265-x

Mtambanengwe, F., Mapfumo, P., Chikowo, R., & Chamboko, T. (2012). Climate change and variability: Smallholder farming communities in Zimbabwe portray a varied understanding. *African Crop Science Journal*, *20*(2), 227–241.

Mubaya, C. P., Njuki, J., Mutsvangwa, E. P., Mugabe, F. T., & Nanja, D. (2012). Climate variability and change or multiple stressors? Farmer perceptions regarding threats to livelihoods in Zimbabwe and Zambia. *Journal of Environmental Management, 102*(2012), 9–17. doi:10.1016/j.jenvman.2012.02.005

Muchesa, E., Nkosi, B. D., Zwane, E. M., & van Niekerk, J. A. (2019). The role of extension support in a communal farmers' market system in Mhondoro-Mubaira, Zimbabwe. South Africa Journal of Agricultural; and Extension, 47(2), 72-80, http://dx.doi.org./10.17159/2413-3221/2019/v47n2a504

Mudzonga, E. (2011). Farmers' adaptation to climate change in Chive District of Zimbabswe

Mugandani, R., Wuta, M., Makarau, A., & Chipindu, B. (2012). Reclassification of agro-ecological regions of Zimbabwe in conformity with climate variability and change. *Journal of African Crop Science*, *20*(2), 361–369.

Mumuni, E., & Oladele, O. I. (2016). Access to livelihood capitals and propensity for

entrepreneurship amongst rice farmers in Ghana. *Agriculture & Food Security, 5*(1), 1–11. doi:10.1186/s40066-015-0049-x

Manyeruke, C., Hamauswa, S., & Mhandara, L. (2013). The effect of climate change and variability on food security in Zimbabwe: A socio-economic and political analysis. *International Journal of Humanities and Social Science*, *3*(6),

Muir, K. (1997). Agriculture in Zimbabwe. Presented at the Leadership for Environment and Development (LEAD) International Zimbabwe Session – Cohort4, April 21 to May 3.

Mupangwa, W., Mutenje, M., Thierfelder, C., & Nyagumbo, I. (2016). Are conservation agriculture (CA) systems productive and profitable options for smallholder farmers in different agro-ecoregions of Zimbabwe? *Renewable Agriculture and Food Systems*, 17 pages. Published online 15 February 2016. doi:10.1017/S1742170516000041

Mupaso, N., Nyamutowa, C., Masunda, S., Chipunza, N., & Mugabe, D. (2014). Characterisation of smallholder irrigation schemes in Chirumanzu District, Zimbabwe. *Journal of Agricultural Science, 6*(2), 189–199. doi:10.5539/jas.v6n2p189

Murendo, C., Gwara, S., Mpofu, N., Pedzisa, T., Mazvimavi, K., & Chivenge, P. (2016). The adoption of a portfolio of sustainable practices by smallholder farmers in Zimbabwe. International Crops Research Institute for the Semi-Arid Tropics

Murisa, T. (2011). Local farmer groups and collective action within fast track land reform in Zimbabwe. *Journal of Peasant Studies*, *38*(5), 1145–1166.

http://dx.doi.org/10.1080/03066150.2011.634502

Murphree, M. W., & Mazambani, D. (2002). Policy implications of common Pool Resource knowledge: A background paper on Zimbabwe, unpublished paper for the Policy implications of common pool resource knowledge in India, Tanzania, and Zimbabwe project.

Musaramdega, H., & Chitongo, L. (2020). A contextual COVID-19 social distancing monitoring strategy for remote communal settings: Insights from Biriiri Communal lands, Zimbabwe. African Journal of Governance & Development, 9(1.1), 309-328, Retrieved from https://journals .ukzn.ac.za/index.php/jqd/artide/view/1755

Musemwa, L., & Mushunje, A. (2011). Agrarian and life style change in Zimbabwe: From colonization to the formation of government of national unity. *African Journal of Agricultural Research*, *6*(21), 4824–4832. doi:10.5897/AJAR11.433

Musemwa, L., & Mushunje, A. (2012). Land reform as a strategy of breaking the circles of poverty in former colonized states of developing countries: A review. A*frican Journal of Agricultural Research*, *7*(31), 4344–4351. doi: 10.5897/AJAR12.002

Mushore, T., Manatsa, D., Pedzisai, E., Muzenda-Mudavanhu, C., Mushore, W., & Kudzotsa, I. (2016). Investigating the implications of meteorological indicators of seasonal rainfall performance on maize yield in a rain-fed agricultural system: Case study of Mt. Darwin District in Zimbabwe. T*heoretical and Applied Climatology*, *124*(3–4),1–7. doi: 10.1007/s00704-016-1838-2

Musungwini, S. (2018). Mobile phone use by Zimbabwean smallholder farmers: A

baseline study. The African Journal of Information and communication (AJIC), 22, 29-52, http://dx.org/10.23962/10539/26171

Mutsvangwa-Sammie, E. P., Manzungu, E., & Siziba, S. (2016). Profiles of innovators in a semi-arid smallholder agricultural environment in south west Zimbabwe. *Physics and Chemistry of the Earth, Parts A/B/C*. Advance online publication. http://dx.doi.org/10.1016/j.pce.2016.09.002

Ncube, P., Robert, S., Zengeni, T., & Samboko, P. C. (2017, January). *Identifying growth opportunities in the Southern Africa Development Community through regional value chains: The case of the animal feed to poultry value chain* (WIDER Working Paper 2017/4). Helsinki, Finland: UNU-WIDER.

Neubert, M. (2016). Significance of the speed of internationalization for born global firms – a multiple case study approach. International Teaching and Case Studies, 7(1), 118-134. doi.10.1504/IJCS.2016.076067

Nezomba, H., Mtambanengwe, F., Tittonell, P., & Mapfumo, P. (2015). Point of no return? Rehabilitating degraded soils for increased crop productivity on smallholder farms in eastern Zimbabwe. *Geoderma, 239–240,* 143–155. http://dx.doi.org/10.1016/j.geoderma.2014.10.006,

Nezomba, H., Mtambanengwe, F., Tittonell, P., & Mapfumo, P. (2017). Practical assessment of soil degradation on smallholder farmers' fields in Zimbabwe: Integrating local knowledge and scientific diagnostic indicators. *Catena*, *156*, 216–227. https://doi.org/10.1016/j.catena.2017.04.014

Neuman, W. L. (2011). *Social research methods: Qualitative and quantitative methods*

(7th ed.). Pearson

Nhundu, K., Mushunje, A., Zhou, L., & Aghdasi, F. (2015). Institutional determinants of farmer participation in irrigation development post fast-track land reform program in Zimbabwe. *Journal of Agricultural Biotechnology and Sustainable Development, 7*(2), 9–18. doi:10.5897/JABSD09.038

Nikolakis, W., & Grafton, R. Q. (2015). Putting indigenous water rights to work: The sustainable livelihoods framework as a lens for remote development. *Community Development, 46*(2), 149–163. doi:10.1080/15575330.2015.1009922

Nkonya, E., Place, F., Pender, J., Mwanjololo, M., Okhimamhe, A., Kato, E., … Traore, S. (2011). *Climate risk management through sustainable land management in Sub-Saharan Africa* (Discussion Paper 01126). Retrieved from International Food Policy Research Institute website: http://www.ifpri.org/publication/climate-risk-management-through-sustainable-land-management-sub-saharan-africa-0

Noor, K. B. M., (2008). Case study: A strategic research methodology. *American Journal of Applied Sciences, 5*(11), 1602–1604. doi: 10.3844/ajassp.2008.1602-1604.

Norlyk, A., & Harder, I. (2010). What makes a phenomenological? An analysis of peer reviewed empirical nursing studies nursing studies. *Qualitative Health Research, 20*(3), 420–431

Norton, A., & Foster, M. (2001). *The potential of using sustainable livelihoods approaches in poverty reduction strategy papers* (Working Paper No. 148). London, UK: Overseas Development Institute.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis.

International Journal of Qualitative Methods, 16(11), 1 – 13. doi:10.1177/1609406917733847

Nyamadzawo, G., Wuta, M., Chirinda, N., Mujuru, L., & Smith, J. L. (2013). Greenhouse gas emissions from intermittently flooded (Dambo) rice under different tillage practices in Chiota smallholder farming area of Zimbabwe. *Atmospheric and Climate Sciences, 3*(4A), 13–20. doi:10.4236/acs.2013.34A003

Nyamangara, T., Mugwira, L. M., & Mpofu (2000). Soil fertility status in the communal areas of Zimbabwe in relation to sustainable crop production. *Journal of Sustainable Agriculture*, *16*(2), doi:10.1300/j064n02-0

Nyareza, S., & Dick, A. L. (2012). Use of community radio to communicate agricultural; information to Zimbabwe's peasant farmers. Aslib, 64(5), doi.10.1108/00012531211163111

OECD. (2018). *Policy coherence for sustainable development 2018: Towards sustainable and resilience societies*. doi:10.1787/9789264301061

Onwuegbuzie, A. J., & Leech, N. L. (2007). Validity and qualitative research: An Oxymoron? Quality and Quantity, 41(2), 233–249. doi:10.1007/s11135-006-9000-3

O'Reilly, M., & Parker, N. (2013). 'Unsatisfactory saturation': A critical exploration of the notion of saturated sample sizes in qualitative research. *Qualitative Research, 13*(2), 190–197. doi: 10.1177/1468794112446106

Paganini, N. Adinata, K., Buthelezi, N., Harris, D., Lemke, S., Luis, A., & Ramba, T. (2020). Growing and eating food during the COVID-19 Pademic: Farmers'

perspectives on local food system resilience to shocks in Southern Africa and Indonesia. Sustainability, 12(20), 8556.doi:10.3390/su12208556

Palmer, R. (1990). Land reform in Zimbabwe, 1980–1990. *African Affairs*, *89*(355), 163–181. Doi: https://doi.org/10.1093/oxfordjournals.afraf.a098283

Patton, M. Q. (2002). *Two decades of developments in qualitative inquiry: A personal, experiential perspective*. Thousand Oaks, CA: Sage.

Patton, M. (2014). *Qualitative research & evaluation methods* (4th ed.). Thousand Oaks, CA: Sage.

Phiri, G. K., Egeru, A., & Ekwamu, A. (2016). Climate change and agriculture nexus in Sub-Saharan Africa: The agonizing reality for smallholder farmers. *International Journal of Current Pharmaceutical Review and Research*, *8*(2), 57–64.

Poulton, C. (2002). *A review of Zimbabwe's agricultural economic policies: 1980–2000*. Available at London Imperial College website: www.imperial.ac.uk/agriculturalsciences/research/sections/aebm/projects/poor-ag.htm#downloads

Pretty, J., & Bharucha, Z. P. (2014). Sustainable intensification in agricultural systems. *Annals of Botany*, *114*(8), 1571–1596. doi:10.1093/aob/mcu205

Price, R. (2020). Impacts of VOVID-19 regulatroy measures on small-scale and informal trade in Zimbabwe. K4D Helpdesk Report, 815-816. Brighton, UK: Institute of Development Studies. https:opendocs.ids.ac.uk/opendocs/handle/20500.12413/15323

Rapsomanikis, G. (2015). *The economic lives of smallholder farmers: An analysis based*

on household data from nine countries. Retrieved from Food and Agriculture Organization of the United Nations website: http://www.fao.org/3/a-i5251e.pdf

Redlich-Amiray, D., & Higginbotton, G. (2014). New emerging technologies in qualitative research. *The Qualitative Report*, 19(26), 1–14, Retrieved from http://nsuworks.nova.edu/tqr/vol19/iss26/3

Reiter, S., Stewart, G., & Bruce, C. (2011). A strategy for delayed research method selections: Deciding between grounded theory and phenomenology. *Electronic Journal of Business Research Methods*, *9,* 35–46. Retrieved from http://www.ejbrm.com

Reynolds, T. W., Waddington, S. R., Anderson, C. L., Chew, A., True, Z., & Cullen, A. (2015). Environmental impacts and constraints associated with the production of major food crops in Sub-Saharan Africa and South Asia. *Food Security*, *7*(4), 795–822. doi: 10.1007/s12571-015-0478-1

Richardson, C. J. (2005). How the loss of property rights caused Zimbabwe's collapse. *Cato Institute Economic Development Bulletin*, *4*, 1–4. http://www.cato.org/pubs/edb4.pdf

Robinson, O. C. (2014). Sampling in interview-based qualitative research: A theoretical and practical guide. *Qualitative Research in Psychology*, *11*(1), 25–41. https://dx.doi.org/10.1080/14780887.2013.801543

Roll-Petersen, L. (2008). Teacher's perceived efficacy and the illusion of a pupil with dyslexia or mild mental retardation: Finding from Sweden. *Education and Training in Developmental Disabilities*, *43*(2), 174–185

Rowley, J. (2012). Conducting research interviews. *Management Research Review, 35*(3/4), 260–271. https://doi.org/10.1108/01409171211210154

Rubin, H. J., & Rubin, I. S. (2011). *Qualitative interviewing: The art of hearing data*. http://dx.doi.org/10.1080/13645579.2015.1123555

Rusinamhodzi L., Corbeels, M., Zingore, S., Nyamangara, J., & Giller, K. E. (2013). Pushing the envelope? Maize production intensification and the role of cattle manure in recovery of degraded soils in smallholder farming areas of Zimbabwe. *Journal of Field Crops Research, 147*(2013), 40–53. http://dx.doi.org/10.1016/j.fcr.2013.03.014

Rusinamhodzi, L., Dahlin, S., & Corbeels, M. (2016). Living within their means: Reallocation of farm resources can help smallholder farmers improve crop yields and soil fertility. *Agriculture, Ecosystems & Environment, 216*, 125–136. http://dx.doi.org/10.1016/j.agee.2015.09.033

Ryoo, S., & Koo, C. (2013). Green practices-IS alignment and environmental performance: The mediating effects of coordination. *Information System Frontier, 15*(5), 799–814. doi:10.1007/s10796-013-9422-0

Schram, T. H. (2006). *Conceptualizing and proposing qualitative research* (2nd ed.). Lewiston, NY: Pearson.

Scoones, I. (1998). *Sustainable rural livelihoods: A framework for analysis* (IDS Working Paper 72). Brighton, UK: Institute of Development Studies.

Scoones, I. (2009). Livelihoods perspectives and rural development. *The Journal of Peasant Studies, 36*(1), 171–196. doi:10.1080/03066150902820503

Scoones, I. (2015). Transforming soils: Transdisciplinary perspectives and pathways to sustainability. *Current Opinion in Environmental Sustainability, 15,* 20–24. doi:10.1016/j.cosust.2015.07.007

Scoones, I. (2016). Land reform, livelihoods and the politics of agrarian change in Zimbabwe. In A. Pallotti & C. Tornimbeni (Eds.), *State, land and democracy in Southern Africa* (pp. 127–148). Farnham, UK: Ashgate Publishing Ltd.

Scoones, I., Mavedzenge, B., & Murimbarimba, F. (2016). Sugar, people and politics in Zimbabwe's lowveld. *Journal of Southern African Studies*, 18 pages. Published online 15 September 2016. doi:10.1080/03057070.2016.1187972

Scoones, I., Mavedzenge, B., Murimbarimba, F., & Sukume, C. (2018). Labor after land reform: The precious livelihoods of former farmworkers in Zimbabwe. *Development and Change, 00*(0), 1–31, doi:10.1111/dech.12449

Scoones, I., Mavedzenge, B., & Murimbarimba, F. (2018). Medium-scale commercial farms in Africa: The experience of the native purchase areas in Zimbabwe. *Africa, 88*(3), 597–619. doi:10.1017/S0001972018000244

Scoones, I., Shonhe, T., Chitapi, T., Maguranyanga, C., Mutimbanyoka, S. (2020). Agricultural commercialization in Northern Zimbabwe: Crises, conjusntions and contingencies, 1890-2020. Working WP,35. Retrieved from; https:www.future-agriculture.org/publications/working-papers-document/working-paper-35-agricultural-commercializations-in-northen-Zimbabwe-crises-conjuctures-and-contingencies1890-2020?

Sen, A. (1981). *Poverty and famines: An essay on entitlement and deprivation*. Oxford,

UK and New York, NY: Oxford University Press.

Sen, A. (1984). *Resources, values and development*. Cambridge, MA: Harvard University Press.

Sen, A. (1985). *Commodities and capabilities (Lectures in economics: Theory, institutions, policy).* Amsterdam, the Netherlands: Elsevier Science.

Shiferaw, B., Tesfaye, K., Kassie, M., Abate, T., Prasanna, B. M., & Menkir, A. (2014). Managing vulnerability to drought and enhancing livelihood resilience in sub-Saharan Africa: Technological, institutional and policy options. *Weather and Climate Extremes, 3*, 67–79. https://doi.org/10.1016/j.wace.2014.04.004

Slater, R., Peskett, L., Ludi, E., & Brown, D. (2007). Climate change, agricultural policy and poverty reduction – how much do we know? *Natural Resource Perspectives*, 109,1–20.

Slootweg, R., Vanclay, F., & van Schooten, M. (2001). Function evaluation as a framework for the integration of social and environmental impact assessment. *Impact Assessment and Project Appraisal, 19*(1), 19–28. doi:10.3152/147154601781767186

Sonneveld, B. G., Bunning, S., Biancalani, R., Ndiaye, D., & Nachtergaele, F. (2016). Do farmers' asset values correlate with land quality? *Journal of Sustainable Development, 9*(1), 268–285. doi:10.5539/jsd.v9n1p268

Stake, R. E. (2013). *Multiple case study analysis*. London, UK: The Guilford Press.

Stoeffler, Q., Alwang, J., Mills, B., & Taruvinga, N. (2016). Multidimensional poverty in crisis: Lessons from Zimbabwe. *The Journal of Development Studies, 52*(3), 428–

446. http://dx.doi.org/10.1080/00220388.2015.1087511

Street, C. T., & Ward, K. W. (2012). Improving validity and reliability in longitudinal case study timelines [Special issue]. *European Journal of Information Systems, 21*(2), 160–175. doi:10.1057/ejis.2011.53

Sui, L., & Sun, L. (2016). Spillover effects between exchange rates and stock prices: Evidence from BRICS around the recent global financial crisis. *Research in International Business and Finance, 36*(2016), 459–471. doi:10.1016/j.ribat.2015.10.011

Tatsvarei, S., Mushunje, A., Matsvai, S., & Ngarava, S. (2018). Farmer perceptions in Mashonaland East Province on Zimbabwe's agricultural land rental policy. *Land Use Policy, 75*, 468–477. doi:10.1016/j.landusepol.2018.04.015

Teklewold, H., Kassie, M., Shiferaw, B., & Kohlin, G. (2013). Cropping system diversification, conservation tillage and modern seed adoption in Ethiopia: Impacts on household income, agrochemical use and demand for labor. *Ecological Economics, 93*, 85–93

Teshome, A., de Graaff, J., Ritsema, C., Kassie, M. (2014). Farmers' perceptions about the influence of land quality, land fragmentation and tenure systems on sustainable land management in the North Western Ethiopia Highlands. *Land Degradation and Development Journal, 27*, 884–898. doi: 10.1002/ldr.2298

Theirfelder, C., & Wall, P. C. (2009). Effects of conservation agriculture techniques on infiltration and soil water content in Zambia and Zimbabwe. *Journal of Soil and Tillage Research, 105*(2), 217–227, doi:10.1016/j-still.2009.07.007

Tittonell, P., & Giller, K. E. (2013). When yield gaps are poverty traps: The paradigm of ecological intensification in African smallholder agriculture. *Journal of Field Crops Research, 143*(2013), 76–90. http://dx.doi.org/10.1016/j.fcr.2012.10.007

Todes, A., Kok, P., Wentzel, M., Van Zyl, J., & Cross, C. (2010, August). Contemporary South African urbanization dynamics. *Urban Forum, 21*(3), 331–348. doi:10.1007/s12132-010-9094-5

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837–851. https://doi.org/10.1177/1077800410383121

Triomphe, B., Waters-Bayer, A., Klerkx, L., Schut, M., Cullen, B., Kamau, G., & LeBorgne, E. (2014). Innovation in smallholder farming in Africa: Recent advances and recommendations. Proceedings of the *International Workshop on Agricultural Innovation Systems in Africa (*AISA), 29–31 May 2013, Nairobi, Kenya. Montpellier, France: CIRAD.

USAID. (2016). *Zimbabwe country development cooperation strategy 2016-2021*. Available from USAID website: https://www.usaid.gov./globalgoals

United Nations (2020*). Africa is leapfrogging into digital agriculture.* Retrieved from: https://www.un.org/africarenewal/web-features/africa-leapfrogging-digital-agriculture

Utete, C. M. B. (2003). *Report of the Presidential Land Review Committee on the implementation of the fast-track land reform program 2000-2002*. Harare, Zimbabwe: Presidential Land Review Committee.

Vanclay, F. (2002). Conceptualising social impacts. *Environmental Impact Assessment Review, 22,* 183–211. doi:10.1016/S0195-9255(01)00105-6

VanLauwe, B., Coyne, D., Gockowski, J., Hauser, S. Huising, J., Masso, C.,… van Asten, P. (2014). Sustainable intensification and the African smallholder farmer. *urrent Opinion in Environmental Sustainability, 8*, 15–22.

Vanlauwe, B., Wendt, T., Giller, K. E., Corbeels, M., Gerard, B., & Notre, C. (2014). A fourth principles is required to define conservation agriculture in sub-Saharan Africa: The appropriate use of fertilizer to enhance crop-productivity. *Field Crops Research, 155,* 10–13. doi:10.1016/j.fcr.2013.10.002

Vermeulen, S. J., Aggarwal, P. K., Ainslie, A., Angelone, C., Campbell, B. M., Challinor,… Wollenberg, E. (2011). Options for support to agriculture and food security under climate change. *Journal of Environmental and Science, 15*(1). doi:10.1016/J.envsci.2011.09.003

Vitoria, B., Mudimu, G., & Moyo, T. (2012). Status of agricultural and rural finance in Zimbabwe. FinMark Trust.

Walker, J. L. (2012). The use of salvation in qualitative research. *Canadian Journal of Cardiovascular Nursing, 22*(2), 37 – 46. Retrieved from http://www.cccn.ca

Whitlow, J. R. (1980). *Deforestation in Zimbabwe: Some problems and prospects.* Harare, Zimbabwe: Government Printer (NRB).

Williams, K. J., & Schirmer, J. (2012). Understanding the relationship between social change and its impacts: The experience of rural land use change in south-eastern Australia. *Journal of Rural Studies, 28*(4), 538–548.

doi:10.1016/jrurstud.2012.05.002

Willis, J. W. (2007). *Foundations of qualitative research: Interpretive and critical approaches*. London, UK: Sage.

World Bank Group. (2013). *Working with smallholders: A handbook for firms building sustainable supply chains*. Retrieved from International Finance Corporation website: Retrieved from: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/handbook_working+with+smallholders

World Bank. (2016, February). *Zimbabwe economic update: Changing growth patterns, improving health outcomes*. Washington, DC: World Bank Group. Retrieved from http://www.worldbank.org/en/country/zimbabwe/publication/zimbabwe-economic-update-changing-growth-patterns-improving-health-outcomes

World Food Programme (2020). *Empowering Smallholder Farmers in Zimbabwe to Market Drought-Resistant Grains and Pulses. Retrieved from:* https://www.wfp.org/operations/200946-empowering-smallholder-farmers-market-drought-resistant-grains-and-pulses

Yaro, J. A. (2004). Theorizing food insecurity: Building a livelihood vulnerability framework for researching food insecurity. *Norsk Geografisk Tidsskrift-Norwegian Journal of Geography, 58*(1), 23–37. doi:10.1080/00291950410004375

Yin, R. K. (2017).*Case study research and publications: Design and methods* (6th ed.). Thousand Oaks, CA: Sage.

Zamchiya, P. (2013). The role of politics and state practices in shaping rural differentiation: A study of resettled small-scale farmers in south-eastern Zimbabwe. *Journal of Southern African Studies, 39*(4), 937–953. doi:10.1080/03057070.2013.858547

Zembe, N., Mbokochena, E., Mudzengerere, F. H., & Chikwiri, E. (2014). An assessment of the impact of the fast track land reform programme on the environmnent: The case of Eastdale farm in Gutu District Masvingo. *Journal of Geography and Regional Planning, 7*(8), 160–175. doi:10.5897/JGRP2013.0417

Ziadat, F., Bunning, S., & De Pauw, E. (201*ng for sustainable land management: Current and emerging needs in land resource planning for food security, sustainable livelihoods, integrated landscape management and restoratio*n (Food and Water Division Working Paper 14). Rome, Italy: Food and Agriculture Organization of the United Nations.

Zingore, S., Murwira, H. K., Delve, R. J., & Giller, K. E. (2007). Influence of nutrient management strategies on variability of soil fertility, crop yield and nutrient balances on smallholder farms in Zimbabwe. *Journal of Agricultural Ecosystems & Environment, 119*(2007), 112–126. doi:10.1016/j.agee.2006.06.019

Appendix A: Permission to Use Sustainable Livelihoods Framework Graphics

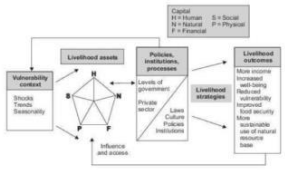
Daphne Halkias, PhD <daphne_halkias@yahoo.com>
To caroline@carolineashley.net

Today at 5:0

Dear Caroline-

I am a Researcher and Professor and have a PhD Management student, Owen Gono, who wishes to use your Sustainable Livelihood Framework graphic in his dissertation project. He is referencing your framework as part of his study's conceptual framework on '*Sustainable Land Management and Farmers' Livelihoods after Land Reform in Zimbabwe: A Multiple Case Study*'. May we have your permission to use your graphic? it would appear as:

Figure 1: The Sustainable Livelihoods Framework



Source: Adapted from Ashley & Carney, 2002, DFID

I also sent an invitation on LinkedIn and following Ashley Insight. Like you, I am a member of Business Fights Poverty (Ashid wrote the Intro chapter of my book: Entrepreneurship and Sustainability my book- if you send me an address, I'd love to send you a copy: https://www.routledge.com/Entrepreneurship-and-Sustainability-Business-Solutions-for-Poverty-Alleviation/Thurman-Malkias/p/book/9781409428732) so I am interested in your work and often point my student to your publications when we do research on international development issues in Africa.

Thank you and best regards--
Daphne Halkias

Daphne Halkias, PhD.
Professor, International School of Management, Paris, France
Fellow, Institute of Coaching at McLean Hospital, Harvard Medical School Affiliate
Research Affiliate, Institute for the Social Sciences, Cornell University, New York, USA
Editor, *International Journal of Teaching and Case Study; International Journal of Technology-Enhanced Learning; International Journal of Social Entrepreneurship and Innovation*

CEO, Consulting Psychologist
Executive Coaching Consultants
www.executivecoachingconsultants.com
email: halkias@executivecoachingconsultants.com
Executive Coaching Consultants cannot accept any responsibility for the accuracy or completeness of this message as it has been transmitted over a public network.

Reply Reply to All Forward More

Caroline Ashley <caroline@carolineashley.net>
To 'Daphne Halkias, PhD'

Today at 5:4

Dear Daphne
Yes of course, permission granted.

Good to hear about your work. Let me know if you are in London any time so we can have coffee.
A book copy would be great. I'm at 1a Waldegrave Park, twickenham, TW1 4TL, U.K. Thanks!

Best wishes
Caroline

Sent from my iPhone

Appendix B: Permission to Use Environmental Entitlements Framework Graphic

On Monday, October 31, 2016 6:17 AM, Robin Mearns <rmearns@worldbank.org> wrote:

Dear Daphne,

My apologies for the delayed reply. This is to confirm that I am happy to grant permission to use the graphic below in Mr. Gono's PhD dissertation. I would just like to check, however, that the correct source is used. Melissa Leach and I did indeed publish a report in 1991 which first developed the environmental entitlements framework. The final v of the paper on the environmental entitlements framework was published in World Development in 1999, then with Ian Scoones as co-author as well.
Best wishes,
Robin

Robin Mearns
Practice Manager, Social Development, East & Southern Africa

Social, Urban, Rural and Resilience
T +1 202-458-5068
M +1 202-203-0705
E Rmearns@worldbank.org
W www.worldbank.org

WORLD BANK GROUP
Social, Urban, Rural & Resilience

Appendix C: Recruitment Letter to Participate in the Study

Sustainable Land Management and Smallholder Farmers in Zimbabwe:

A Multiple Case Study

Re: Welcome package

[02/11/2018]

Dear xxxxxxx,

First, I would like to thank you for your interest in this study. My name is Owen P. Gono. I am conducting a study on Sustainable Land Management and Smallholder Farmers in Zimbabwe: A Multiple Case Study.

The purpose of this qualitative, multiple case study is to gain a deeper understanding of specific knowledge gaps among smallholder farmers in Zimbabwe in order to tailor sustainable land management training to their needs. To address this gap on sustainable land management knowledge among smallholder farmers in Zimbabwe, and consistent with the qualitative paradigm, a multiple case study design will be used to meet the purpose of the study. Each participant will be considered a separate case study.

You are eligible to participate in this study if you meet all the following criteria:

1. You are over the age of 18.
2. You are a smallholder farmer in communal areas, resettled small scale areas, and small scale commercial areas in Zimbabwe and own less than 35 hectares of land.
3. You have been operating on the land for the past 10 years and have witnessed a number of challenges facing smallholder farmers in Zimbabwe.

4. You are willing and able to participate in a 30-minute to 1-hour recorded Skype interview. If neither one is feasible, then answers can be sent via email.

If you meet these criteria, please continue reading; if you do not meet any criteria above, you are not eligible for this study. Thank you for your time.

Interviews will be the primary source of data collection. In addition to a recorded phone or Skype session, I will take notes based on my observations. The interview will take approximately 20 to 40 minutes and you are free to end the interview at any time.

For your convenience, I have included an informed consent form. If you can take part in the study, I will need this form filled out and signed before we can conduct the recorded phone or Skype session. When you respond with your interest in taking part in the study, you may send me any questions or concerns you have about the informed consent form. Once you are comfortable, please sign the informed consent form and send to me via email. At that point, we will schedule your interview at an agreed upon time.

Remember taking part is completely voluntary. Signing the informed consent form does not mandate you in any way. I will confirm your agreement to conduct the interview prior to asking any questions.

Finally, after the session is transcribed, I will contact you to review the written report. You can provide comments and clarify any statements made in the document during this time.

Thank you for your time and effort,

Owen P. Gono, (Researcher)

PhD Student – Walden University

Appendix D: Interview Protocol

A. FIELD SURVEYS PROVIDING ESSENTIAL DATA ABOUT SMALLHOLDER FARMERS HOUSEHOLD

• Name of farmer, village, and district_____

• Age, gender, and number of household members_____

• Highest grade attained by adults in household (men and women) _____

• Ability to read and write (men and women) _____

• Predominant language(s) spoken/written in household_____

• Type of housing (thatch vs. metal roof, soil vs. cement floor and walls) _____

• Productive and home assets (radio, bicycle, television, cell phone, motorbike, irrigation equipment, or walk-behind tractor). _____

• Farm size—A sample of farms should be measured by pacing or with GPS to determine the accuracy of farm sizes provided by farmer_____

• Membership in farmer group or community association_____

B. SURVEY ON SOLUTIONS, STRATEGIES, AND BEST PRACTICES IN FARMER TRAINING ON SUSTAINABLE LAND MANAGEMENT

The types of communication that trainers can use to transmit and collect information affects the frequency of communication, its quality, and its reach among smallholder farmers.

Do you have access to the following?

• Face-to-face interactions between firm or partner staff and farmers_____

• Written materials such as manuals, brochures, and product labels_____

• Information and communication technologies such as radio, Internet kiosks, tablet, computers, video, and cell phones_____

- Written and electronic training materials, such as manuals, posters, calendars, and videos, used to support face-to-face training_____
- Effective training tools are tailored to the needs and preferences of smallholder farmers using both local languages and artwork to convey training messages_____

C. SEMISTRUCTURED QUESTIONS ON SUSTAINABLE LAND MANAGEMENT AND LIVELIHOOD STRATEGIES OF SMALLHOLDER FARMERS

Please share what more information you need to know on the following areas and why this information is needed in your livelihood strategy as a smallholder farmer?

1. Cultivation methods
2. Innovative methods for soil fertility
3. Innovative methods to access water resources
4. Managing changing weather patterns
5. Inter-cropping techniques
6. Access to local markets
7. Framers' associations
8. Land tenure rights
9. Access to credit
10. Education on literacy and numeracy.

11. Your legal rights and policies, legislation and regulation that impact your livelihood
12. Financial service organizations exist (both formal and informal)?

D. SUMMATION

1. Which combinations of sustainable land management activities we discussed today will work best for you to meet your future farming needs?
2. Which activities we mentioned today do you believe are not achievable in the present smallholder farmer's life in Zimbabwe and why?

Would you like to add any final thoughts on the conversation?