THE IMPACT OF EMPOWERING WOMEN FARMERS TOWARDS SUSTAINABLE AGRICULTURE IN THE GAUTENG PROVINCE OF SOUTH AFRICA

By

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DECLARATION

I, Mamatime Kholofelo Thobejane, declare that my dissertation for the Philosophiae Doctor in Sustainable Agriculture (PhD) degree at the University of the Free State is independent work and it has not been submitted by me previously at another university/faculty.

30 November 2022

Kholofelo Thobejane Date

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AGRIS:	Agricultural Integrated Survey
CASP:	Comprehensive Agricultural Support Programme
CBD:	Convention on Biological Diversity
CEDAW:	The Convention on the Elimination of All Forms of Discrimination Against Women
CGE:	Commission for Gender Equality
CGIAR:	International Agricultural Research
COCA:	Census of Commercial Agriculture
CoJ:	City of Johannesburg,
CoT:	City of Tshwane
FAO:	Food and Agriculture Organization
IGDP:	Integrated Growth Development Plan
DAFF:	Department of Agriculture, Forestry, and Fisheries
DAFF FEA:	DAFF Female Entrepreneur Awards
DARD:	Department of Agriculture and Rural Development
DoW:	Department of Women
DoA:	Department of Agriculture
GDARD:	Gauteng Department of Agriculture and Rural Development
GEM:	Gender Empowerment Measure
GDI:	Gender-Related Index
GDP:	Growth Domestic Product
GFP:	Gender Focal Points
GHS:	General Household Survey
GPI:	Gender Parity Index
GP:	Gauteng Province
FIES:	Food Insecurity Experience Scale
IFPRI:	International Food Policy Research Institute

IGA:	Income-Generating Activities
IPM:	Integrated Pest Management
LFA:	Logical Framework Approach
MAFISA:	Micro Agricultural Financial Institutes of South Africa
NDP:	National Development Plan
NGO:	Non-Governmental Organization
OPHI:	Oxford Poverty & Human Development Initiative
OECD:	Organization for Economic Co-operation and Development
SIDA:	Swedish International Development Cooperation Agency
SDG:	Sustainable Development Goals
TFP:	Total Factor Productivity
USAID:	United States Agency for International Development
VAT:	Value-Added Tax
VSS:	Voluntary Sustainability Standards
WCED:	World Commission on Environment and Development
WEAI:	Women's Empowerment in Agriculture Index
WHO:	World Health Organisation
5DE:	Five Domains of Women Empowerment

Abstract

Despite the South African Constitution emphasising values and gender equality; most women continue to face barriers and commercial restrictions that limit their participation in the mainstream economy. As a result, methods must be devised by the sector to determine whether the policies and strategies they invested in for gender mainstreaming, which were intended to build more equitable, empowering, sustainable and inclusive societies, are effective and producing the desired results. Due to a lack of gender-disaggregated data, women's roles in agriculture and, thus, their opportunities and constraints need to be better understood.

This study aimed to quantify the impact of women's empowerment on sustainable agriculture. Even though the Department of Agriculture has been implementing the women empowerment project since 1999, the literature findings show that the impact of agriculture on empowering women in the sector cannot be quantified. The sector's eligibility to request assistance is gender neutral. Descriptive research methodology was used for this study, and quantitative data were collected in the MS Excel package and statistically analysed using the Women's Empowerment in Agriculture Index (WEAI) and Agricultural Integrated Survey (AGRIS).

Additionally, the study applied a Logical Framework Analysis (LFA) for problem analysis and translating the causes and effects of the problems that women farmers face into objectives and future strategies. Respondents were farmers who share a common domain category of being classified as commercial farmers. Only those farmers who were classified as commercial farmers who qualified for the Gauteng Department of Agriculture and Rural Development (GDARD’s) commercialisation programme and benefited from the Department of Agriculture, Forestry and Fisheries Female Entrepreneur Awards (DAFF FEA) programme were eligible to participate in the study.

Except for the time domain, access to, and decisions about credit indicators, this study found that sufficiency in the production, leadership, assets, income, and time usage categories was more closely associated with empowerment than demographic variables. Within this study, 91% of women and 81% of men reported feeling empowered. The domain in the sample that contributes the most to women's disempowerment, according to the deconstruction of the disempowerment measure, is time.

The areas of empowerment that contribute the most to male disempowerment are time (workload) and resources (access to and credit decisions). Under the sub-indicators biodiversity, profitability, and resilience, female and male participants in Gauteng are unsustainable on the environmental and economic dimensions.

Furthermore, the study's findings evaluated the practitioners' willingness to examine and discuss gender issues. The findings revealed that 44% of practitioners have a high willingness to explore gender issues and 86% of practitioners were unable to discuss gender issues.

This study also proposed developing a gender policy as a starting point to direct the sector to incorporate the gender dimension into pertinent policies and strategies rather than addressing gender through a separate and isolated process. The inclusion of gender budgeting and sex-disaggregated data administration must be referenced in this policy, which serves as the guiding principle for all programmes, initiatives, and action plans. Effective collection and analysis of gender-disaggregated data are critical to ensuring women are empowered to participate in all aspects of the economy. By doing so, we improve our chances of strengthening our country's economy and advancing the two most pressing global goals of equity and sustainability.

Keywords: *Women empowerment, sustainable agriculture, sustainable development, equity, equality, gender, commercial farmer, gender budgeting, gender-disaggregation, mainstream economy*

CHAPTER 1: INTRODUCTION

1.1. BACKGROUND

The South African government has supported many laws and convention memberships to empower women. According to the law, transmitting the information women need to exercise their legal rights remains the biggest challenge. The National Development Plan (NDP) recognizes that women account for a sizeable share of the impoverished and offers a variety of steps to improve women's equality. This effort, therefore, reinforces the need to establish the security of tenure, especially for women communal farmers who are defined as a previously disadvantaged social group and have suffered from perpetual intersectionality (Levendale, 2017).

Gender equality has not yet been achieved in South Africa, despite balanced progress in women's empowerment laws and policies since the introduction of the constitution in 1996. All citizens are guaranteed the right to equality under Act 108, Section 9 of the 1996 Bill of Rights, which also forbids unfair discrimination that is perpetrated directly or indirectly based on, among other things, a person's gender, age, race, or handicap. The South African National Policy Framework on Women's Empowerment and Gender Equality was supported by the Commission for Gender Equality (CGE), a Chapter 9 institution of the constitution. This was established to play a crucial role as the national gender machinery alongside gender focal points (GFP) in national departments and other organizations of civil society (African Development Bank, 2009).

Total equality has been deemed a global priority as a crucial step in both human growth and economic prosperity. Even though there has been considerable progress in terms of legislation and several troubling concerns involving inequality still exist today. South Africa and all other nations that have ratified the Conventions are legally required to implement its provisions. The Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), one of the international treaties adopted by the United Nations General Assembly in 1979, now serves as an international bill of rights advocating for the realisation of equality by ensuring women's equal access to equal opportunities in life.

The accomplishment of gender equality and the empowerment of all women and girls, as well as the promotion of sustained, inclusive, and sustainable economic growth and the elimination of inequality, are some of the highlights of the adoption of the

Sustainable Development Goals. To address issues of gender inequality, equity, and sectoral women's empowerment, several laws, policies, strategies, and programs have been created and put into place in South Africa. Lack of access to resources, which has been brought on by historical causes including economic stagnation, socio-cultural norms on gender during the apartheid era, as well as years of racial and gender discrimination, is the main barrier to gender equality in South Africa. Regardless of the gender-skewed land ownership (farms and agricultural holdings), women still produce the bulk of food for household use in South Africa, as in many other developing nations, accounting for 11% of total production (Land Audit, 2017).

The idea of sustainability in agriculture has gained global attention over the past three decades. It has been a primary concern in the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) eras. The central argument has remained that the ability of communities to grow food depends on the ecological health of the landscape within which they grow the food. This pushes decision-makers to identify and scale up methods of producing food that minimises damage to the farm ecosystem while ensuring that they regenerate and replenish. Several approaches have been used, including crop, diversity and rotation, use of cover crops, integrating crops and livestock systems, and adopting the landscape approach to agriculture. There are conflicting findings across the globe regarding how women’s empowerment and inclusion in decision-making processes have helped drive sustainable agriculture objectives.

In Eritrea, Bahta *et al.* (2017) report a positive relationship between women empowerment through micro-credit schemes and sustainable food security. Musara *et al.* (2022) also reported a similar pattern using smallholder sorghum farmers in semi-arid Zimbabwe, where women farmers participating in climate-smart agriculture projects were found to be more food and income secure. Ahmed (2022) found no significant impacts of women empowerment in sustainable agriculture landscapes in Ethiopia using improved seed and inorganic fertiliser study and tracing the maize yield and welfare outcomes.

In the National Development Plan, gender equality in agricultural development is emphasised as a formal and important necessity (NDP, 2012). The plan considers gender, race, and locality and suggests several actions to promote women's equality. Among other targets is the driving pillar, which recognises that women should be

actively involved in and empowered by economic transformation processes. This is a fundamental requirement for their active engagement in sustainable agriculture activities and places them as important players in overall agricultural value chain development. For instance, it is central that communal farmers should have secure tenure, especially women farmers. The NDP claims that expanding asset ownership is necessary and that improving the representation of the country's racial, gender, and disability mix in skilled, technical, professional, and management professions is a key enabler for empowerment. In the context of commercial agriculture, this is a critical step in realigning women's roles in sustainable agriculture processes and therefore becomes a key research issue in South Africa.

The World Economic Forum (2015) estimates that it will take approximately 202 years for women and men to participate equally in the economy and achieve gender equality at the current rate of development. In the 2030 Agenda for Sustainable Development, women's empowerment has been emphasized as a prerequisite for ending poverty and inequality (Oxfam, 2019). SDG 5 states that while women comprise half of the world's population, they also represent half of its potential. But today, gender discrimination still exists everywhere, preventing social advancement. Globally, 143 nations have guaranteed gender equality in their constitutions as of 2014, while 52 still have not done so. Therefore, the study explores the impact of women's empowerment on achieving the goals of sustainable agriculture using commercial farmers in the Gauteng Province of South Africa.

1.2. PROBLEM STATEMENT

Sustainable agriculture is widely defined as an integrated system of production practices which can satisfy food and fibre needs while supporting the natural resource base. The role of women in the various functions as agro-sectors migrate towards this all-inclusive agricultural system remains significantly contested. Of major concern is that the African female farmers, who are described as "the backbone of rural economic development, the quiet pillars of Africa's food security and economic progress," are not yet adequately empowered to function in a way that impacts the sustainable agriculture processes (Sibanda, 2011). Evidence demonstrates that they significantly contribute to global food security and economic development, even though it is still impossible to determine their exact contribution in terms of volume and character due to regional differences and the problem of intersectionality and disempowerment (FAO, 2017).

Even though there is consensus that sustainable agriculture can lead to overall economic growth, the South African government's lack of coordination in its planning and implementation is impeding the effective implementation of its strategy (IGDP, 2012). Each program has its implementation strategy, resulting in a dispersed scattering of projects across South Africa's landscape. An unorganised and disjointed gendered approach used to create programs and policies for the agriculture sector could lead to inadequate implementation. Therefore, regarding women's participation in economic activities in the industry, little integrated information is therefore available and more information is needed in that regard. Due to a lack of systems in place to gather information on farmers based on their sex, this may also have an impact on the problems facing South Africa's agricultural economy in terms of sustainable agriculture. This restricts the availability of pertinent data that could support relevant stakeholders to increase gender responsiveness in specific contexts and engage constructively with pertinent stakeholders on identified issues.

Even though the DALRRD in South Africa has been implementing the women empowerment project since 1999, the findings reveal that it is not possible to quantify the impact of agriculture on empowering women farmers. The analysis noted that it is challenging, if not impossible, to monitor how much of the previous DALRRD budget was allotted for women or gender-sensitive programs, and how much was spent on men (Department of Women, 2013). More specifically, understanding the impact of the women empowerment program on sustainable agriculture pillars is also currently not well explored. This study will examine the missing links and factors sustaining this status quo and recommend re-aligning the relevant policies and practices.

1.3. OBJECTIVES

The study seeks to generate information that will support the empowerment of women commercial farmers in the Gauteng province to be more sustainable in agriculture. Although the agricultural sector has grown in national and international trade, women producers have not shared in this success. These growth efforts have resulted from the realisation that we must devise means of determining whether the policies, resources, and strategies used to build more equitable, empowering, sustainable, rights-affirming, inclusive, and peaceful societies are effective or not, and whether they are producing the desired changes.

The primary goal of this research is:
To develop strategies to quantify the empowerment and agricultural sustainability of commercial women farmers in the Gauteng Province.

Sub-objectives:

(i) Assessing the empowerment of commercial female farmers in the Gauteng Province
(ii) Evaluate the agricultural sustainability of commercial female farmers in the Gauteng Province.
(iii) Determine the challenges commercial female farmers face in the Gauteng Province.

1.4. STUDY RATIONALE

The study is based on the fact that the South African Constitution places gender equality at the centre of development processes. However, women still encounter enduring barriers and commercial restrictions that limit wider inclusion in the mainstream economy, contrary to the men in the sector. Therefore, there is unquestionably more work to be done with regard to gender equality, with a special focus on women's empowerment. This study aims to empower women commercial farmers to be more sustainable in agriculture.

The study aims to achieve the above-stated objectives by following the approach outlined below:

(i) To outline the background of women farmers in South Africa and within the Gauteng Province specifically.
(ii) A survey was conducted involving factors affecting the empowerment and sustainability of women farmers in agriculture internationally and locally.
(iii) Empirical farm-level data were collected from commercial farmers in the Gauteng Province, focusing on demographic characteristics, resources, policies, and institutions obligated to support women farmers.
(iv) A statistical technique was applied to determine the characteristics of empowered and agricultural-sustainable farmers.

1.5. RESEARCH QUESTIONS

According to the research, gender roles impact how productive and involved men and women can be in the economy (World Bank, 2012). Gender relations consequently influence sector outcomes and impact economic efficiency. As a result, gender should not be seen as a purely social issue or as something to be considered just after deciding, but rather as a crucial component of developing and implementing policies that merit specific analytical attention. A rising corpus of empirical data connects gender disparities in resource management, decreased agricultural productivity and income, and well-established relationships between gender and sustainable development. However, sectoral policies and programmes have not always been gender-sensitive (World Bank, 2012). The study will look at the impact of empowering women to be agriculturally sustainable and will ask the following questions:

Main research question:

What is women farmers' empowerment and agricultural sustainability level in the Gauteng Province?

- To what extent are women farmers empowered in the South African province of Gauteng?
- What is the agricultural sustainability of women farmers in the South African province of Gauteng?
- What challenges do commercial farmers face in the Gauteng Province of South Africa?

1.6. CONCLUSION

The study is primarily concerned with the impact of empowering women farmers towards sustainable agriculture. Figure 1.1 below outlines the sections of the study in a framework analysis to explain the steps that will lead to the development of commercial women farmers' empowerment and agricultural sustainability strategies

within the Gauteng Province. The Figure also outlines the different chapters that will be discussed within the study.

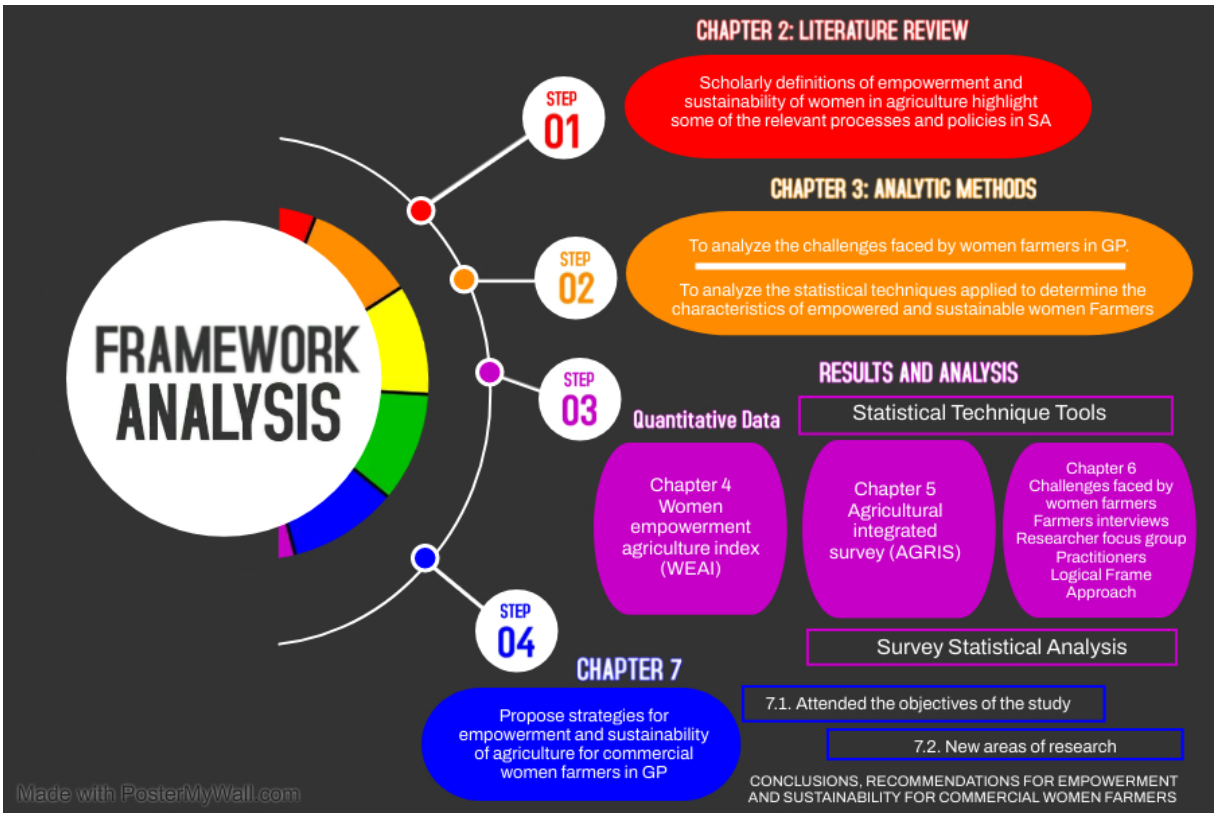

Figure 1.1: Framework Analysis

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

This chapter includes scholarly definitions of empowerment and sustainability of women in agriculture. To enhance women's participation and economic circumstances across natural beliefs and socio-economic levels, agriculture's sustainability becomes a prerogative of Santra and Kundu (2001). There are four sections in this chapter. The first section examines the meaning of empowerment, including scholarly definitions of women's empowerment, before identifying the measures and indicators of women's empowerment. It will highlight areas where women are still denied basic rights and are excluded from mainstream economic processes. The second section includes pertinent literature on sustainable agriculture and women's empowerment. The third section examines the contribution of South African policies towards the economic empowerment of women, the performance of existing economic women empowerment programmes in South African agriculture, and the measures used to monitor agricultural sustainability in women's economic empowerment. The final section concludes with scholarly definitions and commercial agriculture indicators.

Women farmers are still side-lined in the mainstream of economic relationships and have limited or no control over productive resources such as land, production inputs, credit, and technology, despite their role as guardians of household food security (FAO, 2017). It has become evident that measures to capitalize on women's contributions and address the stated obstacles that impede their development and success can only improve and accelerate economic growth and food security. It is challenging to emphasize the importance of gender equality in attaining sustainable development, according to Joseph (2017). Males and females are both human, but women are more vulnerable than men in South Africa; for instance, women make up much of the population and are the poorest demographic (Budoo, 2016).

The most affluent women are found in Southern Africa, where they devote 90% of their income to improving the health and education of families and the local area. Women are still primarily on the periphery of economic decision-making and continue to be excluded from prospects for considerable economic empowerment (Morna & Nyakujarah, 2011). According to a study on the basics of sustainable development, gender imbalance between men and women poses a significant obstacle to this goal.

Levendale (2017) suggests the following obstacles to women's empowerment in South Africa:

- Women are generally poorer than men.
- Women suffer more from a lack of time compared to men as women devote more of their time to caring for others than men, resulting in women suffering from time poverty.
- Because men and women have different economic opportunities and rights, women have fewer options, and
- Women prioritize others, whereas men invest more in themselves.

Santra and Kundu (2001) outlined a step-by-step discussion to reveal the areas of concern and the anticipated solutions to some of the major stumbling blocks in overall women empowerment as a means of achieving agricultural sustainability. The most urgent requirement for women's empowerment in general, specifically for women in agriculture, is access to productive assets. Because most rural women still do not have land tenure, they cannot independently decide on various agricultural concerns. Therefore, it is necessary to make conscious decisions to improve women's access to resources. Women must be empowered since this is the only sure-fire method to make them "partners in development" and include them in the mainstream economy, not just as "beneficiaries" but also as "contributors" to the agricultural value chain and active members of society at large. This empowerment mentioned above should consider the following:

1. Facilitation of women's economic participation and strengthening their economic base.
2. Access to credit and savings, the ability of women to establish and have access to credit, setting up self-help groups and local banking systems set by women, non-governmental organizations, and provision of facilities by the government; and
3. Ownership and control over resources, women need control over limited resources, such as land and capital, to make decisions and implement them in any necessary way.

Ukeje *et al.* (2020) claim that South Africa, like many other African nations, presents significant difficulties in enhancing food security and unemployment and ensuring that

women are fully integrated into the mainstream economy. Despite the absence of statistics on women's economic activities in agriculture at the commercial level, women's empowerment is necessary to achieve more rapid sustainable development as women play a crucial role in agriculture and food production. The primary constraint to agricultural sector growth is that the structure and production methods have remained unchanged since independence more than four decades ago.

In Ethiopia, they came to the realisation that a strong gender policy is essential to integrating gender equality and empowerment into their agricultural and rural development plans. This integration can substantially impact female farmers' productivity and food security and increase their access to productive resources, including land, water, and capital (Ogato, Boon & Subramani, 2009). Furthermore, according to Ogato, Boon & Subramani, 2009), female farmers who have access to agricultural services, including loans, extension, and rural institutions, are better able to handle long-term environmental and socioeconomic issues in agriculture.

2.2. DEFINITION OF EMPOWERMENT

According to Santra and Kundu (2001), women's empowerment is a process of self-affirmation and confidence, the capacity for women to project themselves as they attain economic independence, ownership of productive assets, the capacity to manage capital and assets, and provide leadership in matters about both women and community-related issues at all levels.

De Waal (2006) asserts that to change gender power relations, empowerment is essential because it enables people or groups to become aware of women's subordination and increases their ability to fight it. De Waal (2006) further explains that when associated with involvement, empowerment can be ensured.

Empowerment, according to Ogato *et al.* (2009), is "the process by which powerless individuals become conscious of their status and organise collectively to seek greater access to public services or the advantages of economic advancement."

Sharp *et al.* (2003) and Townsend *et al.* (1999) define empowerment as creating a sense of effective agency and power. According to this conception of power, becoming empowered and thinking of oneself as a capable agent is just as much a goal of the process as the tangible outcome of any given undertaking.

Narayan (2002) also considered empowerment and participation equivalent notions, where empowerment confers the right to engage in and benefit from activity and requires active community participation. Gray *et al.* (2005) emphasised empowerment as allowing for participation and elements of empowerment to be divided into four categories by Bartle (2003) and the World Bank: participation, outreach, trust, and empowerment. They collaborate to provide underprivileged individuals with the incentives, resources, and tools required to participate in decision-making.

Empowerment paths are not linear; instead, they rely on feedback loops that reinforce one another to promote positive, ever-expanding cycles of change. This entails not just the individual's development but also the community's development (Lay, 2012).

According to Kabeer (2012), the processes by which women could exert strategic kinds of agency regarding their own lives and larger structures of limitation that positioned them as subordinate to males constitute women's empowerment. The Beijing Platform for Action and Millennium Development Goals on gender equality and women's empowerment did not attempt to define women's economic empowerment. Still, they did pave the way for a stronger link between this empowerment and women's access to productive resources, such as paid work.

Wright and Annes (2017) cited the perspectives of development scholars on empowerment as a procedure and an exercise in the agency. By defining empowerment as "the expansion of people's freedom of choice and action to shape their lives as well as growth in their ability to make strategic life choices in a context where this ability was previously denied to them". This definition is supported by Ali (2013), Malhotra and Schuler (2005), and Nayaran (2005).

According to McEwan and Bek (2006), empowerment has become "a popular, mostly undisputed concept". However, how it has been employed in political and development discourses leaving it vague and poorly defined, making it challenging to judge expectations and the efficacy of empowerment strategies and programs. They also cite Lyons *et al.* (2001) and Sharp *et al.* (2003), who claim that the concept's ambiguity makes it appealing to people worldwide. The interpretation, definition, and application mainly of empowerment by South African post-apartheid governments, particularly how it appears to be reduced to economic empowerment, essentially risk of reinforcing rather than deconstructing power structures while largely maintaining existing power relations (McEwan & Bek, 2006).

Women's empowerment is essential to food security (Olumakaiye & Ajayi, 2006). Increasing women's social, economic, and educational power is called "women's empowerment." It alludes to a setting without gender bias and equal rights for all public and workforce members. According to Quagliariello *et al.* (2016), the empowerment of women is the authorisation of power or the enhancement of women's general position, status, and condition in all spheres of life.

Quagliariello *et al.* (2016) defined women's empowerment as "women's ability to make strategic life choices where that ability had previously been denied them". Women's empowerment is achieved when women and girls acquire the power to act freely, exercise their rights, and fulfil their potential as full and equal members of society. Moreover, Quagliariello *et al.* (2016) describe the following obstacles to empowerment:

- Because of the male's inherent superiority complex, they frequently do not allow their female counterpart to rise as high as them;
- Significant domestic responsibilities;
- Restrictions on social, economic, and religious activities; and
- In most societies, particularly in rural areas, boys are given preference for education and a healthy diet over girls. Many families in society community to prefer male children.

According to the OECD (2012), women's economic empowerment should be required for pro-poor growth and sustainable development. Sound public policies, an all-encompassing strategy, a long-term commitment, and gender-specific viewpoints must be incorporated at the policy and programming design stages to satisfy this need. Women benefit from economic empowerment by having more access to economic opportunities and resources like employment, financial services, real estate, and other productive assets, as well as developing their skills and market knowledge. The fact that increased female incomes and bargaining power translate into more investments in children's education, health, and nutrition, which promotes long-term economic growth, is one of the key reasons women's economic empowerment is essential. From 42% in 1997 to 46% in 2007, women's participation in waged and salaried jobs rose. Additionally, total agricultural production in Africa may increase by up to 20% if women have equal access to agricultural inputs as compared to men.

A comprehensive and responsive strategy will decide a country's success in empowering women to manage and implement public policies, including macroeconomic, financial, and trade policies, as stated by the OECD (2012). The following strategies for empowering women were shown to be effective: trade policy, monetary transfers, social protection, and public finance management.

Women's empowerment, described as increasing women's access to development components like health, education, earning opportunities, rights, and political engagement, is said to have a bidirectional link with economic growth, according to Liliane and Mbabazi (2015). Progress by itself has the potential to significantly reduce gender inequality in one direction, while persistent discrimination against women has the potential to obstruct development in the other.

In other words, empowerment can speed up progress (Duflo, 2012). Contrarily, women's economic empowerment refers to a process that gives them more access to economic opportunities and more authority to make and implement financial decisions that impact themselves and their families, often referred to as "agency".

Access and agency work together to influence women's empowerment over time. Even though the empowerment process frequently starts with an individual, cultures, civilizations, and institutions can either support or hinder the appointment of empowerment (Markel *et al.*, 2016).

2.3. SOUTH AFRICAN PROGRAMMES TO ADDRESS WOMEN'S EMPOWERMENT

The peaceful and successful democratic transition in South Africa is considered a significant victory for the country's people. Unfortunately, democracy has not been accompanied by considerable economic growth or policies that raise the standard of living for all inhabitants of the nation or significantly improve their quality of life (Inman & Rubinfeld, 2013). South Africa must balance its economy's potential and problems with the aspirations raised since democracy was established. Given the situation, it is not unexpected that after 28 years of democratic governance and reform initiatives, women farmers and agricultural entrepreneurs' lives have not improved much. Women's empowerment is still a problem in the agricultural sector of South Africa.

South Africa’s development post-apartheid nation and the more general shift from a racialised discriminatory system to one of greater political, social, and economic justice are both dependent on empowerment. With a focus on the function of self-organisation, empowerment is seen as a facilitator for the realisation of its rights and vital to building participatory democracy. Therefore, efforts to reform society's political system are based on complex theories of how power works. The ability to make decisions and ensure that marginalized socialised to accept the status quo because they cannot even consider alternatives are hindered by a critical understanding of empowerment, which is essential to transformation in South Africa (McEwan & Bek, 2006).

Although a vague and ill-defined notion, empowerment, is currently vital from a theoretical and political standpoint, none more so than in South Africa, where it is considered essential to the country's post-apartheid development. Thus, empowerment describes an improvement in people's capacity to make wise decisions in circumstances where this capacity was previously unavailable to them (Sida, 2020).

Women's empowerment has been cited as a critical factor in defining the status of women in South Africa. The Ministry for Women's Chapter 9 Institutions, like the Commission on Gender Equality, was created by a Parliamentary Act to mainstream gender equality and ensure women's legal rights and entitlements were upheld. In 1995, the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) was ratified. The United Nations General Assembly Session on Gender Equality and Development and Peace for the Twenty-First Century, which adopted the Outcome Document titled "Further actions and initiatives to implement the Beijing Declaration and the Platform for Action," unambiguously supported the Beijing Declaration and the Platform for Action (1995). However, there is still a considerable gap between the objectives outlined in the Constitution, the laws, regulations, policies, plans, programs relevant to them, and the situational reality of women's standing and gender equality in agriculture. The national CEDAW, Beijing +15, and office on the status of women 15-year report explored this in-depth.

There is no gender policy requiring the adoption of programs and procedures connected to gender in the South African agricultural sector, particularly those that promote women's empowerment. The current climate does not encourage the creation and implementation of assistance to raise the standard of living and quality of life for women working in the field. The Integrated Growth Development Plan (IGDP, 2012)

identified the government's fragmented scattering of projects across South Africa's landscape because of the government's uncoordinated implementation and planning as a barrier to the effective implementation of government strategy. Each program developed its own implementation plan.

Due to a disorganised and fragmented gendered implementation strategy employed for programs and policies for the sector, most women empowerment strategies and programs developed by the agriculture sector in South Africa are implemented ineffectively. There is scant information on how women contribute to the sector's economic activity. It is obvious that women's under-represented participation in the sector harms not just them but society and the industry, as it hinders women's advancement and inhibits economic growth by reducing food security for families. The government must support programs where women are active participants to promote greater engagement by all women in the sector.

The department has been running the women's empowerment competition since 1999 (DoW, 2013); however, it is impossible to measure the impact of DAFF in empowering women farmers. According to the DoW (2013) report, the department is gender budget insensitive, which limits attempts to conduct thorough gender budgeting. It is important to note that the department lacks a well-developed gender policy, and gender does not appear to be adequately prioritised. Currently, policies and programs only mention women, youth, and people with disabilities. According to the DoW (2013) report, the sector should consider the following four recommendations:

- First, the Department of Agriculture should strive to maintain gender-disaggregated figures, which means conceptualising its planning, programming, and budget allocations in a way that allows at least some quantitative assessment of the department's impact on women in the agriculture sector.
- Second, the department should emphasise women and gender issues in its policy pronouncements and policy documents, such as the budget vote speech of the Minister of Agriculture.
- Third, DAFF should develop and publicize a clear and comprehensive gender policy that considers women's importance in agriculture and the specific and severe challenges they face.
- Fourth, DAFF should strive for more significant departmental employment equity and adequate women representation in senior management positions.

The recommendations above were intended to provide a platform for women to be equal participants in the mainstream economy, resulting in their overall empowerment. Furthermore, the report advocated for developing a gender policy that would require the agricultural sector to integrate the gender dimension into relevant policies and activities rather than addressing gender in a separate and isolated process.

According to the literature, improving women's access to resources is a massive task that necessitates deliberate, planned and radical changes in gender relations. According to Farnworth *et al.* (2013), any transformation in Africa's agriculture will be dependent on women's participation. Investing in women's economic empowerment is a high-yield investment with multiplier effects on the continent's productivity, efficiency, and inclusive growth (Lay, 2012). Furthermore, Seguino (2013) believes that investing in women's economic empowerment is an essential indicator of governments' commitment to gender equality and pro-poor policy goals. Sen (2005) supports these viewpoints by stating that people are the ultimate concern and that transforming gender relations will allow women, men, and their children to live more prosperous, more meaningful lives in the ways they choose. Gender mainstreaming is a government priority in South Africa to achieve gender equality, empowerment, and socio-economic transformation.

Currently, the impact of women empowerment in the sector is measured by counting the number of women who compete and those who receive assistance from other sector programs. There needs to be more focus on capturing the quality of women's participation in the sector's intervention programs and how this participation affects their lives. This makes it more challenging to identify appropriate gender empowerment outcome indicators or develop tools to measure the department's support for women in the sector.

Since 1999, the Department of Agriculture, Land Reform, and Rural Development has been running the DAFF Female Entrepreneur Awards (DAFF FEA) initiative to empower and increase women's participation in the sector. Figure 2.1 outlines the challenges the industry faces to achieve the desired results of empowering women in the sector rather than just recognising their existence.

Figure 2.2: Problem Analysis

2.4. MEASURES OF WOMEN'S EMPOWERMENT

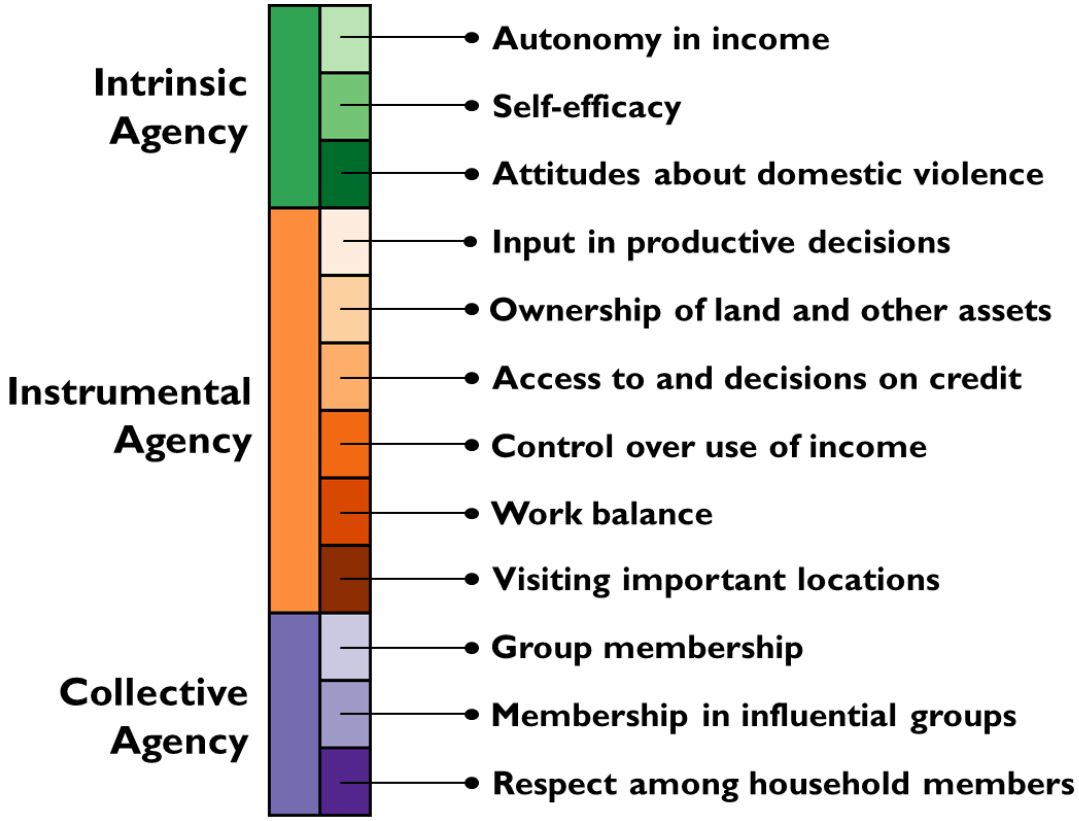

Figure 2.3: Measure of Women's Empowerment

Due to its complexity and multidimensional nature, measuring empowerment is a challenge. This is particularly true in agriculture, where empowerment is still relatively new. According to the literature, there currently needs to be a widely used instrument available to researchers, practitioners, and donors who want to quantify agricultural empowerment. The Women's Empowerment in Agriculture Index (WEAI), developed jointly by the United States Agency for International Development (USAID), IFPRI, and the Oxford Poverty and Human Development Initiative (OPHI) (Meizen-Dick, 2019), was the first comprehensive and standardised measure to capture women's empowerment in agriculture directly. This metric assesses five aspects of empowerment: (i) production, (ii) income, (iii) resources, (iv) leadership, and (v) time. 'Production' and 'income' are indicators of decision-making power over agriculture and control over income and expenditures (Akter *et al.*, 2015).

Empowerment is a constant process and challenging to measure, according to Goetz and Gupta (1996). Sometimes the effects of empowerment are felt over time, such as managerial control or loan access, which results in significant achievement. The Human Development Report (1995) included both the Gender-Related Index (GDI)

and the Gender Empowerment Measure (GEM). The GEM indicator evaluates women's contribution to political and economic empowerment, such as the proportion of seats held by women in parliament/assemblies and the proportion of women in supervisory, administrative, and technical positions. The GDI indicator measures gender disparities in access to basic needs.

Chung *et al.* (2013) used five factors to assess women's level of empowerment: education, economic contribution, governance, health, and media. Women's development is measured in terms of decision-making and political engagement, whereas women's empowerment is described as a contributor to economic production. Using contraceptives and individual family health care services are crucial components of women's empowerment. The literature also presents the viewpoints of scholars on the six empowerment-measuring domains (Leder, 2015). First, one can gauge their level of empowerment by looking ahead, being aggressive, making plans, doing actions that future focussed, and being conscious of their own concerns. Second, mobility via outside-the-home activities and interactions with men. Third, having a home, learning new skills, and earning more money from non-traditional jobs all contribute to economic security. Fourth, position, authority over decisions, and confidence. Fifth, communicating clearly in public requires awareness of one's legal standing, access to services, and the capacity to of the fer community and social services. Lastly, developing a self-identity outside the family raises a woman's worth and promotes a feeling of solidarity with other women; problem articulation and self-expression, for instance, are steps toward empowerment. Women's empowerment has various elements, according to Malhotra (2002). Women's empowerment is influenced by economic, sociocultural, legal, political, and psychological issues.

Longwe (1991) created several empowerment measurement scales, including the well-being degree, which shows when fundamental requirements are satisfied. The level of access indicates the extent to which everyone has assured access to finance, land, and education. The right to make equal decisions are not being exercised to the full extent of involvement and mobilisation. Lastly, the control degree suggests that people can make decisions and that resources and decisions influence one's quality of life.

The need to develop indicators for assessing women's empowerment and tracking the effectiveness of measures to empower women has been underlined by the increased interest in agriculture as a driver of inclusive growth, particularly in terms of women's

empowerment and job creation (Sraboni *et al.*, 2014). In that study, the Women's Empowerment in Agriculture Index (WEAI) was employed as a metric that may be used to evaluate the level of women's empowerment in agriculture, identify areas where empowerment gaps exist, and determine how much progress is possible.

2.5. SUSTAINABLE AGRICULTURE TO ADDRESS WOMEN'S EMPOWERMENT

To achieve sustainable agriculture, gender inequality must be addressed, claims Ignaciuk and Chit Tun (2019). This is because countries with high Gini coefficient levels have lower levels of land production and are more susceptible to food insecurity, making it difficult to boost productivity and decrease hunger. Because most farming populations, particularly women, in highly unequal nations lack the financial resources and capacity to engage in and improve agricultural methods, gender inequality stifles progress toward sustainable agriculture on numerous fronts.

Sexsmith (2019) links sustainable agriculture and women's empowerment and SDG 5, which discusses how gender equality and women's empowerment in agriculture continue to be significant challenges in the Global South. Sexsmith also explains how Voluntary Sustainability Standards (VSSs) can be used to achieve related goals of the 2030 Sustainable Development Goals (SDGs) and offers suggestions for development organisations working to promote gender equality. Collaboration between industry stakeholders on interconnected economic, environmental, and social justice goals is necessary for attaining sustainability in agriculture, as it is for achieving sustainability generally.

The SDGs and VSSs are global responses to several issues, including food insecurity, unequal access to land, productive resources, education, the division of unpaid care and domestic work by gender, gender discrimination in access to decision-making and empowerment, and insecure and precarious agricultural work for women. These are obstacles to gender equality and undercut women's contributions to economic, environmental, and social well-being.

Sustainable development is defined by Gaviglio *et al.* (2017) as "development that meets the demands of the present without compromising the capacity of future generations to meet their own needs." The word "sustainability" has been frequently used in the scientific community to explain and encourage sound agricultural system management techniques. Even though there has yet to be a consensus among

academics on how to define agricultural sustainability, assessments of it typically involve the assessment of the three traditional pillars of sustainability: the environment, society, and economy. These pillars are used for evaluation at various scales, from field and farm to regional, national, and even international scales.

Sustainable development is a widely used idea. The 1992 UN Conference on Environment and Development in Rio defined sustainable development as "economic development that fulfils the demands of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Since Rio, researchers and decision-makers have tried operationalising and applying this idea. According to Laws *et al.* (2002), three main scientific interpretations of sustainability are defined as an ethical relationship, the preservation of a system within its operational parameters, and a sort of continual research (Wiek & Binder, 2005).

To reach a consensus, the "Brundtland report" introduced the idea of sustainable development in the late 1980s. It defined it as "an economically viable, environmentally sound, and socially acceptable development that meets the needs of the present without jeopardizing future generations' ability to meet their own needs." The three pillars of sustainability are described by Latruffe *et al.* (2016), below:

2.5.1. Economic Pillar

Latruffe *et al.* (2016) claim that agriculture should bring wealth to the farming community. Economic viability, as described in this context, is often considered as the ability of a farming system to endure over the long term in the face of shifting economic conditions. Variations in output and input costs, yields, output outlets, and public support and regulation can all impact how the economy changes. Long-term refer to durability, the farmer's career, or generational continuity, i.e., the capacity of a farm to be passed down to a successor. The main indices of economic viability are profitability, liquidity, stability, and productivity. To evaluate profitability, revenue and cost are compared as a difference or as a ratio, or by income variables like farm income. Liquidity is a measure of the cash available to pay for immediate and short-term obligations, while stability is usually a measure of the share and growth of equity capital. The capacity of production elements to produce output is measured by productivity. In addition to being frequently measured as a partial productivity indicator (which is a ratio of output to one input), production can be quantified using methods

that allow for the possibility of input or output substitution, such as Total Factor Productivity (TFP) and technological efficiency (Latruffe, 2010).

Latruffe *et al.* (2016) highlight several themes in the literature for which few indicators are available. These typically concern social themes that have received little attention in the literature to date. Economic contributions, such as farm output level, are crucial for the viability of upward and downward industries, and the presence of farms helps to maintain a minimal level of public services in rural areas.

2.5.2. Environmental Pillar

The environmental contribution concerns how agriculture affects the quality of life in rural areas (e.g., the creation of renewable energy, and reduction of pollution). As a result, the area that will require the greatest indicator development in the future is the social sustainability of farms and, more broadly, of agriculture. In the context of climate-smart agriculture, indicators of novel practices that support more effective use of natural resources and farmer resilience are also likely to become more prominent.

The environmental indicators cover ten human-centred themes: air, soil, and water quality, greenhouse gas emissions, nutrients, pesticides, biodiversity, non-renewable energy resources, and physical and chemical quality. All these issues affect natural resources. Natural environments significantly impact human, animal, and plant health quality, and many human health issues are now attributed to poor air and water quality. Women are vulnerable to poverty; when the natural environment suffers, it is directly linked to women's disempowerment in terms of food security (Lebacq *et al.*, 2013).

The breadth of farm-level data that is currently accessible restricts the kind of indicators that can be generated, even though Latruffe *et al.* (2016) define the ideas of indicator importance and selection in their study. The most beneficial use of sustainability indicators is in analysing trends in indicators over time that is of concern to stakeholders and policymakers. Although this limitation can be overcome by gathering additional data and using existing datasets or expert opinions, these methods are not without limitations.

2.5.3. Social Pillar

Despite the relevance of social dynamics being acknowledged, Markel *et al.* (2016) claim that most market systems and programs for women's economic empowerment

still have a poor understanding of how social factors affect human behaviour. By focusing on market behaviours and incentives and frequently supposing that people would make logical decisions when presented with the necessary tools and information, current techniques aim to simplify the complexity of human behaviour. To increase women's access to opportunities like markets, education, information, land, and rights, most programming ignores how their sociocultural environment affects their decisions and capacity to engage with and profit from those chances. Agency issues, such as voice, choice, and decision-making authority are considered by many market systems programs. However, even initiatives that specifically aim to increase women's agency do not go further into the intricate social norms and belief systems that affect women's capacity to fully engage in market systems.

How to quantify agricultural sustainability is the main issue in every research on sustainable agriculture. Sustainability is a "social construct" that has yet to be operationalised, claim Hayati *et al.* (2014). Additionally, Ikerd (1993) provides evidence that it is impossible to assess sustainability precisely because it is a site-specific and dynamic notion.

With the global context in mind, preliminary indicators for evaluating agricultural sustainability were created in accordance with Hayati *et al.* (2010):

- Social and policy implications affecting economic viability, social structure, etc.
- Measurability and soundness of the analysis
- Adaptability to different scales (e.g., farm, district, country, etc.)
- Be sensitive to changes in management and climate, including ecosystem processes, link to process-oriented modelling, and
- Be available to a wide range of users (e.g., acceptability).

In their conclusion, Hayati *et al.* (2014) note that using sustainable performance measurements as inputs for policy instruments can promote better decision-making integration. Allahyari (2009) offered a few definitions of sustainable agriculture from diverse literary sources. Sustainability is defined by the dictionary as the ability to continue or grow over time (Wagner, 1999). Additionally, sustainable agriculture was described by Allahyari (2009) as the effective management of agricultural resources to satisfy changing human requirements, protect the environment, and expand biological resources.

According to Allahyari (2009), sustainable agriculture is a method that satisfies short-term and long-term needs of society for food, fibre, and other related needs while maximising net benefits through resource conservation to preserve other ecosystem services and functions and long-term human development. Finally, Somers (1998) suggested that sustainable agriculture must focus on raising awareness and improving farming practices.

Häni *et al.* (2006) claim that the demand for agricultural products with multiple uses rises in concert with the requirement to feed an increasing world population. The ecological, economic, and social constraints of agricultural land expansion and production method intensification are simultaneously reached. The solution to these issues lies in sustainable production and its all-encompassing principles. Sustainability should be measurable across areas, nations, and commodities in a globalised agricultural world. To fairly compare various farm kinds and geographical regions around the world, it is necessary to consider all strengths and potentials as well as shortcomings and blockages. Assessing agricultural performance in line with the all-encompassing sustainable production principles is crucial. This sustainable development's ecology, business, and social components decisions may be distorted when just economic considerations are made to compete for attention. When just economic considerations are made, decisions may be distorted, resulting in social and environmental dumping. Häni *et al.* (2006) further adapted the definition of sustainable agriculture (SAI, 2003, modified) for use in agriculture and to make it operational for evaluation tools. In line with the principles of human dignity, sustainable agriculture uses productive, competitive, and efficient methods while preserving and enhancing the environment, the global ecosystem, and the socioeconomic status of local communities.

2.6. SUSTAINABILITY MEASURES

According to Hayati et al. (2014), sustainable agriculture includes three interdependent and interconnected components, economic, environmental, and social; however, it is challenging to monitor due to its complexity. This is also because quantifying agricultural sustainability is difficult for several reasons, including the fact that sustainable agriculture is a dynamic notion rather than a static one:

- Current measures generally fall short of assessing the interactions and interdependence among the three components and trade-offs of pursuing one component at the expense of another.
- Many current measures or indicators are not particularly useful to farmers or are too time-consuming to measure in their day-to-day work, making it difficult for them and their families to track progress toward agricultural sustainability. This is especially unfortunate because many issues concerning sustainable agriculture are location or situation-specific.
- While most indicators show progress or no progress toward specific components of sustainability, they fall short of determining cause/effect relationships to assist in assessing current problems and providing ideas on what needs to be done to ensure continued progress toward sustainability. Another complication is that some sustainable agriculture strategies (for example, full crop rotation) require 5-10 years of implementation before showing visible or measurable results.

Sustainability in worldwide agriculture must be quantifiable across geographies, nations, and commodities, contend Häni *et al.* (2006). A fair comparison should be made between the benefits and drawbacks, potentials and bottlenecks of various farm kinds and geographical regions. The methodology must be straightforward and at least somewhat robust, thorough, and scientifically accurate. Einstein once observed, "It has to be as simple as possible without getting any simpler." To have a widespread effect or to be widely applicable, it must also be reasonably affordable. The necessary instrument must help the farmer and other parties by highlighting the production's potential strengths and weaknesses so that improvements can be made.

By highlighting data trends, indicators are statistical constructs that can be used to examine the effects of policy decisions. Sustainable development is c as a better balancing of all three dimensions, and sustainability indicators aim to identify and quantify key links between economic, social, and environmental concerns (Dillon *et al.*, 2014).

2.7. DEFINING COMMERCIAL AGRICULTURE IN SOUTH AFRICA

Commercial agriculture is defined by the Census for Commercial Agriculture (CoCA) (2017), as businesses that are registered for Value-Added Tax (VAT). According to

CoCA (2017), released in 2020, South Africa uses 46.4 million hectares of its entire land area or 38% of its total land area for commercial agriculture. The 36.5 million hectares of commercial grazing area, 7.6 million hectares of arable land, and 2.3 million hectares of other land usage make up the 46.4 million hectares.

A commercial entrepreneur in the sector is defined by the DAFF FEA guideline document (2016) as an organisation that can show activities that have been ongoing with entity registration for at least two years. The organisation or person should have a clear definition of its membership and roles inside a legally created and registered business. The business must be registered in the participant's name; if there are men in the business, women must make up 80% of the entity's ownership, management, and decision-making roles. The company must be registered for VAT and have a minimum yearly revenue of R1 million.

2.8. CHAPTER SUMMARY

Ignaciuk and Chit Tun (2019) contended that tackling gender inequality is essential for attaining sustainable agriculture and, by doing so, calls for industry stakeholders to cooperate in accomplishing associated objectives for social justice, the environment, and the economy. Women's role in farming and their opportunities and constraints need to be better understood due to a lack of gender-disaggregated data. As a result, data on women-owned farms (number of hectares, kinds of enterprises they operate, income, etc,) is urgently required (Farnworth & Hutchings, 2009). Effective sex-disaggregated data collection and analysis is crucial to ensuring women are empowered to participate in all facets of the economy. By doing this, we have a higher chance of boosting our country’s economy and ultimately achieving the two most urgent global goals, sustainability and equity. The literature also recommends establishing a gender policy to mandate that the agriculture sector include the gender budgeting factor in important policies and actions rather than addressing gender through a unique and isolated procedure.

In South Africa, literature advocated for developing a gender policy requiring the agricultural sector to integrate the gender dimension into relevant policies and activities rather than addressing gender in a separate and isolated process. Ethiopia supports this recommendation as they realise that a strong gender policy is essential to integrating gender equality and empowerment into their agricultural and rural

development plans. According to Ogato *et al.* (2009), female farmers with access to agricultural services, including loans, extension, and rural institutions, are better able to handle long-term environmental and socioeconomic issues in agriculture.

Because the concept of empowerment in agriculture is relatively new, it is difficult to quantify. Researchers, practitioners, and donors lack a widely accepted instrument for measuring empowerment. The Women's Empowerment in Agriculture Index (WEAI) is the first comprehensive and standardised measure that directly captures women's empowerment in agriculture. The WEAI was first used by Esha *et al.* (2014) as a metric to evaluate the level of women's empowerment in agriculture, identify areas where empowerment gaps exist, and determine how much progress is possible, as well as track the effectiveness of measures to empower women has been highlighted by increased interest in agriculture as a driver of inclusive growth and job creation.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. BACKGROUND

This chapter elaborates on the methodology this study has used and outlines the range of data capturing and analysing vehicles applied in data collection, such as individual semi-structured interviews and content analysis, as defined by Yin (2003). The study used an embedded methodology, given the mixed nature of the research questions. Qualitative and quantitative data were collected using questionnaires, Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) and analysed using Microsoft Excel and Statistical Package for Social Science (SPSS). To achieve the study's primary goal, descriptive statistical tools and content analysis were used to identify challenges and measure women commercial farmers' level of empowerment and sustainability in GP. The tool applied to dissect the challenges and translate them into solutions and strategies were the Logical Framework Approach (LFA). The two other tools applied using descriptive statistics to assess the sustainability and empowerment levels were Agricultural Integrated Survey (AGRIS) programme and the Women‘s Empowerment in Agriculture Index (WEAI), respectively.

3.2. RESEARCH DESIGN

In this study, the features of a particular person or group were described using a descriptive research design (Kothari, 2004). With a focus on women commercial farmers, the study aimed to examine the empowerment and agricultural sustainability of commercial farmers in the Gauteng area of South Africa to compare women better and men commercial farmers. The study employed this embedded methodology to gather both qualitative and quantitative information from commercial farmers in the Gauteng province. This philosophy was appropriate since it accommodated both the positivism and interpretivism paradigms and thus captured the various dimensions of the research (Husam & Pius, 2020).

Research Questions

I. What challenges do commercial farmers face in the Gauteng Province of South Africa?
II. To what extent are women farmers empowered in the South African province of Gauteng?

III. What is the agricultural sustainability of women farmers in the South African province of Gauteng?

3.3. STUDY AREA

The study concentrated on commercial farmers in the Gauteng province. According to the Land Audit report (2017), the Gauteng province has the highest number of farms and agricultural holdings owned by both men and women. According to the report, women in GP have the highest ownership rate at 40%, followed by Free State and Western Cape at 34% and 34%, respectively. This study's target sample consists of commercial farmers in GP. The focus group will concentrate on commercialisation and DAFF FEA program participants, emphasising those who have benefited from the initiatives.

Gauteng province is South Africa's most significant contributor to GDP; it is considered the country's economic hub and contributes significantly to the financial, manufacturing, transportation, technology, and telecommunications sectors, among others. It has the most people of any South African province, with a large proportion of them living in cities, and it is the smallest of South Africa's nine provinces in terms of land size. It makes up around 1.5% of the entire land area of the nation and contributes one-third to South Africa's GDP, 10% to Sub-Saharan Africa, and 7% to all of Africa's GDP. With three metropolitan (metros) and two district municipalities, Gauteng is home to more than 24% of South Africa's population, making it one of the largest agricultural product markets in the world.

The metros account for most of the region's population and generate the most economic output. The districts are Sedibeng and West Rand, whereas the metros are Johannesburg (CoJ), Tshwane (CoT), and Ekurhuleni. Despite the province's limited agricultural area and lack of historical prominence as a significant agricultural production location, the majority of South Africa's agricultural processing takes place in this province due to its central location and well-established industrial hub with infrastructure network, GDARD strategic plan, and other factors (2020-2025).

Given Gauteng's high levels of urbanisation, there is limited land available for agricultural activities, with only about 20% of land covered by irrigated and rain-fed commercial agriculture. The province's outer regions, particularly those to the northeast of Tshwane, Sedibeng District to the southeast, and West Rand District to

the southwest, have large areas of land where various agricultural activities are carried out. These activities primarily consist of livestock farming and crop and, as well as other farming activities such as vegetable production, tunnel production, and flower growing, according to the Gauteng City Region Agri-food Transformation and Development Strategy (2016).

The commercial agricultural industry had 2 291 farms in 2017, of which 827 or 36.1%, were active in cattle, 611 or 26.6%, in mixed farming, and 483 or 21.1%, in cereals and other crops. The City of Tshwane had 865 (37.8%) of all farms in the province in 2017, followed by the City of Johannesburg with 404 (17.6%) farms and Sedibeng with 379 farms (16.5%). The commercial agriculture sector's overall revenue in 2017 was R32.2 billion, up 385% from the R6.7 billion reported in 2007.

Most of Gauteng's commercial agricultural land was used for grazing (198 thousand hectares) and arable farming (180 thousand hectares). Crop production takes place on arable land, whereas raising cattle and raising game takes place on grazing land. The City of Tshwane came in second with 22.8% of commercial agricultural land in Gauteng, followed by West Rand with 18.3%. The Sedibeng district accounted for 33.9% of that total. The smallest share belonged to Ekurhuleni (8.2%). A total of three districts, namely; Johannesburg (31.3%), Sedibeng (29.6%), and Tshwane (23.6%), accounted for 84.5% of the country's grazing land, 87.4% of the land was arable, with Sedibeng (39.5%), West Rand (26.5%), and Tshwane City (21.4%).

Figure 3.1: The Map of Gauteng Province with Regions

3.4. SURVEY DESIGN

Race continues to be the main driving force behind equal participation in the South African economy, but research also finds a sizable gender disparity in access and status (DoW, 2015). While race is still the main factor influencing financial access in South Africa, statistics from surveys indicate a gender difference that transcends race. Black women, however, who have the lowest levels of income and formal access to economic opportunities and financial services, are the ones who suffer the most from the combination of racial and gender disadvantages. A new World Bank Group study showed that nations that do not address gender inequality lose economic growth and support towards South Africa's progressive constitutional and legal framework, highlighting the significance of gender equality. Numerous studies have shown a sizable gender disparity in economic activities.

The survey was carried out in Gauteng province, using questionnaires distributed with a particular focus on commercial farmers in the primary and secondary agriculture sectors. For a personal interview, the questionnaire included closed and open-ended questions. The questions focused on the general characteristics of commercial farmers and their families (age, education, marital status, children, and so on), empowerment characteristics, sustainability dimensions, and agri-economic elements. Data from questionnaires were statistically analysed through SPSS. The empowerment and

sustainability questions were guided by the Women's Empowerment in Agriculture Index (WEAI) instrument, and sustainability measures were guided by the Agricultural Integrated Survey (AGRIS) instrument. The Logical Framework analysis was applied as a tool for problem identification and translating the causes and effects of the problems that women farmers face into objectives and strategies. The blended survey was appropriate since it captured the diagnostic and explanatory dimensions in the study area. This was important since a need to explain relationships while also exploring into the relatively untapped territory of quantifying the impacts of women empowerment on sustainable agriculture.

3.4.1. TARGET GROUP

The target group of the study was mainly commercial black female farmers, and the male black farmers were the control group. The study used baseline data obtained from the GDARD's commercialisation program and a population of 68 commercial farmers who were registered for the program. The respondents were a total of 23 female farmers, 16 male farmers, 10 experts from the academia-industry, and 16 practitioners from the study area were interviewed. The commercial farmers were selected from all of GP's regions and engaged in a variety of agricultural production systems. A portion of the other group consists of commercial female farmers who participated in the DAFF FEA project, while the first cohorts of farmers are registered under the GDARD's commercialisation program.

Women commercial farmers are given special attention because research from the World Bank has shown that nations that do not address gender inequality miss out on economic growth. Economic growth in SA has slowed, and the country now has a 35% unemployment rate, which will cause food insecurity. The extension managers and officers who regularly assist commercial farmers were included as the practitioners. They offer technical guidance and general advice on farm management. Experts in Log Frame analysis from various fields participated in the final group, along with researchers and professors from the University of the Free State's Faculty of Natural and Agricultural Sciences, agricultural economists, and professionals in sustainable development from the Free State Department of Agriculture. To reduce the likelihood of non-response to the questionnaires, the researcher tested the consistency and validity of the instruments on 10% of commercial farmers who were not included in the sample, as Gray (2004) recommended.

3.4.2. Definition of Commercial Farmers

The second and third phases of data collection are from commercial farmers in GP. The approved definition of commercial farmers in South Africa is by the National Department of Agriculture, Forestry, and Fisheries (2018). This study will refer to commercial farmers as defined by the Department of Agriculture's National Policy on Comprehensive Producer Development Support (2018), which divides commercial farmers into three types: medium-scale commercial producers, large-scale commercial producers, and mega or corporate producers.

Table 3.1: Definition of Commercial Farmers in South Africa (DAFF, 2018)

Medium Scale Commercial Producer	**Large Scale Commercial Producer**	**Mega/Corporate Producer**
Annual turnover ranging from R1 000 001 – R10 million	Annual ranging between R10 000 001 – R50 million	Annual turnover above R50 million.
Enterprises producing for the source of income	Enterprises producing for the market to make a profit	Enterprises producing for the need to make a profit
Individual or entity for the purpose of deriving a source of income along the value chain of agriculture, forestry, and fisheries activities.	Individuals or entities profit from the production and sale of agriculture, forestry, and fisheries products.	Individuals or entities profit from producing and selling agriculture, forestry, and fisheries products.

3.4.3. The Definition of DAFF FEA Farmers

The third data set will come from commercial female farmers who participated in the DAFF FEA project and are also included in the commercialisation programme. The DAFF FEA initiative is intended to develop effective methodologies to increase women's economic participation in agriculture, with the added benefit of providing knowledge on how to scale up these methodologies, which are likely to be most effective when institutions leverage their local environment's social, political, and economic structures. It is a women's empowerment program that recognises the efforts

and contributions of women, young women, and women with disabilities to food security, job creation, economic growth, and poverty alleviation in the sector. The program's goals are consistent with the vision of the National Development Plan, which emphasises women's empowerment and participation in the country's economic transformation (DAFF FEA Guiding Document, 2016).

3.5. SAMPLE SIZE AND SAMPLING TECHNIQUES

Strydom (2003) supports using samples as a more precise way of gathering information from large groups of people. This prevents the formidable task for those interested in studying such a large population as complete coverage of the total population is seldom possible, and all the members of interest cannot possibly be reached. According to Leedy and Ormrod (2001), the important consideration to make in such situations is to ensure that the sample selected is truly representative of the population, as this ensures the external validity of the research study.

A questionnaire was circulated to a selected group of farmers registered under the commercialisation programme of GDARD. The programme had a total population of 68 farmers. The study followed a convenient sampling and asked the population of farmers to participate in the study. However, only 39 participated. A total of 23 female farmers, 16 male farmers, 10 experts from the public and academia industry, and 16 practitioners from the study area were interviewed. In as much as the project would have desired to include all the 68 farmers in the study, there were numerous challenges of self-selection and exclusion by farmers. As such, the exact number of responses from commercial farmers was volatile and varied because some farmers refused to be classified as commercial after learning the definition of the commercial farmer as defined by the DAFF (2018). A commercial farmer must have a turnover of one million rands (R1m) to be eligible for VAT, according to the definition. However, the sample size represents 57.5% of the population and can be taken as being representative of the commercial farmers in the Gauteng province of South Africa. Kivunja (2017) argued that a sample size representing above 30% is a good enough value for statistical analysis. The same proposition was made by Husam and Pius (2020). To triangulate the data, the method of saturation was then employed with 10 experts from the public and academia-industry, and 16 agriculture practitioners were from the study area. The triangulation process provided deeper insights into the issues affecting women's

empowerment in the sustainable agriculture domain from different angles and perspectives.

As a result, Slovin's formula was used to administer a total of 60 questionnaires. Participants were chosen using a convenience sampling technique, while agricultural practitioners were selected using a purposive sampling technique. Convenience sampling is categorised as a non-probabilistic method that uses purposeful selection factors to choose people for the sample population. According to Kenneth (1978), purposive sampling is a type of sampling in which the researcher makes decisions about which respondents to select and selects only those who fit the purposes of the study. The researcher works with commercial farmers, people with knowledge and experience with women's empowerment projects, such as extension officers and policymakers, and industry experts from government and academia in this study. Slovins' formula was used to calculate an appropriate sample size from a population; in this case, a list of commercial farmers compiled by the Gauteng Department of Agriculture and Rural Development (GDARD) to kick-start the province's commercialisation program was used as a baseline. The researcher was given a list of 68 farmers who reached out to be interviewed for this study.

3.6. POPULATION AND SAMPLING IN THE QUANTITATIVE STUDY

The sample was drawn from the Gauteng Department of Agriculture and Rural Development's (GDARD) commercialisation program database by the Farmer Support unit. The study used baseline data obtained from the GDARD's commercialisation program and a population of 68 commercial farmers who were registered for the program. However, the exact number of responses from commercial farmers could have been more stable and varied because some farmers refused to be classified as commercial after learning the definition of the commercial farmer as defined by DAFF (2018). According to the definition, a commercial farmer must have a turnover of one million rands (R1m) to be eligible for VAT. The samples were geographically distributed across the province for the interviews to reflect the diversity, and only 39 participants responded via telephonic and email interviews. The study further interviewed 16 agricultural practitioners servicing the farmers to partake in the study and finally had a focus group with 10 industry experts from academia and the public sector.

3.7. RESEARCH PROCEDURES

The researcher needed permission from the University's ethical committee to engage with the participants. The questionnaire was tested and approved by the UFS ethical committee for use with participants. Informed consent forms were given to participants to read and sign before the researcher could begin the interview. Participants were also required to discuss their comforts and discomfort with the researcher regarding the study. For those who did not understand the official language, English, the researcher translated it into their language, Sepedi or IsiZulu, the most widely spoken language in Gauteng Province.

The information gathered was reported so that individuals could not be identified. For quantitative data, a questionnaire was used as the data collection method. Because the interviews were telephonic due to COVID-19 restrictions, they lasted more than an hour (60 minutes each), and one had to gain the person's trust on the other end. The interviews took place between November 2020 and June 2021. The interviews were typed and transcribed for analysis while maintaining the participant's anonymity. The LFA stakeholder group session consisted of experts from the industry and academia. Prior to the engagement, the participants were informed of the consent forms they had to read and sign. This session was to gather expert insight on the topic in a structured manner.

3.8. MEASURING INSTRUMENTS

Women are seen as growth and development engines in the agriculture industry, according to Alkire *et al.* (2013). However, the programs aimed at empowering or disempowering women lack impact measuring techniques and will therefore remain an ideal. To evaluate the effect of agricultural interventions on raising the status of women, there needs to be a renewed emphasis on creating tools for women's empowerment. According to Hillary Clinton, a former secretary of state for the United States of America, "data not only measures success but also motivates it because what gets measured gets done." She added that if leaders are evaluated, this will inspire them to be more motivated to address issues since no leader would want to end their tenure with a legacy of finishing last on a list of rankings. Most indices were developed to record various parameters to offer a rapid measurement that facilitates comparison. Alkire *et al.* (2013) suggest that the agricultural sector has to have a tool to measure and monitor the impact of women empowerment interventions; this will mainly assist

the historically gender-blind agricultural-related indicators of women empowerment. WEAI and AGRIS will be used in this study to measure the indicators of empowerment and agricultural sustainability, respectively.

3.8.1. Women ‘s Empowerment in Agriculture Index

Several studies have been conducted to measure women's empowerment within the agricultural sector. The Women's Empowerment in Agriculture Index (WEAI) was developed as one key step in this direction by the US government's Feed the Future Initiative (2012). This WEAI is a significant breakthrough that will help people understand how women's empowerment, food security, and agricultural growth are related. WEAI assesses women’s roles and level of involvement in the agriculture sector. Additionally, it gauges how women are empowered compared to men (Alkire *et al.*, 2013). According to some, the best indicators of women's empowerment are their resources and sense of agency. Because when they are combined, they constitute the empowerment capabilities required for individuals to pursue livelihoods and achieve desired livelihood outcomes.

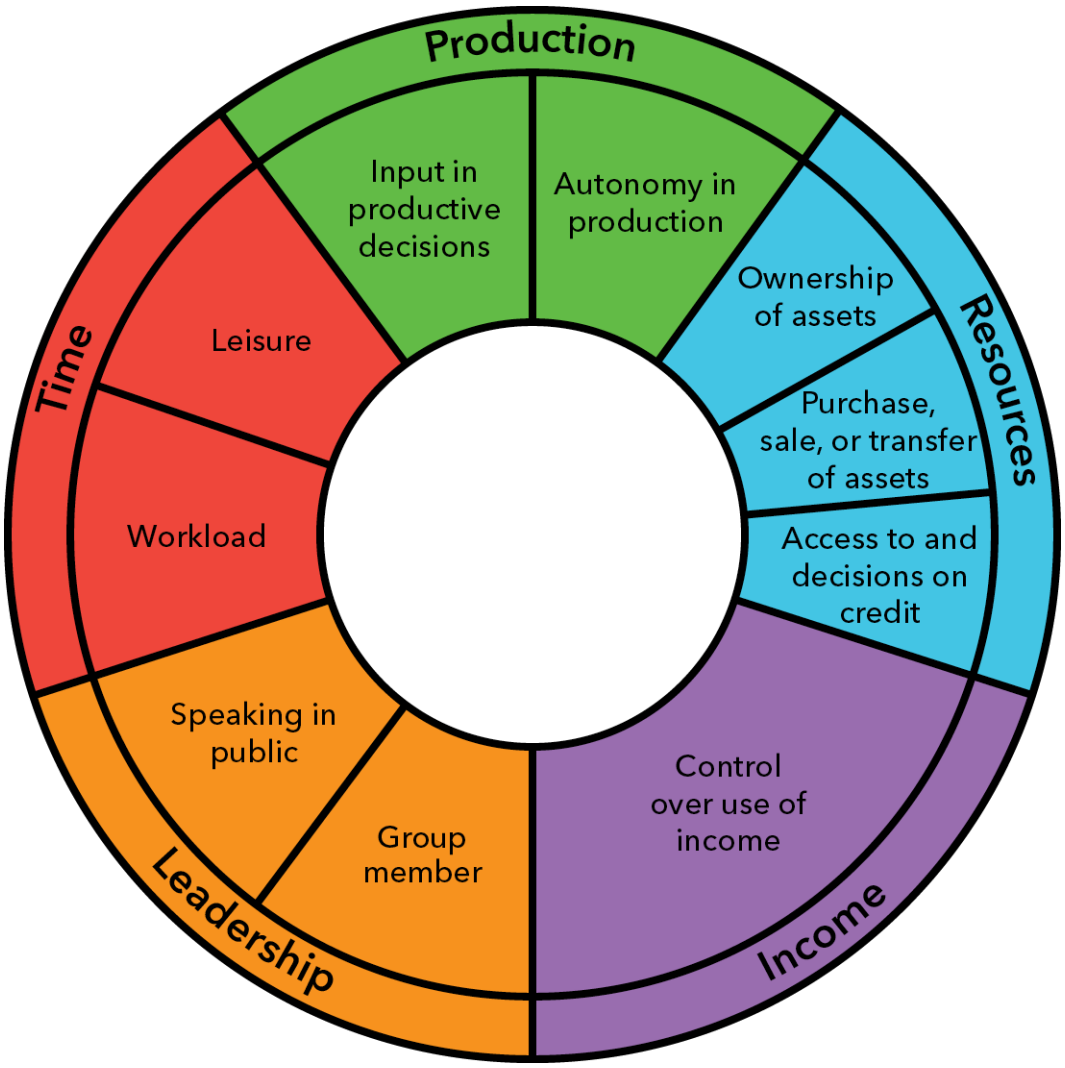

Figure 3.2: Summary of Analysis and Measure of WEAI 5DE

Alkire *et al.* (2013) outlined that WEAI can be used to assess the extent of women's empowerment in agriculture and identify areas where empowerment gaps exist. WEAI was originally designed as a monitoring and evaluation tool; however, its broader applicability and an opportunity to be applied as a diagnostic tool for policymakers, development organisations, and academics seeking to inform efforts to increase women's empowerment was realised.

3.8.1.1. Five Domains of Empowerment

The WEAI is a weighted average of two sub-indices: Five Domains of Women Empowerment (5DE) and the Gender Parity Index (GPI). The 5DE sub-index will be the primary focus of this research. The 5DE domains are as follows: production,

resources, income, leadership, and time. As a measure of empowerment, each domain has indicators and weights (Sraboni *et al.*, 2014). The WEAI, USAID table below initially defines the five domains that reflect agricultural priorities. Table 3.2 below outlines how the Five Empowerment Domains (5DE) measure empowerment in agriculture. The following indicators will be elaborated as they were used to design the questionnaire and structures of the questions posed to the farmers in the study.

Table 3.2: WEAI Domains, Indicators, and Weights (Source: Alkire *et al.*, 2013)

Domain	Indicator	Definition of the indicator	Weight
Production	Input in productive decisions	Cash crop and livestock farming decisions can be made solely or jointly.	1/10
	Autonomy in production	Autonomy in agricultural production (e.g., which inputs to purchase, which crops to grow, what livestock to rear, and so on). Describes the extent to which the decision-making motivation of the participants reflects his or her values instead of a desire to please others or to avoid harm	1/10
Resources	Ownership of assets	Ownership of major household assets solely or jointly	1/15
	Purchase, sale, or transfer of assets	Whether the participant is involved in the decision to buy, sell, or transfer his or her owned assets	1/15
	Access to and decisions about credit	Access to and participation in credit decision-making	1/15
Income	Control over the use of income	Control over income and expenditures, either solely or jointly	1/5
Leadership	Group member	Whether the participant is an active participant in at least one economic or social group, for example, agricultural marketing, credit, and water users' associations	1/10
	Speaking in public	Whether the participant is at ease speaking in public about various issues, such as intervening in a family dispute,	1/10

Domain	Indicator	Definition of the indicator	Weight
		ensuring proper wage payments for public work programs, etc.	
Time	Workload	Time allocation for productive and domestic tasks	1/10
	Leisure	Satisfaction with the amount of time available for leisure activities	1/10

Alkire *et al.* (2013) assert that because the idea of empowerment is so individual, each person has a different definition of what it means depending on their experiences, personalities, and objectives. The WEAI uses both direct and indirect empowerment measures. Instead of acting primarily to avoid social criticism or overt pressure, direct methods of empowerment typically emphasize a person's capacity to promote the aims and goals they value. In the past, rather than emphasizing empowerment itself, indirect or proxy measures of empowerment have concentrated on the possession of resources necessary for empowerment or drivers of empowerment, including education or asset ownership.

3.8.1.2. Analysis and Measures of WEAI on 5DE

The table above outlines how the Five Empowerment Domains (5DE) measure empowerment in agriculture. The indicators below will be elaborated on as they were used to design the questionnaire and structures of the questions posed to the farmers in the study (Alkire *et al.*, 2013).

Domain 1: Agricultural Production

There are two indicators utilized in this area of agricultural productivity. Individuals have adequacy in this indicator if they participate and have at least some input in decisions or if someone else makes the decisions but the individual believes they could. The first indicator, input in productive decisions, is derived from responses to whether the individual had sole or joint input in making decisions about autonomy. Autonomy, which measures a person's capacity to act in accordance with their values, serves as the second indicator of agricultural production. This indicator looks at how well someone understands the problem and balances competing desires to avoid punishment or social rejection with their own moral principles (Alkire *et al.*, 2013).

Domain 2: Control and access to productive resources

When determining land and asset ownership, the first factor to consider is whether a person reports single or joint ownership of property and assets (including agricultural land, large and small livestock, fishponds, farm equipment, house, non-agricultural land, and means of transportation). It is deemed a sufficient achievement for a person to report single or joint ownership of at least one substantial asset (that is, not including poultry, non-mechanized equipment, or small consumer durables).

The second indication of decisions involving the acquisition, sale, or transfer of real estate and other assets, as defined with comparable assets, concerns the identity of the person with the power to decide on such matters. This acknowledges that even though complete asset ownership may not be relevant in many countries, possessing other sets of rights, notably having control over the acquisition and disposal of assets, can be advantageous. Like the first indicator, someone is deemed adequate if they can or do participate in choices about the purchase, sale, or transfer of an asset that belongs to the household.

The third credit access and decision indicator looks at choices made regarding whether to apply for credit and how to use credit revenues from various sources (non-governmental organisations, formal and informal lenders, friends or relatives, rotating savings, and credit associations). Even if they don't use it, a person must be a part of a household with access to credit, and if that household used credit, the individual must have been involved in at least one credit-related decision.

Domain 3: Control Over Income Use

The level of input into decisions about how to spend money earned from agricultural and non-farming activities is evaluated in this domain. A person meets the criteria for this indication if they have a say in how much money is made as a result of their involvement in the activity.

Domain 4: Community Leadership

If the person belongs to an economic or social group and whether they feel safe speaking up in public are two factors in the fourth domain. The group member indicator, which encompasses a wide range of social and economic groupings, indicates whether the person belongs to at least one group in recognition of the importance of social capital as a resource. Social and cultural norms that restrict engagement in activities

outside the house may prevent a person from joining a group, empowerment in speaking up and participating in group activities.

Responses to questions about the person's comfort level in speaking up in public to help decide on infrastructure (such as small wells and roads to be built), to ensure proper payment of wages for public work or other similar programs, and to protest the wrongdoing of authorities or elected officials, are used to determine whether the person is comfortable speaking in public. This variable indicates the respondent's empowerment in using their voice and taking part in collective action, although it does not cover the whole spectrum of public participation options.

Domain 5: Allocation of Time

The last domain has two indicators that measure how much time is spent on the household and productive duties, and how satisfied people are with the amount of time they have for leisure activities. Based on a thorough 24-hour time allocation, the first metric, the productive and domestic workload, is calculated. During the past 24 hours, respondents were asked to recollect how much time they spent on primary and secondary activities. A person is deemed inadequate (has an excessive workload) if they worked more than 10.5 hours in the preceding 24 hours. Hours worked are calculated as the total of time spent on work-related tasks as the primary activity plus 50% of that time as the secondary activity.

The last indicator asks if the person is subjectively content with how much time is available for leisure pursuits like going to the movies, watching TV, listening to the radio, or playing sports. Even so, if a person is content with the quantity of free time offered, that individual is adequate.

3.8.1.3. The Weight of WEAI

Both the percentage of women who are empowered and the degree of disempowerment are reflected by the 5DE. The study results will show that everyone was given a binary score for each of the ten indications, indicating whether the performance in that indicator was satisfactory. The woman then receives the empowerment score, which is calculated by summing the weights of the indicators she deems adequate and ranges from 0 to 100 percent. A woman or man is typically considered empowered in the 5DE if they have sufficient accomplishments in four out

of the five domains or are empowered in a combination of the weighted indicators demonstrating 80% total adequacy. The reasoning behind selecting 80% as the threshold for total sufficiency is covered in the Computing 5DE section. Equitable levels of productive resources, credit, decision-making power, control over income, voice, time, and intra-household parity are indicators of empowerment. The Alkire-Foster methodology can be used to break down the headline 5DE index and show how each indicator's empowerment changed over time. It is then easy to determine, for example, who has achieved sufficiently in fewer than 40% of the categories. If we think this group is the most disadvantaged, we can offer them certain assistance (Alkire *et al.*, 2013).

3.8.2. Agricultural Integrated Survey

The Agricultural Integrated Survey (AGRIS) framework was also used to examine the data, with a portion of the questionnaire representing several aspects of sustainability. To help national statistics agencies provide high-quality and reasonably priced disaggregated data on the technical, economic, environmental, and social aspects of agricultural holdings, AGRIS, a farm-based modular multi-year survey, was created. For the best possibility of acquiring accurate data, face-to-face interviews should be conducted by trained enumerators, according to AGRIS. It also captures information on gender-specific subjects through the core and rotating modules. To analyse the labour contributions of women to agriculture as well as their access to and control over productive resources, it is necessary to classify families headed by men and women more accurately (Fonteneau & Georgieva, 2018).

Economic, environmental, and social data from commercial farmers were obtained for this study to assess the sustainability status. The data was then combined at the provincial level by sub-indicator and reported on a dashboard utilising a traffic-light system. Data were evaluated using the dashboard, which lets countries quickly examine how they are doing concerning numerous sustainability-related dimensions and themes. They can then choose where to concentrate their policymaking efforts as a result. Each sub-results indication is displayed along a continuum of acceptable (yellow), unsustainable (unacceptable), and desired (green) criteria and levels (red). The dashboard then analysed the sustainability criteria, starting with the economic, environmental, and social factors (Khan, 2021).

3.8.2.1. Economic Dimension

The economic dimension's initial indicator for land productivity was chosen because it could be used to assess the agricultural value of outputs generated on a particular plot of land. For various reasons, maintaining or growing output in relation to the land area used is an essential part of sustainability. Land productivity at the farm level reflects technology and production techniques for specific agro-ecological conditions. In a larger sense, higher output is made possible by increased land productivity, which also relieves strain on increasingly scarce land resources. This is typically related to deforestation, which results in the loss of ecosystem services and biodiversity (FAO, 2018).

The sub-definition indicator, as identified by Fonteneau and Georgieva (2018), is "agricultural output value per hectare" (crops and livestock). Farm surveys should routinely collect data on farm outputs and agricultural areas, giving assessment at the farm level a solid foundation.

- Farm output is the volume of agricultural output at the farm level, which generally includes the production of multiple outputs, such as crop types and crop and livestock combinations.
- Farm agricultural land area is defined as the area of land used for agriculture on the farm.

The distance from the 90th percentile of the national distribution is used to calculate the sustainability criteria:

- Green (desirable): Sub-indicator value is ≥ 2/3 of the corresponding 90th percentile
- Yellow (acceptable): Sub-indicator value is ≥ 1/3 and < 2/3 of the corresponding 90^{th} percentile
- Red (unsustainable): Sub-indicator value is < 1/3 of the corresponding 90^{th} percentile

Second, another important aspect to consider when evaluating sustainability in agriculture is the farm's economic viability, which is mainly influenced by its profitability. By looking at the farmer's net income from farming activities, profitability is determined. The availability and use of data on farm economic performance as measured by profitability will lead to better micro and macroeconomic decisions. Because performance measurements impact behaviour, better performance statistics can

influence government and producer behaviour as well as decision-making in both large-scale commercial farming and medium- and small-scale subsistence agriculture. Net farm income needs to be greater than zero for a farm to be profitable.

- Red (unsustainable): Below zero for all the previous consecutive years.
- Yellow (acceptable): Above zero for at least one of the previous three years.
- Green (desirable): Above zero for the last three years.

Third, resilience is the ability of a system to withstand pressure and shocks, persist, and continue functioning efficiently. Absorptive, anticipatory, and adaptive capacities are used to measure it (in the sense of providing stability, predictable rules, security, and other benefits to its members). A farm will perform better on this sub-indicator if it uses the mitigation strategies listed below (FAO, 2018):

- Obtaining or using credit
- Have access to or use insurance
- On-farm diversification (a single agricultural commodity's share of the holding's total value of production must not exceed 66%)
- The availability of a specific service and the holder's ability and means to get the service (necessary paperwork, collateral, a favourable credit history, etc.) are defined here; and
- In general, the farm will be able to prevent, resist, adapt to, and recover from external shocks, including floods, droughts, market failure (such as price shock), climatic shock, and pest/animal illnesses, if it has access to one or more of the three components mentioned above.

Sustainability criteria

If a farm has employed or possesses the capacity to utilize the risk mitigation techniques outlined below, it is regarded as resilient (Khan, 2021):

- Green (desirable): Access to or use of at least two of the mitigation mechanisms listed above.
- Yellow (acceptable): Access to or use of at least one of the mitigation mechanisms listed above.
- Red (unsustainable): No access to the mitigation mechanisms listed.

3.8.2.2. Environmental Dimension

A sustainability concern, soil degradation is a sub-indicator that assesses how much agriculture affects soil health. The questionnaire is instructed to concentrate on the four threats that combine the more prevalent (for national monitoring, countries may choose to add any of the other areas indicated above, depending on relevance) and easier to assess aspects through farm surveys (FAO, 2018). This will help to propose a manageable solution while capturing the main trends in the country in terms of soil health:

- Soil erosion
- Reduced soil fertility
- Irrigated land salinization
- Waterlogging

The questionnaire collects the farmer's knowledge of the agricultural holding's soil degradation situation. Farmers, according to experience, are acutely aware of the state of their soils, health, and degradation level. Farmers are also given the opportunity to mention threats other than the four listed above.

Second, another environmental sustainability measure in agriculture was water use, specifically irrigated agriculture, which is by far the most important economic sector using freshwater resources. In many places, water withdrawal from rivers and groundwater aquifers exceeds what is environmentally sustainable. This affects both rivers and underground aquifers. As a result, sustainable agriculture necessitates limiting the amount of freshwater used for irrigation. While there are no internationally agreed-upon standards for sustainable water use, signs of unsustainable water use typically include progressive decreases in groundwater levels, drying out of springs and rivers, and increased conflicts among water users (DoA, 2002).

This water-use sub-indicator assesses how much agriculture contributes to unsustainable water-use patterns. Water sustainability should ideally be measured at the river basin or groundwater aquifer scale because the cumulative effect of all users sharing the same resource impacts water sustainability. The survey assesses farmers' water scarcity knowledge and behaviour and assigns them to one of three levels of sustainability. This understanding and behaviour can be expressed as follows (FAO, 2018):

- whether the farmer uses water to irrigate crops on a small or large scale on the farm and why, if the answer is negative (does not need, cannot afford).
- whether the farmer is aware of issues of water availability in the farm area and notices a decrease in water availability over time.

Third, fertilizer pollution risk is another indicator of agricultural sustainability because it can degrade environmental quality due to excessive use or poor fertilizer management. Chemical levels in soil and water bodies must be kept within acceptable limits for sustainable agriculture. Integrated plant management must consider all nutrient sources (mineral and organic) and their management to achieve the best = nutrient balance. Measuring soil and water quality provides insight into the extent and causes of pollution; however, establishing soil and water monitoring systems is costly and not always feasible in developing countries. Farmers were questioned about their fertilizer use, understanding of the environmental risks associated with fertilizer and manure applications, and plant nutrient management practices. The following risk-reduction management measures are being considered:

- Use organic sources of nutrients alone or in combination with synthetic or mineral fertilizers, not exceeding recommended doses.
- Consider soil type and climate when determining fertilizer application doses and frequencies.
- Use site-specific nutrient management or precision farming at least once every five years; and
- Use buffer strips along water courses.

Pesticides are important inputs in modern agriculture (crop and livestock), but if not properly managed, they can harm people's health and the environment. The questions were based on information about farm pesticide use, pesticide type, and risk-mitigation measure(s) implemented. Possible solutions are provided below (Fonteneau & Georgieva, 2018):

Health

- Observance of pesticide label instructions (including the use of protective equipment)
- Waste disposal that is safe (cartons, bottles, and bags)

Environment

- Adherence to recommendations on the pesticide label

- Adoption of the required good practices such as adjusting planting time, applying crop spacing, crop rotation, mixed cropping, or inter-cropping
- Biological pest control or use of bio-pesticides
- Adoption of pasture rotation to suppress livestock pest population
- Use of pest resistant/tolerant cultivars, disease-resistant/tolerant livestock breeds, and standard/certified seed and planting material

Sustainability criteria

Farm sustainability in terms of pesticides will be evaluated as follows (Khan, 2021):

- Green (desirable): The farm does not use pesticides or only uses pesticides that are moderately or slightly hazardous (WHO Class II or III). In this case, it follows either an integrated pest management (IPM) program or both health-related and at least three environmental-related measures.
- Yellow (acceptable): The farmer uses only moderately or slightly hazardous pesticides (WHO Class II or III) and takes some precautions to protect the environment and human health (at least two from each of the lists above)
- Red (unsustainable): Farmer uses highly or extremely hazardous pesticides, illegal pesticides, or moderately or slightly hazardous pesticides without taking specific measures to mitigate environmental or health risks associated with their use (fewer than two from each of the lists above).

Biodiversity

The Convention on Biological Diversity (CBD) emphasizes the close relationship between agriculture and biodiversity, considering three levels of biodiversity: genetic diversity, agrobiodiversity at the production system level, and ecosystem level (wild) biodiversity, and how agriculture is practised influences all three levels. This questionnaire examined farm adoption of biodiversity-supportive practices at the ecosystem, species, and genetic levels. This indicator considers both crops and livestock. The practices are classified as follows (SDG, 2022):

- Examines the holding area for natural or diverse vegetation (at least 10% of the holding is recommended). This can include maintaining wildflower strips, stone and wood heaps, trees or hedgerows, and natural ponds or wetlands.

- It does not use synthetic pesticides, buys no more than 50% of livestock feed, and does not use antimicrobials as growth promoters.
- At least two of the following contribute to farm production, each accounting for at least 10% of the total value of the holding's output: crop/pasture; trees or tree products (including perennial crops such as orchards or vineyards); livestock or animal products; and fish.
- Rotates at least three crops or crops and pastures across at least 80% of the farm area (excluding permanent pastures) over three years.
- A single continuous commodity has a maximum area of no more than 2 hectares (excluding pasture), and areas larger than 2 hectares use at least two different varieties.
- At least 50% of each animal species' population consists of locally adapted breeds or endangered breeds.

Sustainability criteria:

Adoption of biodiversity-friendly practices (SDG, 2022):

- Green (desirable): The agricultural holding meets at least four of the above criteria.
- Yellow (acceptable): The farm meets two or three criteria above.
- Red (unsustainable): The agricultural holding meets only two criteria.

3.8.2.3. Social Dimension

The social dimension considers the following indicators of sustainability: decent employment, food security, and land tenure.

Decent Employment

Social sustainability examined the decent employment information on the remuneration of farm employees. It informs about the economic risks that unskilled workers face regarding remuneration, which is then compared to the national minimum wage established in the agricultural sector (Fonteneau & Georgieva, 2018).

- Green (desirable): If the farm employs no labour, if the holding has fair labour certification, or if the wage rate paid to unskilled labour is higher than the

minimum national wage rate or the minimum agricultural sector wage rate (if available).

- Yellow (acceptable): If the wage rate paid to unskilled labour equals the minimum national wage rate or the minimum agricultural wage rate (if available).
- Red (unsustainable): If the wage rate paid to unskilled labour is less than the national minimum wage or the agricultural sector minimum wage (if available)

Food security

Another measure of social sustainability is food security. The Food Insecurity Experience Scale (FIES), which was used in this study, is a statistical measurement scale similar to other widely accepted statistical scales designed to measure unobservable traits like aptitude/intelligence, personality, and a wide range of social, psychological, and health-related conditions. It is a metric of the severity of food insecurity based on direct household interviews that relies on people's yes/no answers to eight simple questions about their access to adequate food. The food security questions posed to farmers were based on the FIES framework. The FIES questions are about the individual respondent's or the respondent's household's experiences. The questions are designed to elicit self-reported food-related behaviours and experiences associated with increasing difficulties in obtaining food due to resource constraints (FAO, 2018).

- Green (preferred): Moderate food insecurity
- Yellow (acceptable): Some food insecurity.

Land Tenure

Land tenure allows for the evaluation of social sustainability in terms of rights to agricultural land areas. Because agricultural land is such an important input for agricultural production, having secure land rights ensures that the agricultural holding retains control of such an important asset and does not risk losing the land used for farming. Farmers are less productive when access to and control over economic resources and services, particularly land, is limited. Long-standing disparities in economic and financial resources have disadvantaged some farmers' ability to participate in, contribute to, and benefit from larger development processes. As a result, the equitable distribution of economic resources, particularly land, contributes

to economic efficiency and positively impacts key development outcomes such as poverty reduction, food security, and environmental sustainability (SDG, 2022).

Access to land security level.

- Green (desirable): Has a formal document with the holder/name holding on it, or has the right to sell any of the holding's parcels, or has the right to bequeath any of the holding's parcels.
- Yellow (acceptable): Has a formal document even if the holder's/name holdings are not on it.
- Red (unsustainable): No positive responses to any of the four questions above.

Each sustainability indicator is presented in the form of a dashboard in the reporting mode. The dashboard described provides a solution by measuring sustainability at the farm level and aggregating it at the national level. The results are computed, and the dashboard is built separately for each sub-indicator. Aggregation at the national level is accomplished by adding the agricultural land area of all agricultural holdings by sustainability category, using a 'traffic light' approach (red, yellow, or green), and reporting as a percentage of the country's total agricultural land area (minus common land) (FAO, 2018).

3.8.3. Logical Framework Approach

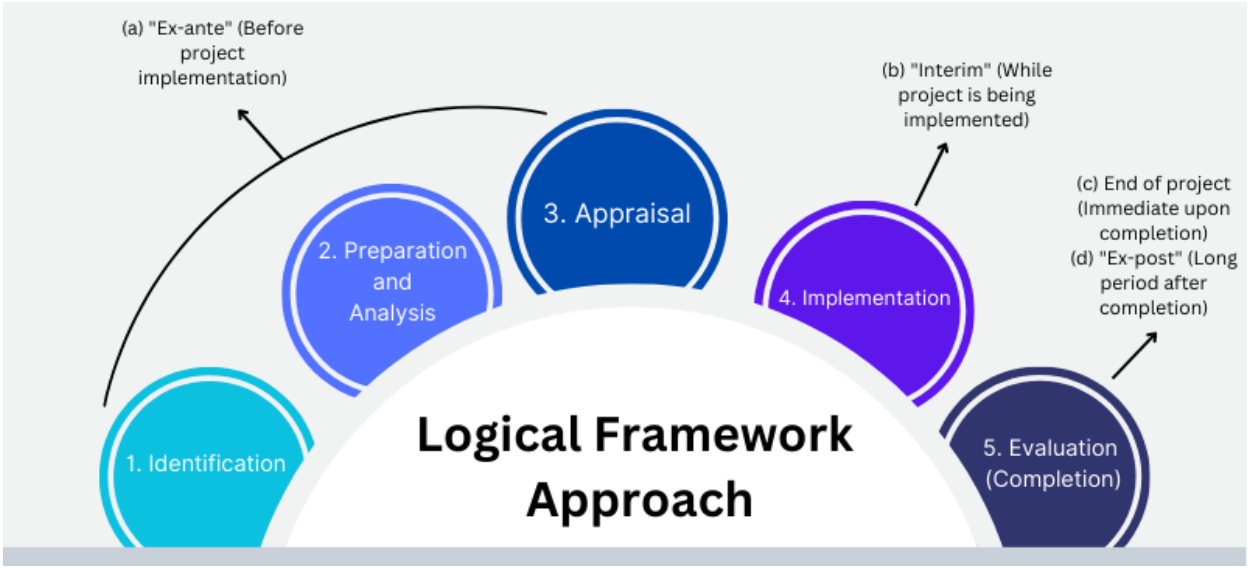

Figure 3.3: Logical Framework Approach

The Logical Framework Analysis (LFA) method was used within this study to attempt an analysis of the problems, causes, and effects that women farmers in GP face. According to Hamsphere (1999), the approach is an implementation strategy that includes problem analysis, stakeholder analysis, and the creation of a hierarchy of objectives. It is regarded as providing a clear set of expectations for what should be accomplished and assisting in the development of a framework for a reporting tool. Figure 3.3 above simplifies the approach; the cause-and-effect links between the problem circumstances found in the survey are displayed using a problem tree diagram. All the participants' known difficulties are included, and they are arranged so that the more difficult ones are divided into easier ones. By outlining the anatomy of cause and effect surrounding a problem with more structure, problem tree analysis assists in the development of solutions. The objective tree is then created by changing the problem tree, turning the root issues into their corresponding root solutions (Ammani *et al.*, 2010).

Bakewell and Garbutt (2005) said that LFA is one of the best options for planning and monitoring development work. In this study, LFA was used as a foundation for problem identification and to translate the causes and effects of the problems that women farmers face into solutions that can be easily tracked to achieve the impact of empowerment and sustainability indicators for women farmers. LFA is highly

recommended for this study because it demonstrates the ability to produce visible, long-term impact results for development interventions (Bakewell & Garbutt, 2005).

The results of the logical framework technique are shown in a logical framework matrix. When broken down to the output level, the matrix summarizes the project design and comprises four columns and five rows. The vertical logic outlines the project's goals, clarifies causal connections, and indicates important presumptions and unknowns outside the project manager's control (columns 1 and 4). The horizontal logic outlines the methods for measuring project goals and validating those measurements (columns 2 and 3). The monitoring and assessment of the project are built upon this. It keeps track of the indicators that will show when a goal has been achieved, the measures that will demonstrate that the goal has been met, the sources used to verify the information, and finally, the assumptions or hypotheses that will describe what else needs to occur for the project to succeed (Hamsphere,1999). The matrix will be modified for this study based on its objectives.

3.9. LIMITATIONS OF THE STUDY

The questionnaire did not receive a 100% response rate from the farmers influencing the research finding's reliability. To lessen the gaps that could affect the target number of commercial farmers' sample size, emails and telephonic interviews were conducted. These preventive measures were made primarily due to the COVID-19 restrictions, but this also failed because of the sensitivity of the farmers not trusting to give out their personal information to someone on the other side/over the phone and others retracting once they were informed of the meaning of commercial farmer.

3.10. CHAPTER SUMMARY

Race and gender are the main determinants of financial access and a barrier to equal economic participation in South Africa. Recent World Bank Group research shows that nations that do not address gender inequality lose out on economic growth; however, South Africa's constitutional and legislative framework is progressive and highlights the importance of gender equality (Kirkwood, 2018).

The province of Gauteng, which serves as the nation's economic centre, hosted this study. Gauteng province has the highest number of farms and agricultural holdings owned by males and females. Women in GP are the highest in ownership at 40%,

followed by FS and WC at 34%, respectively (CoCA, 2017). The research methodology for this study is derived from its objectives. Respondents in this study were farmers who shared a common category domain of being classified as commercial farmers. Only the farmers categorised as commercial farmers qualified for inclusion in the study. A profundity literature search was conducted to identify tools to design appropriate field data collection instruments and analysis methodologies. This was guided by scientific literature and socio-economic aspects of women's empowerment in agriculture (Ogato *et al.*, 2009). In using a quantitative methodology, a questionnaire was designed for interviews and analysis tools of AGRIS, LFA, and WEAI. According to Benschop and Khalil,(2019) AGRIS is defined as the program that is a farm-based, multi-year survey that is intended to assist national statistical agencies in producing high-quality, inexpensive disaggregated data on the technical, economic, environmental, and social dimensions of agricultural holdings. LFA is defined as an implementing strategy that includes problem analysis, stakeholder analysis, and developing a hierarchy of objectives, and is seen as providing a clear set of expectations of what should be achieved, as well as assisting in the establishment of a framework for a reporting tool (Hamsphere,1999). WEAI is defined as a new survey-based index designed to assess women's empowerment, agency, and inclusion in agriculture (Alkire *et al.,* 2013).

CHAPTER 4: EMPOWERMENT OF WOMEN FARMERS IN GAUTENG, SOUTH AFRICA

4.1. INTRODUCTION

The primary source of information was obtained through in-depth interviews, which were conducted from November 2020 to April 2021. The engagement was then extended until June 2021 due to the respondents' inability to participate in the research. The initial interview process began with a meeting with a senior provincial agricultural official from the Gauteng Department of Agriculture and Rural Development (GDARD) to discuss the selection of commercial farmers in GP. The focus of selection was on farmers who had registered for the province's commercialisation program and female farmers who had participated in the DAFF FEA programme at the commercial level but were not part of the commercialisation programme.

The Gauteng Department of Agriculture and Rural Development (GDARD), according to Nesamvuni *et al.* (2016), has assisted women and small-scale farmers in intensive production systems, including poultry and horticulture, through vegetable tunnels. According to GDARD, most female farmers receive support equivalent to provinces like KwaZulu-Natal, North West, and Limpopo. In keeping with government goals on women's empowerment, the GDARD's funding for women climbed from almost R1.8 million in the 2004/2005 fiscal year to slightly over R42 million in the 2011/2012 fiscal year. As a result, it is not surprising that 85% of participants who graduated from smallholder to commercial farmers with the help of GDARD felt empowered, and these empowered participants specified that they had been given support and encouragement. The main reasons for not feeling empowered among the 15% of participants were a lack of access to resources and, in particular, no assistance from the Department of Agriculture. This lends support to the literature by Santra and Kundu (2001), which adds to our understanding that access to assets is the single most pressing need for women's empowerment in general and specifically for women in agriculture. From a policy perspective, this calls to action the different stakeholders involved in women's empowerment and sustainable agriculture innovations to realign their efforts with this critically needed pillar.

4.2. BACKGROUND OF THE FARMERS

This study's main objective is to empower women farmers in South Africa's Gauteng Province to be agriculturally sustainable. As a result, the study was required to determine the degree of farmer empowerment and sustainability in Gauteng to respond to the research questions about empowerment, agricultural sustainability and challenges faced by farmers in Gauteng. The farmers included in this report fall under the National Policy on Comprehensive Producer Development Support's category of commercial farmers (2018).

4.2.1. Demographic Information

Nesamvuni *et al.* (2016), reported that the majority of farms subsidised by CASP were situated in Sedibeng (172 farms), the City of Tshwane (158 farms), and finally, Westrand, reinforcing the government's support for farmers (61). With 33 and 38 farms, Johannesburg and Ekurhuleni Metropolitan cities came in last and second. Following these findings, most of the female participants (22%) were from the Sedibeng and Tshwane district/region, and most of the male participants were from West Rand (31%) or Sedibeng (25%).

4.2.1.1. Marital Status

The marital status of married female participants is 35%, while married male participants are 56%. Long-term plans for both female and male farmers are to stay in farming and leave a legacy for future generations. 91% of female participants and 100% of male participants want to remain in farming. Most female participants (65%) were interested in farming from the start, while most male participants (87%), were interested in farming from the start. This was because most female participants (93%) and 71% of male participants who were interested in farming from the start wanted to carry on a family tradition.

4.2.1.2. Education

The education level of the women who participated was a diploma (43%) and a degree (30%), compared to 50% of the male participants who had diplomas and 25% with degrees. Most participants (46%) had a diploma, while 28% had a degree. Education level appears to have had a statistically significant influence in this context, as 9% of women did not have access to education and are still empowered in agriculture.

4.2.1.3. Age

The median age of the female participants was 53 years, ranging from 30 to 79 years. The average age of the male participants was 55 years, ranging from 43 to 67 years.

4.2.1.4. Level of Operation and Type of Farming

The conventional type of production was used by 74% of female participants and 94% of male participants. Approximately 9% of female participants identified animal breeding as their type of farming, while 12% of male participants identified animal breeding as their type of farming. Crop production is the most common type of farming indicated by female and male participants, with 74% of female participants and 62% of male participants indicating crop production as their type of farming. Only 26% of female participants indicated agro-processing as their type of farming, while no male participants indicated agro-processing as their type of farming. Finally, 56% of female participants identified livestock production as their type of farming, while 56% of male participants identified livestock production. The farmer's operation level is at the commercial level for 78% of the female participants and 94% of the male participants. Less than half of the female participants (43%) were enrolled in the GP commercialisation program, while most male participants (87%) were enrolled in the GP commercialisation program.

4.2.1.5. Duration in Farming

Most female participants (52%) volunteered to pursue farming as a livelihood as their first choice, compared to 56% of male participants who volunteered to pursue farming as their first choice. The average time spent farming by female participants was 15.35 (6.49 years), with a minimum of 4 years and a high of 33 years spent as a source of income. With a minimum of 3 years and a high of 33 years, men's agricultural experience lasted an average of 13.34 (7.03) years. Most female participants (65%) and 87% of male participants were interested in farming from the start. Among the farmers who were interested in farming from the start, 93% of the female participants and 71% of the male participants wanted to carry on a family tradition.

In this study, more than 80% of the female participants had access to assets and resources, which translated into female participants feeling empowered. According to the study, women in Gauteng have 91% empowerment compared to 81% for men.

The 9% of females who were not yet empowered performed inadequately in 4% of the domains. The 19% of males who were not yet empowered performed inadequately in 4% of the domains. According to the decomposition of the disempowerment measure, the domain in the sample that contributes the most to female disempowerment is time, workload and leisure elements. For males, the domain that contributed the most to their disempowerment was time, specifically the workload element, resources, access to, and credit decisions.

4.3. EMPOWERMENT DEFINITION

Empowerment is a complicated idea that differs between cultures, persons, sexes, occupations, and positions in life, according to Sen (1993), Narayan (2002). Men and women may view empowerment in general and women's empowerment in particular from different angles, but they all concur that women's participation in decision-making is a crucial aspect that must be considered for woman empowerment. This has fundamental policy implications in that the practitioners also need to factor in these variations when designing policies and possibly integrate these observations to accommodate both males and females. The outcome is that there will be patterns and tendencies of resource co-mobilisation and sharing in production communities, thus expanding opportunities for women to be actively engaged in sustainable agriculture functions.

The study findings supported the literature when establishing the participants' understanding of empowerment. Most participants (67%) thought being empowered meant having access and rights to activities, while 30.1% understood empowerment as having control, 15% as being able to express themselves, and 10% as being able to share knowledge and skills with others. These cross-cutting issues need to be integrated into women empowerment programming if sustainable benefits are to be derived in the agriculture sector.

The study used the WEAI instrument to measure empowerment, and the five empowerment domains listed below were elaborated on. WEAI assesses decision-making power, access to resources (including credit), income control, time burdens, and group membership (Meizen-Dick, 2019).

4.4. EMPOWERMENT DOMAIN 1: PRODUCTION

The production domain indicators are input in effective decisions and production autonomy. The cut-off was set at a minimum of two different decision types; there are 91% more females than males with appropriate input in productive decisions, or 88% more females than males. According to this definition of production autonomy, 78% of females and 94% of males are adequate.

In the production domain, 38.5% of participants indicated that the production decision is made jointly by males and females during crop and variety selection. Participants in the management of production activities indicated that this decision is made jointly by males and females, while approximately 51,3% indicated that the decision to purchase inputs is made jointly by males and females. As indicated by 38.5% of participants, the decision to rear livestock is made jointly by both males and females. The decision to sell crop/livestock is made jointly by males and females, according to 48.7% of the participants. Female and male participants in homestead and gardening activities indicated that 23% of participants make joint decisions, and 35.95% of participants in crop post-harvest operations make joint decisions. These results are important since they show the shift in male dominance in agricultural decision-making processes in the study area.

Joint decision-making provides an adequate source of information from both males and females in the farming systems and as such, enhances the probabilities of improved farm performance. Policies need to further reinforce these positives by creating further opportunities in the agribusiness realm, which advocate for joint participation in sustainable agriculture activities. The starting point will be to establish gendered associations, which can be important sources of sustainable agriculture information where male and female farmers converge and productively discuss emerging challenges and opportunities. This also feeds directly into the leadership dimension, which shall be discussed in later sections of this chapter.

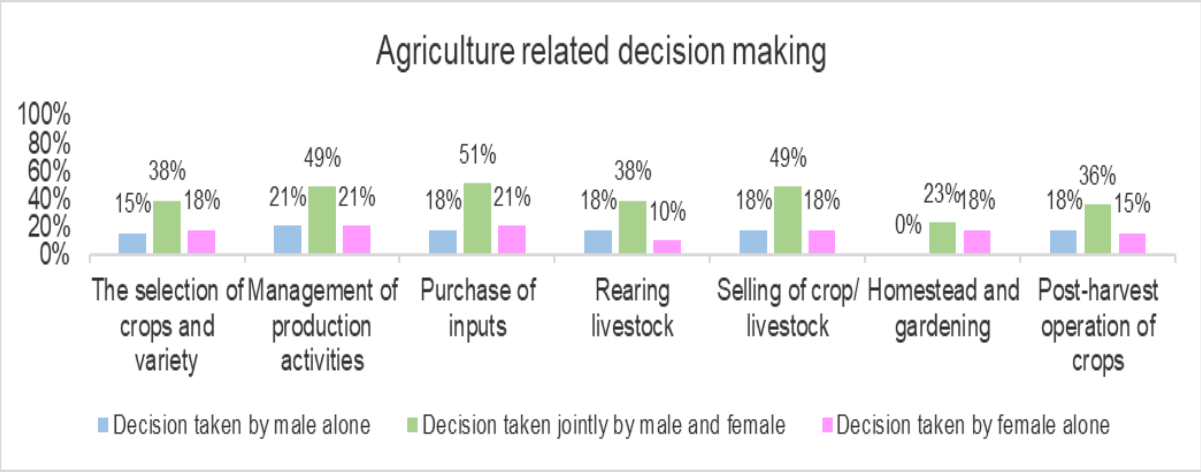

Figure 4.1: Decision-Making in Relation to Production Autonomy

Indicating whether they agreed or disagreed with the scenario as representing their reality, the farmers pointed to the parts representing their day-to-day experiences. Many participants (64%) strongly disagreed with the notion that problems will arise with someone if they act differently. The assumption that acting in a manner that wins the approval of others was highly disagreed with by most participants (44%), while 61% strongly agreed. According to the mean, the assertion that participants act as they do is most frequently agreed upon (X = 4.43 0.99), while the statement that they act as they do for others to not think poorly of them is least frequently agreed upon (X = 1.83 0.88). Most people contend that figuring out what is meant by the average of strongly agree and disagree suggests that there is typically no "equality" between options and that the difference between "strongly disagree" and "disagree" may be the same as the difference between "disagree" and "agree."

Most participants, as indicated by the mode, concurred that they act in a certain way because they personally think it is the right thing to do (mode = 5), whereas a smaller percentage concurred that they act in a certain way to avoid others' negative opinions of them (mode = 1). The statement that was most frequently agreed upon was that they carry out their actions because they genuinely believe that doing so is the right thing to do. Conversely, 8% of respondents indicated that the statement that was least frequently agreed upon was that they carry out their actions to avoid the ill will of others. In addition, when comparing the two extremes of strongly agree and strongly disagree, 62% of the participants strongly agreed with the statement that they act the way they do because they believe it is the right thing to do, while 44% strongly disagreed with the statement that they would face repercussions if they act differently.

4.5. EMPOWERMENT DOMAIN 2: RESOURCES

The following indicators are part of this domain: credit access and decisions, asset ownership, asset acquisition, sale, or transfer. If a person declares solo or joint ownership of at least one asset, suggesting that ownership cannot be restricted to merely minor assets, that individual is considered sufficient in this area. According to this criterion of asset ownership, 100% of both men and women had sufficient ownership. In this region, if a person owns at least one sort of right over at least one type of agricultural asset, they are deemed adequate. 96% of females and all males were deemed adequate. A person must be a member of a credit-accessible household and, if the household used a source of credit, must have taken part in at least one credit-related decision to be considered acceptable on this indicator. According to this measure of credit availability and decision-making, 74% of females had enough credit compared to 87% of males.

The second empowerment domain examined indicated resources, which assets/resources the participants had, with 90% having real estate and land. 46% of participants had retirement accounts, and 100% had equipment, machinery, and office supplies. Most participants had savings accounts, and 97% owned homes and cars.

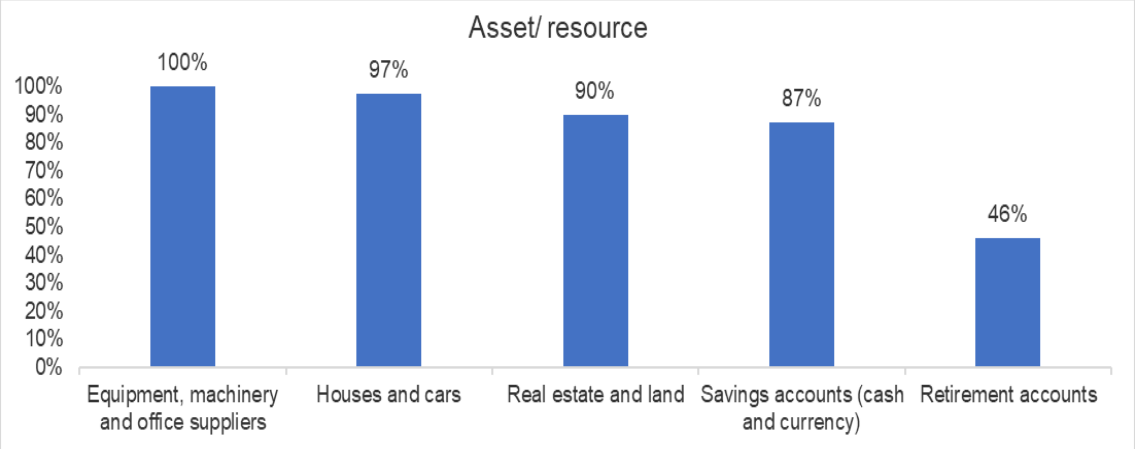

Figure 4.2: Assets and Resources

4.6. EMPOWERMENT DOMAIN 3: INCOME

This domain also includes control over the use of time as an indicator. The respondent is regarded competent in control over the use of income if they are deemed adequate in at least one of the sub-indicators and are not making decisions about minor household members. 100% of females and 100% of males, respectively, reported having appropriate control over how their income was spent. This domain also

includes control over the use of time as an indicator. The respondent is regarded competent in control over the use of income if they are deemed adequate in at least one of the sub-indicators and are not making decisions about minor household members. The proportion of females and males who had adequate control over their income use was 100% and 100%, respectively.

Third, in terms of buying and selling land, 74% of participants indicated that decisions were made jointly by males and females. Fourth, when it comes to travelling and recreation, 77% of participants said that travel and recreation decisions were made jointly by men and women. Finally, the only indicator in the income domain where a decision was made individually was voting in elections, with 51% of participants indicating that voting in election decisions was made solely by females.

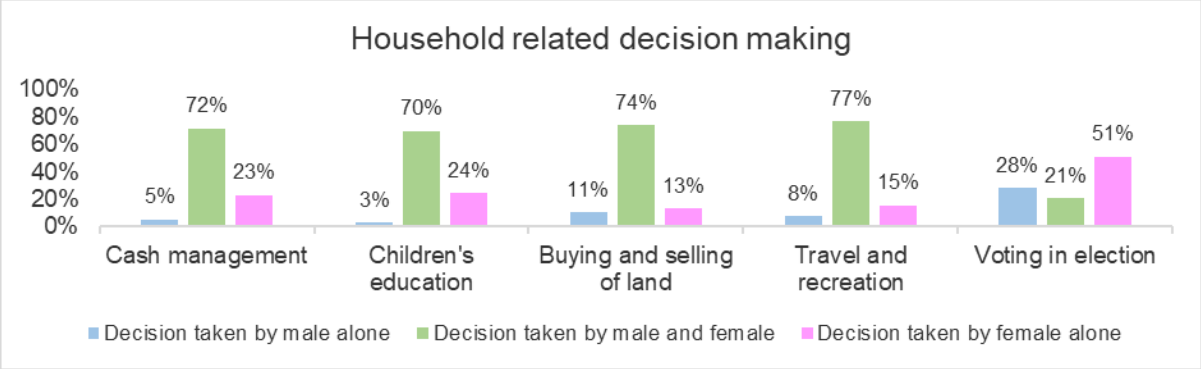

Figure 4.3: Household Decision-Making

This graph examined household decisions concerning the following aspects: salary and minor household expenses. Regarding their own wage/salary, 74% of participants made a significant decision on their own wage/ salary, and 51% made a small decision on minor household expenses. Other aspects, such as cash management decisions, were taken jointly by males and females, according to 71.8% of participants, and children's education decisions were taken jointly by males and females, according to 69.2% of participants. Males and females made joint decisions about buying and selling land, according to 74.4% of participants. Most participants (76.9%) indicated that travel and recreation decisions were made jointly by males and females, while 51.3% indicated that voting in election decisions was made solely by females, and 79.5% of participants had most of the input in voting in elections.

4.7. EMPOWERMENT DOMAIN 4: LEADERSHIP

Men are significantly more likely than women to be disempowered by a lack of community leadership and influence, just as poverty is more likely to be caused by a lack of credit and time (Sraboni *et al.*, 2014). The following indicators are part of this domain: group participation and public speaking skills. Males had a 100% adequate group membership rate, compared to 87% for females. The respondent is deemed adequate if at least one of the three reasons makes them feel at ease speaking in front of an audience. Both men and women are equally capable of speaking in front of an audience.

The fourth empowerment domain is leadership, and participants described their various roles in the community and activities related to their farming discipline. About 92% of those polled indicated they belong to or participate in any social, political, or religious organisation. The 92% who participated in these organisations were divided into 8% who belonged to/participated in a women's self-help group, 17% who belonged to/participated in a religious group, and 11% who belonged to/participated in an NGO. Only one participant who belonged to/participated in an organisation indicated political party involvement. 11% of participants belonged to/participated in a cooperative organisation, while 89% belonged to/participated in a business or farmer association. All participants who did not belong to or participate in an organisation indicated a lack of time.

92% of individuals felt at ease speaking in front of others to discuss infrastructure, while everyone else ensured the proper processes were completed when payment was necessary. Participants reported protesting against the improper conduct of authorities or elected officials in 51% of cases and family disputes in 97% of cases.

4.8. EMPOWERMENT DOMAIN 5: TIME

Workload and leisure indicators are part of the time domain. If a person works fewer hours per day on home and agricultural tasks than the 10.5-hour time poverty threshold, they are regarded to have a sufficient workload. In these circumstances, the manageable workload for women is 9%, and for men, it is 6%. A relatively high percentage of people, 94% of men and 70% of women, report feeling extremely satisfied/satisfied/neutral about having enough leisure time.

The third area of empowerment focused on time, asking participants to estimate how many hours they spend on each of the following on a typical day. With a standard deviation of 1.98 hours and a range of 4 to 12 hours, the average amount of time spent on agricultural activities was 9.03 hours. With a minimum of 2 hours and a maximum of 10 hours, the average time spent on household tasks was 4.01 hours, with a standard deviation of 1.54 hours. With a standard deviation of 1.21 hours, a range of zero to four hours, and an average of 2.58 hours, leisure time was spent on activities. With a standard deviation of 1.17 hours, a minimum of 3 hours, and a high of 8 hours, the average time spent sleeping was 7.21 hours. Four people selected other options, with an average time spent on them of 2.50 hours, a standard deviation of 0.58 hours, and a range of 2 to 3 hours.

The level of satisfaction with the amount of time available for leisure activities among all participants is depicted in Figure 4.4. 54% of participants said they were at least somewhat happy with how much time they had for leisure activities.

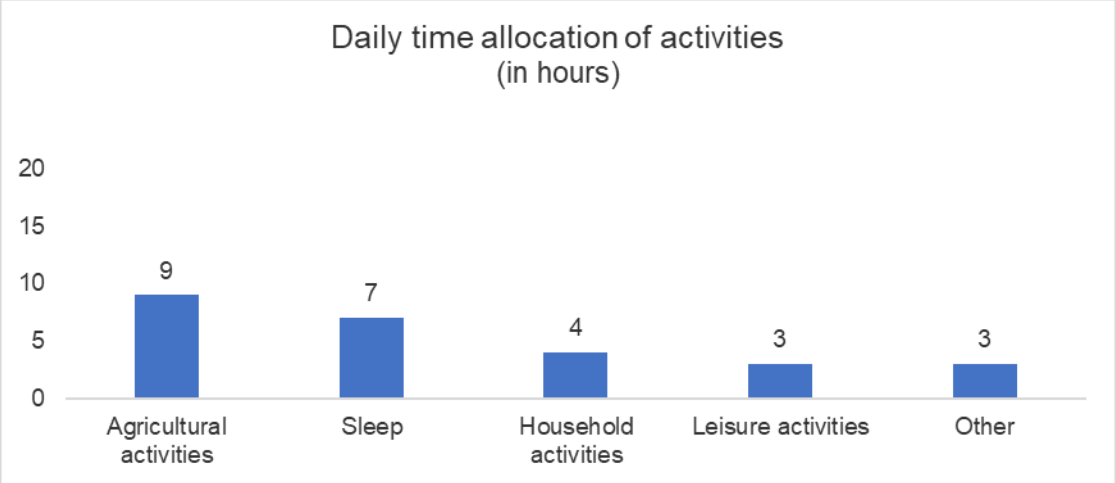

Figure 4.4: Time use

4.9. TOTAL EMPOWERMENT

The domain in the sample that contributes most to female disempowerment, as determined by the disempowerment measure's decomposition, is time (workload and leisure). The areas that have the most significant effects on male disempowerment are time (workload) and resources (access to and credit decisions). In this study's 5DE, 91% of women and 81% of men reported feeling empowered. In 4% of the domains, the 9% of females who lacked sufficient power did poorly. Males who were not yet empowered made insufficient progress on average in 4% of the domains. The

male's M0 was, therefore, 0.07, and their 5DE was 0.93, whereas the female's M0 was 0.04, and her 5DE was 0.96.

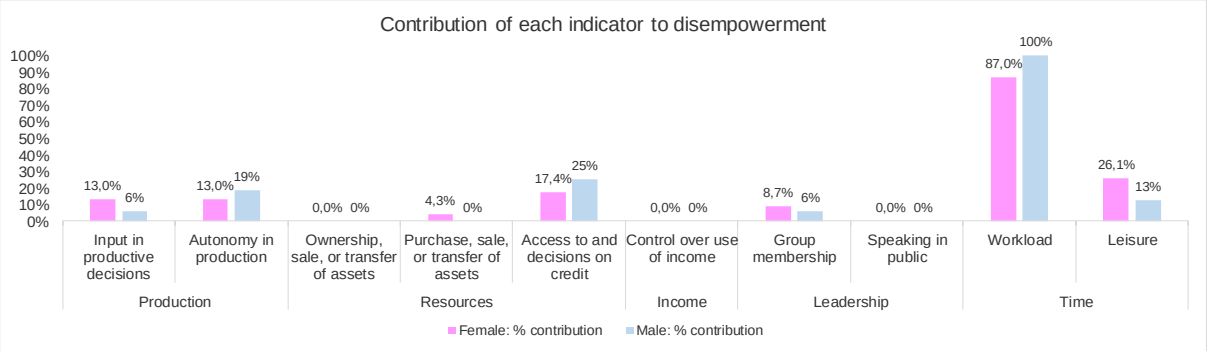

Figure 4.5: 5DEs (Domains of Empowerment) analysed according to Alkire *et al.* (2013)

The disempowerment headcount was finally calculated, and if a person's inadequacy score is higher than 20%, they are considered disempowered. Two women (9%) and three males (19%) lacked sufficient power.

Average inadequacy (A) score:

Females: (0.4 + 0.4 = 0) / 2 = 0.4

Males: (0.3 + 0.5 + 0.3) / 3 = 037

Index of Disempowerment (M0): Is the sum of H and A

Table 4.3: Disempowerment table

	Females	**Males**
Disempowered headcount (H)	9%	19%
Average inadequacy score (A)	4%	4%
Disempowerment index (M_0)	0.04	0.07
5DE Index (1 - M_0)	0.96	0.93

The number of issues faced by commercial farmers in GP was unaffected by gender; both male and female farmers encounter similar challenges. Furthermore, demographic status is not significantly related to empowerment levels; for example, the education level of female farmers did not affect empowerment levels; even with

limited education, they were empowered. Because of this, it contends that discrimination against women can hamper economic growth by lowering family food security and obstructing women's and girls' access to better educational possibilities. Mayra and Furst-Nichols (2014) note that whereas no male farmers are affected by food security, a tiny number of female farmers do experience it in peripheral communities. This is a major policy lesson in that there can be a need to empower both male and female farmers but also streamline specific issues, such as access to credit which remain topical in sustainable agriculture literature. The take-home message, therefore, becomes that there is no one size fits all intervention in women empowerment programming in modern-day agricultural systems. This can be attributed to other external programs occurring outside the agriculture domain that have also empowered women while leaving spillover effects to the agriculture sector.

4.10. PRACTITIONER VIEWS ON GENDER ISSUES

In addressing limited information on empowerment systems provided by extension officers or practitioners in this case, the study revealed that 44% of the practitioners have the willingness to examine gender issues highly, and only 12% of the practitioners rated their ability to discuss issues concerning gender high which meant 86% of the practitioners could not discuss issues concerning gender. Many practitioners rated their willingness to examine gender issues highly (44%). Few practitioners (12%) rated their ability to discuss issues concerning gender as high.

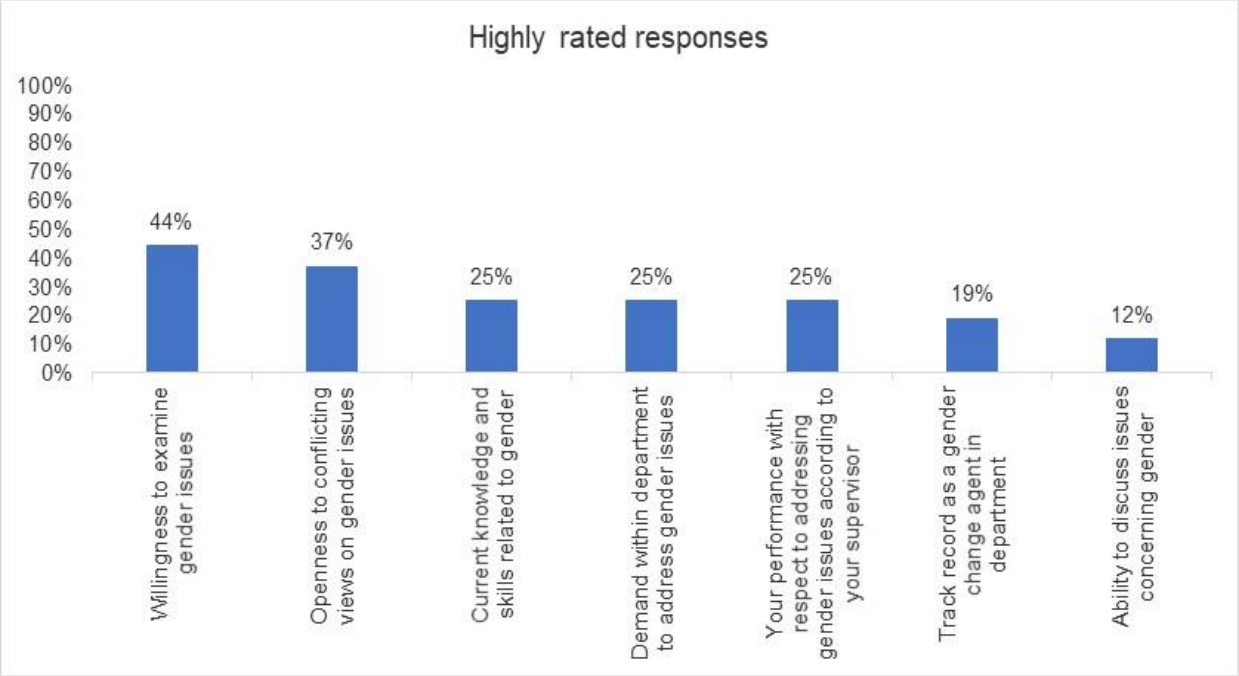

Figure 4.6: Willingness to Examine Gender Issues

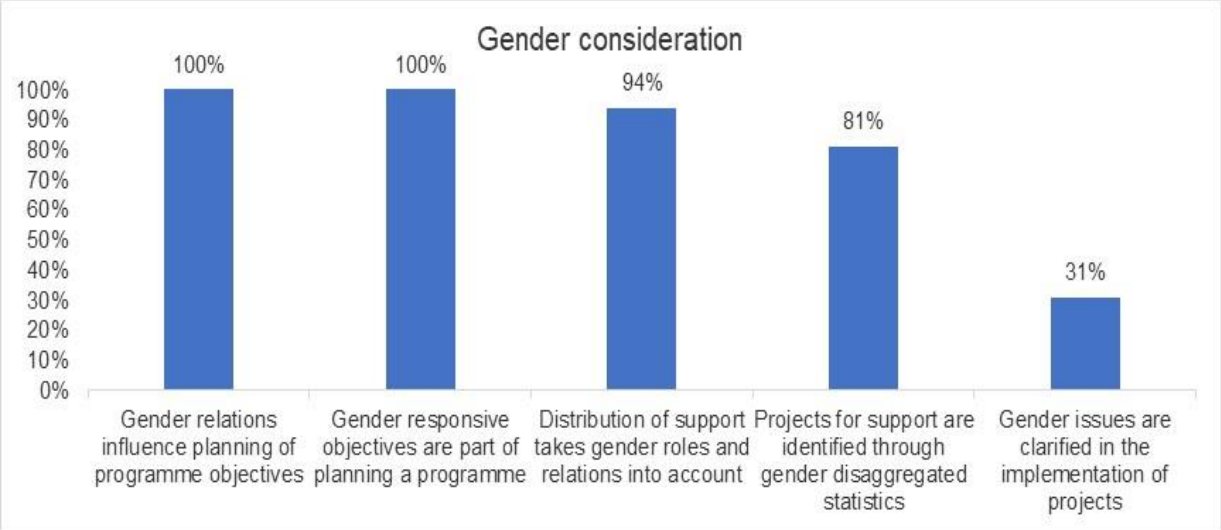

Figure 4.7: Gender Consideration in Support to Farmers

Finally, in addressing limited information on empowerment systems provided by extension officers or practitioners in this case, the study revealed that 44% of the practitioners have the willingness to examine gender issues highly, and only 12% of the practitioners rated their ability to discuss issues concerning gender high which meant 86% of the practitioners did not have the ability to discuss issues concerning gender. This is a cause for concern, given that the willingness of core decision-makers must be the mainframe of transformation. To correct this, there is a need for an

aggressive policy position that aims to capacitate these stakeholders and create awareness around the importance of these gender issues. This can imply reconfiguring the existing policies to capture these missing links, which can compromise the functionality of the different initiatives towards women's empowerment in commercial farming systems of South Africa.

4.11. CONCLUSION

In conclusion, this chapter presented the findings on women farmers' empowerment level in the Gauteng Province. This study demonstrated that sufficiency in the production, leadership, assets, income, and time usage categories was more closely associated with empowerment than demographic variables. Except for the workload, leisure domain, and access to and decisions regarding credit indicators, the majority of the study's factors significantly influenced women's empowerment. The five areas of empowerment were used to determine that more than 80% of the farmers in this study felt empowered (5DE). However, based on the deconstruction of the disempowerment measure, the domain in the sample that contributes most to women's disempowerment is time. Furthermore, most indicators in the 5DE contributed to empowerment to varying degrees (workload and leisure). Time (workload) and resources (access to and decisions about credit) are the areas of male empowerment that contribute the most to their disempowerment.

CHAPTER 5: AGRICULTURAL SUSTAINABILITY OF WOMEN FARMERS IN GAUTENG, SOUTH AFRICA

5.1. INTRODUCTION

This chapter will assess the sustainability of farmers and look at the awareness of sustainability indicators among farmers in the following dimensions, economic, environmental, and social, through the AGRIS as a measuring tool. This was done to answer the research question of the sustainability of women farmers in Gauteng. Sustainability indicators are characteristics of a system that can be measured quantitatively and are thought to be connected to sustainability. They have multiple characteristics (economic, environmental, and social), and can effectively be incorporated into an overall score (Dillon *et al.*, 2014). This study followed an AGRIS approach to measure the sustainability of commercial farmers and the sustainability impact on female commercial farmers of the Gauteng Province of South Africa.

5.2. SUSTAINABILITY INDICATORS

Table 5.1 summarizes the sustainability measures concerning the dimensions, themes, and sub-indicators. Table 5.1 shows that several themes and indicators are reported under each dimension, thus showing the complexity of understanding and managing the concept of sustainability in agriculture. Key among the themes is both micro and macro issues. The core micro issues revolve around individual farm decision-making processing regarding land, profit margins, income generation, food security, and soil health. At the macro level, biodiversity and resilience are also highlighted. In responding to the level of agricultural sustainability, the study shows that women and male participants in Gauteng are unsustainable on the environmental and economic dimensions under the sub-indicators biodiversity, profitability, and resilience.

Table 5.1: Sustainability of Agriculture Measure

Dimensions	No	Theme	Sub-indicators
Economic	1	Land productivity	Farm output value per hectare
	2	Profitability	Net farm income
	3	Resilience	Risk mitigation mechanisms
Environmental	4	Soil health	Prevalence of soil degradation
	5	Water use	Variations in water availability
	6	Fertilizer Pollution risk	Management of fertilizers
	7	Pesticide risk	Management of pesticides
	8	Biodiversity	Use of biodiversity-supported practices
Social	9	Decent employment	Wage rate in agriculture
	10	Food security	Food insecurity experience scale (FIES)
	11	Land tenure	Secure tenure rights to land

5.3. ECONOMIC DIMENSION

Agriculture must meet the needs of current and future generations for its products and services while also ensuring profitability and environmental, social, and economic equality to be sustainable (Haug *et al.*, 2021). The study supports those desirable economic factors translate to sustainability. The women farmers in Gauteng were sustainable in land, productivity, and profitability, except for the resilience factor.

The economic dimension has three themes: land productivity, profitability, and resilience. The land productivity theme's sub-indicator is the farm output value per hectare. On this theme of land productivity, three female and seven male participants could not be calculated. However, most female participants had desirable land productivity of 57%, and some male participants had desirable land productivity of 25% because more than 70% of agricultural land is used for agricultural purposes. This is critical for policy since it shows the performance of the current practices in attaining high levels of productivity. If appropriate support mechanisms such as land conservation are implemented at the farm level, then the productivity of land can be enhanced. This was also alluded to by Musara *et al.* (2022) in a climate-smart agriculture study in Zimbabwe, where land productivity was also higher among the female adopters of a land productivity-enhancing technology.

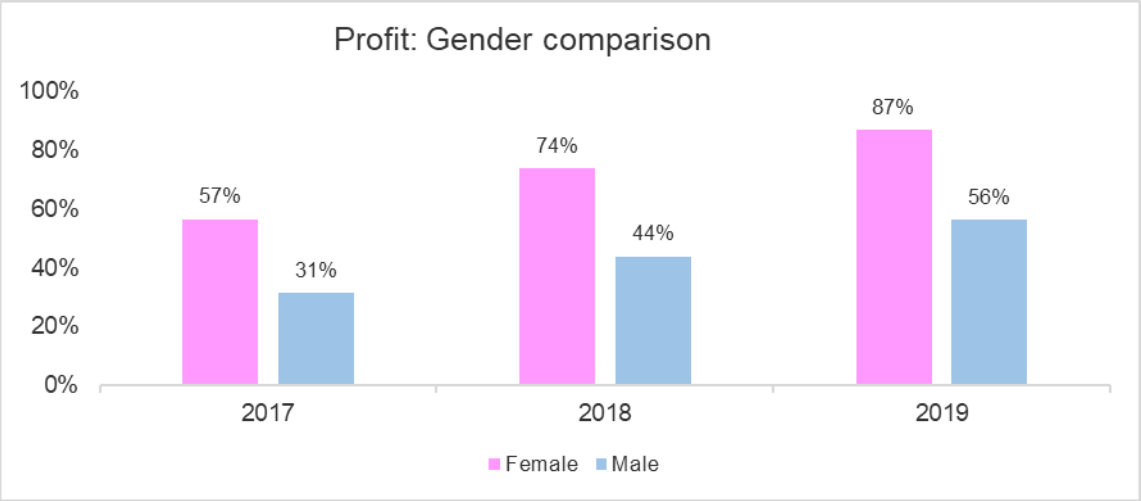

Figure 5.1: Profitability Gender Comparison

Secondly, the profitability theme's sub-indicator is the net farm income. The profit could not be calculated for one female participant, while most female participants had a desirable profit (52,2%), and few male participants had a desirable profit (18,8%). This shows that they made a profit for three consecutive years (2017-2019) in Figure 5.1 below. There is a notable progressive increase in the profit levels from 2017 to 2019 for both males and females. However, females had relatively higher margins throughout the three-year period under review. The ability of female farmers to find lucrative markets can be a major source of the profit differences. This is because if the women are empowered, then they can actively collaborate in various market information-generating platforms and penetrate rewarding markets. Similar results were also reported by Burke *et al.* (2015) in a dairy marketing study in Kenya.

Lastly, the resilience theme's sub-indicator is risk mitigation mechanisms. Resilience could not be calculated for two female participants; only one female participant had desirable resilience, while no male participants had desirable resilience. Resilience meant having access to insurance/financial instruments and off-farm income-generating activities (IGA). They are considered unsustainable when the participants have no access to insurance/ financial instruments or off-farm IGA.

The findings reveal the participants' resilience level, as 33% of the participants had some sort of insurance or financial instrument. Of the 33%, 26% of female participants and 44% of the male participants had some sort of insurance or financial instrument. This shows that access to financial resources directly affects a farm's ability to be

resilient. This can be attributed to the catalytic effects of finances in accessing the necessary requisite resources in sustainable agriculture. Angelucci and Conforti (2010) also reported the risk management effects of agricultural finance in commercial farms in the Caribbean states. Lessons from this can then push a policy which supports more access to financial resources by women as an empowerment approach in South Africa.

Most of the female participants (96%) said farming was their income-generating activity (IGA), and 94% of the male participants said farming was their IGA. The female participant's annual income means generated from the farm was R2 356 190.48 with a standard deviation ± R2 180 423.07, showing a variation from the mean. The income generated from the farm has a minimum of R120 000.00 and a maximum of R6 500 000.00. The annual income means generated from the farms was R3 625 208.33, and the standard deviation is significant at ± R5 791 155.18, outlining that the results are more spread out from the mean with a minimum of R500 000.00 and a maximum of R22 000 000.00.

The mean values are on average, 34% higher than those reported by Mabuza *et al.* (2016) in Swaziland. This is, therefore, an indicator that the agricultural production systems are sustainable and can be a major source of livelihood. However, Diiro (2013) further reiterated the need for policy to place female farmers at the center of agricultural technologies if the income benefits from farms is to increase over time and in a sustainable manner. These are critical policy lessons for South Africa as they reshape the women's empowerment programs towards sustainable agriculture and include the adoption of innovations as a critical component for supporting income generation.

Only one male participant was involved in other income-generating activities outside of farming, compared to a few female participants who, at 22%, demonstrated their involvement. For the female participants, the mean annual income from non-farm activities was R380 000, with a standard deviation of R370 405 ranging from a low of R100 000 to a maximum of R800 000. In contrast, for one male participant, the average annual income from non-farm activities was R90 000. This diversity is an important risk management approach where off- and on-farm activities complement each other in supporting sustainability. However, it is also important to note that the value of off-farm income is significantly lower than that of the farm. As such, a well-

structured balance must be identified for sustainable agriculture in South African commercial farms. This is also supported by Noltze *et al.* (2013) when they presented an argument about the relationship between natural resources management, agricultural yield, and household income.

5.4. ENVIRONMENTAL DIMENSION

To achieve sustainable development, it is necessary to recognise the interdependence of the economy, and the environment and that responsible environmental management makes economic sense. It translates into economic growth, globalisation, mechanisation, less reliance on FDI, and job creation.

Climate and temperature are required for natural resources to thrive, and climate is responsible for 30% of global productivity variations. Crop damage can occur due to extreme weather or changes in rainfall and temperature, affecting farmers' income and food security. Unsustainable agricultural practices can also result in high greenhouse gas emissions, decreased soil fertility, reduced water retention capacity, and eventual soil erosion (OECD, 2021). This will negatively affect women because they are more vulnerable than men to hunger and the negative effects of environmental damage that could be caused by climate change, temperature, or unsustainable farming practices.

According to UNDP (2011), there is an urgent need to transform agriculture toward more sustainable practices. As more women enter agricultural production, agricultural intensification and the resulting environmental damage worsens women's conditions as yields decline due to drought and water gathering, a primarily female activity that can become increasingly strenuous. In terms of health, women are more vulnerable than men because biological factors (size, physiological, hormonal, and enzyme differences between men and women, as well as between adults and children) can make women more susceptible to health damage from toxic chemical exposure. Women's disadvantages in agriculture pose a threat to sustainable agriculture and sustainability.

The environmental sustainability dimension has five themes: soil health, water utilisation, pesticide danger, fertiliser pollution risk, and biodiversity. The study's findings were sustainable on the environmental factors supporting literature that unsustainable farming practices will negatively affect women as they are more

vulnerable than men. The only environmental factor that was unsustainable was water use.

The incidence of soil degradation is the first theme of the sub-indicator for soil health. Not experiencing any type of soil degradation is the desired result (soil erosion, reduction in soil fertility, salinisation of irrigated land, waterlogging). Most female individuals (61%) and most male participants (81%) reported favourable soil health. The absence of any aspects of soil deterioration, such as soil erosion, a decline in soil fertility, salinisation of irrigated land, and waterlogging, is what desirable soil health means. Acceptable soil health entails some degree of soil deterioration, including waterlogging, salinisation of irrigated land, soil erosion, and a decline in soil fertility. These findings show that to achieve sustainable development, it is necessary to recognize the interdependence of the economy and the environment, and responsible environmental management makes economic sense. It translates into economic growth, globalization, mechanization, less reliance on FDI, sustainable import substitution, and job creation (Noltze *et al.*, 2013).

Secondly, the water use theme's sub-indicator is variation in water availability. The desirable outcome means that the participants do not use water to irrigate crops, and water availability remains stable. Only one female participant had desirable water use; 74% had unsustainable water use, while 75% of the male participants had desirable water use. This is not surprising given that the Department of Agriculture (2002) stated that South Africa's available freshwater resources are already nearly exhausted and under stress. With projected population growth and economic development rates, it is unlikely that South Africa's projected demand for water resources will be sustainable, resulting in the study's findings that water use is unsustainable. From a policy and practice perspective, climate and temperature management practices are required for natural resources to thrive, and climate is responsible for 30% of global productivity variations. Crop damage can occur due to extreme weather or changes in rainfall and temperature, affecting farmers' income and food security. Additionally, unsustainable agricultural practices can also result in high greenhouse gas emissions, decreased soil fertility, reduced water retention capacity, and eventual soil erosion (OECD, 2021). This will negatively affect women because they are more vulnerable than men to hunger and the negative effects of environmental damage that could be caused by

climate change, temperature, or unsustainable farming practices, which demand more water.

Third, the management of fertilisers is covered by the sub-indicator for the fertiliser pollution risk topic. In this instance, the desirable entails using fertilisers (or not using them) and taking four precautions to reduce dangers. Five female participants and eight male participants' fertiliser pollution risks could not be assessed; however, 78% of the female participants and 44% of the male participants had acceptable fertiliser pollution risks. Most female participants (65%) and 56% of the male participants used fertiliser and followed the recommended doses. Of those who used fertilizer, all female participants and 89% of the male participants followed the recommended doses. Of those who used fertilizer, 80% of the female participants and 67% of the male participant's combined fertilizers with organic nutrients (manure/compost).

Fourthly, the pesticide risk theme's sub-indicator covers the management of pesticides. The desirable outcome indicates no use of pesticides/ uses pesticides and taking both health and at least three environmental precautions. The pesticide theme could not be calculated for five female and seven male participants. Most female participants at 78% had desirable results for pesticides compared to 56% of the male participants that had desirable results for pesticides. 65% of the female participants used pesticides, and 56% of the male participants also used pesticides. All female participants who used pesticides and all male participants who used pesticides adhered to the label recommendations (use protective equipment) and safely disposed of the waste (cartons, bottles, bags).

Lastly, the biodiversity theme's sub-indicator is the use of biodiversity-supported practices. The desirable, in this case, means meeting all criteria (crop rotation, diverse crops, diverse livestock), and 48% of the female participants had desirable biodiversity. In contrast, only two male participants had desirable biodiversity.

According to the environmental factor, 56% of male participants and 74% of female participants rotate their crops. When applying fertilizer, 93% of the female participants considered the soil type and climate, compared to 78% of the male participants. All of the female participants who used fertilizer confirmed that they undertake nutrient budget calculations using soil sampling at least every five years, and 78% of the male participants who used fertilizer also reported using soil sampling as a guide at least every five years. Regarding nutrition management, 87% of the female participants who

used fertilizer and 67% of the male participants who used fertilizer indicated that they performed site-specific nutrient management or precision farming. 53% of the female participants who used fertilizer and 67% of the male participants who used fertilizer agreed that buffer strips should be utilized along water channels.

The results show the interaction of pesticide use, fertilizer application and crop rotation practices as affecting the sustainability of agriculture. All these speak to an emerging environmental dimension of climate-smart agriculture practices (Mujeyi *et al.*, 2021). According to UNDP (2011), there is an urgent need to transform agriculture toward more sustainable practices which apply less of the chemicals mentioned above while revisiting aspects such as crop rotation and cover crops. As more women enter agricultural production, agricultural intensification and the resulting environmental damage worsens women's conditions as yields decline due to droughts and water gathering. This primarily female activity can become increasingly strenuous. In terms of health, women are more vulnerable than men because biological factors (size, physiological, hormonal, and enzyme differences between men and women, as well as between adults and children) can make women more susceptible to health damage from toxic chemical exposure. Women's disadvantages in agriculture pose a threat to sustainable agriculture and sustainability.

5.5. SOCIAL DIMENSION

The results in Table 5.1 show that the social sustainability dimension has three themes, decent employment, food security, and land tenure. Haug *et al.* (2021) add that the trending climate change and environmental degradation, combined with rising socioeconomic inequalities, undermine the ability of ecological systems to interrelate with social and economic systems in the future to support food production and agricultural livelihoods. Sustainability is an important concept in agriculture and food security and is directly related to using natural resources. Furthermore, sustainability necessitates changes in the agricultural social organisations through equitable resource distribution and is strongly linked to achieving gender equality (SDG 5) and zero hunger (SDG 2) (SDG, 2016). The social sustainability dimension has three themes: decent employment, food security, and land tenure.

The issue of decent employment contains information on farm workers' compensation and the financial dangers that unskilled workers face when comparing their compensation to the minimum wage established at the federal level for the agricultural industry. The farm is considered unsustainable when the compensation received is insufficient to provide a living level at least as good as the minimum wage. When one does not engage labour, and the wage rate is around the minimum wage, one achieves the desired decent employment outcome (R20.00). Approximately 17% of the female and 19% of the male participants had suitable jobs. Under-minimum pay (R20.00) is the unsustainable wage rate, and 52% of the female participants had unsustainable employment.

This indicates the challenges in agriculture's ability to offer livelihood-sustaining wages, regardless of the previously identified high-profit margins under the economic dimension. This challenges policymakers to re-align the wage rates with profit margins to motivate labour productivity increases in commercial farms of South Africa. Baquedano *et al.* (2010) suggested reconfiguring subsidy programs and ensuring that profit margins inform farm wage policies. Blending the social and economic dimensions in this regard should enhance sustainability prospects in South Africa.

The Food Insecurity Experience Scale is the second theme of the sub-indicator for food security (FIES). No or mild food insecurity is desirable for food security, and 87% of the female participants had desirable food security, with all male participants having desirable food security. Few female participants (13%) and no male participants were worried they would not have enough food to eat and were unable to eat healthy and nutritious food. Most female participants (52%) and some male participants (37%) ate only a few kinds of foods. Some female participants (17%) and some male participants said yes (31%) to skipping a meal. Few female participants (13%), and no male participants said yes to their household running out of food. The fewer females' food security status is a concern given that most females are responsible for producing the food.

Food security imbalances were also reported by Musara *et al.* (2022) and Mujeyi *et al.* (2021) due to gender differences. This is a critical lesson for policy since there is a need to enhance access to food for all while also acknowledging the wage rate gap that has already been reported in this dissertation. The way forward is to reflect on the holistic definition of food security to cover food availability, access to food, utilization

and stability and then further trace the sustainability differences as suggested by Manda *et al.* (2016) using the case of Zambia. The study findings, therefore, point towards the need for this policy shift as a way forward. Bahta *et al.* (2017) also made specific recommendations about women empowerment and policy shifts in South Africa for enhancing food security.

Secure tenure rights to land make up the third sub-indicator for the land tenure topic. Most female participants (96%) had acceptable land tenure, and all male participants had acceptable land tenure, which in this case means one possesses a formal document with the name of the holding. Most female participants (96%) had formal documentation issued by the Land Registry, and all male participants had formal documentation issued by the Land Registry. Most female participants had a title deed (54%). This was the most common type of formal document for females; some male participants had a title deed (19%). Only one female participant had a certificate of customary tenure, and no male participants had a certificate of customary tenure. No female participants had a certificate of occupancy, and one male participant had a certificate of occupancy. No female participants had a registered will, and only one male participant had a registered will. No female or male participants had a registered certificate of hereditary acquisitions. Half of the female participants had a long-term lease (50%), and 81 % of the male participants had a long-term lease. This was the most common formal document for males, while no female participants had a registered rental contract. These results show the progressively changing land rights landscape in Africa in general and South Africa in particular, where females are also increasingly becoming landowners. If this policy is aggressively advocated for, then the entire matrix of social imbalances will go away since land is the primary factor of production. Mabuza *et al.* (2016) argued that land access does not guarantee agricultural sustainability; rather, it has more to do with the attitude of landowners to take agriculture as a business and a major source of income.

5.6. OVERALL SUSTAINABILITY

Figure 5.2 below shows that water use was the biggest barrier to the agricultural sustainability of female participants, followed by finding suitable work and having resilience. A chi-square test of association revealed a statistically significant correlation between gender and the environmental dimension's water use component:

χ (1) = 20.98, $p < 0.001$. This association's strength was significant $\varphi = 0.810$, $p < 0.001$.

The female participants are unsustainable in the environmental, economic, and social dimensions underwater use at 74%, resilience at 48%, and decent employment at 57%. Unsustainable water use frequently results in groundwater levels declining over time, springs and rivers drying up, and more disputes between water users.

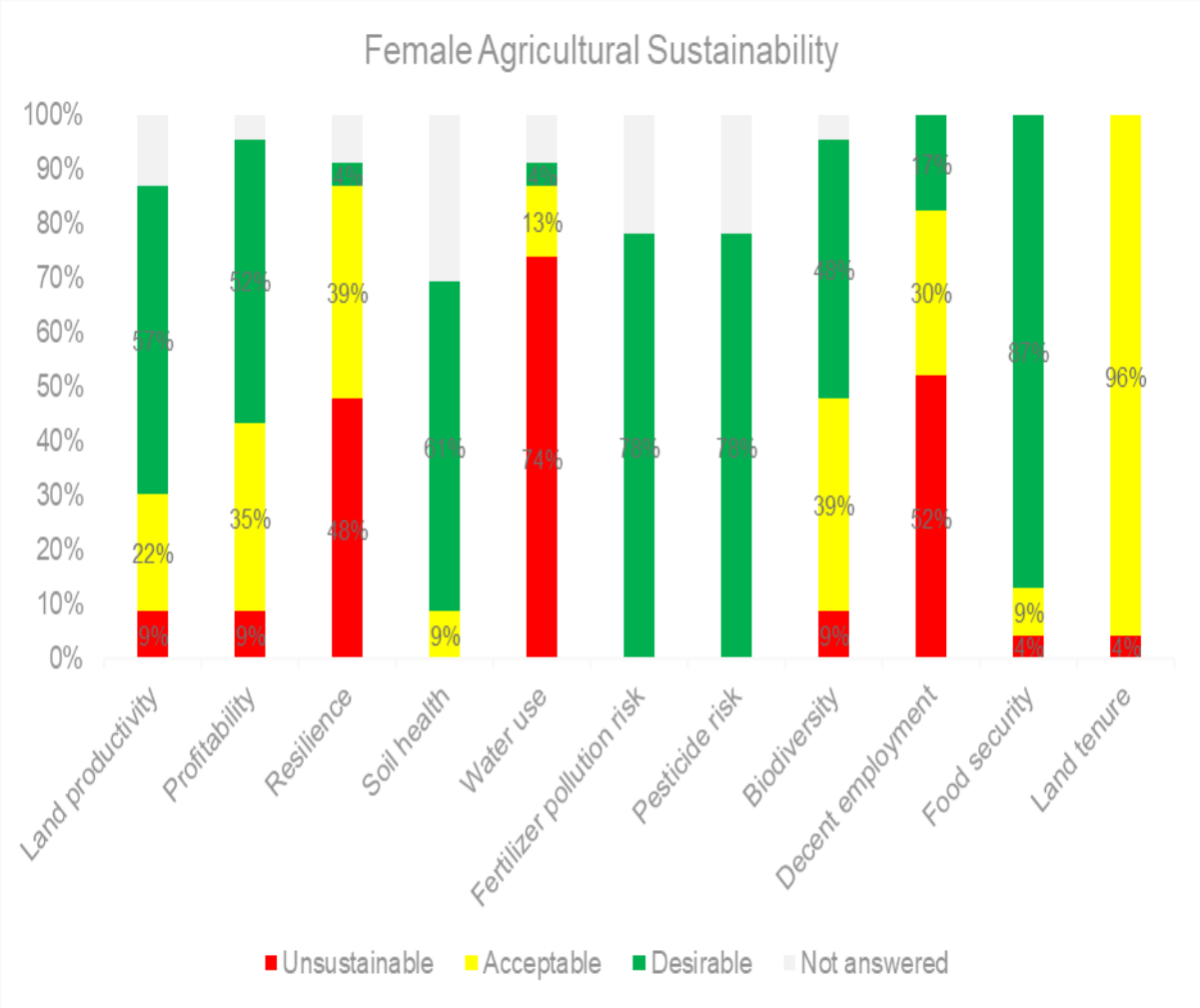

Figure 5.2: Female Agricultural Sustainability Levels

All these issues point towards the need to restructure agricultural practices to target more of the resilience pillar since it is more encompassing. The interactive effects as already discussed in this chapter, are manifesting; hence, the resultant outcome will be that the overall sustainability can be compromised if resilience is unsustainable. Women's water use inefficiency is also a major concern since it influences the ability to provide other aspects such as food and soil health. There is a need to focus on the

resilience of agricultural practices if sustainability is to be holistically achieved among female farmers in the commercial agriculture sector.

While the graph below shows that the most limiting theme to male participants' agricultural sustainability was resilience, followed by profitability and biodiversity. The emergence of resilience for males is also a major concern regardless of the differences in other limiting themes they experience relative to the females.

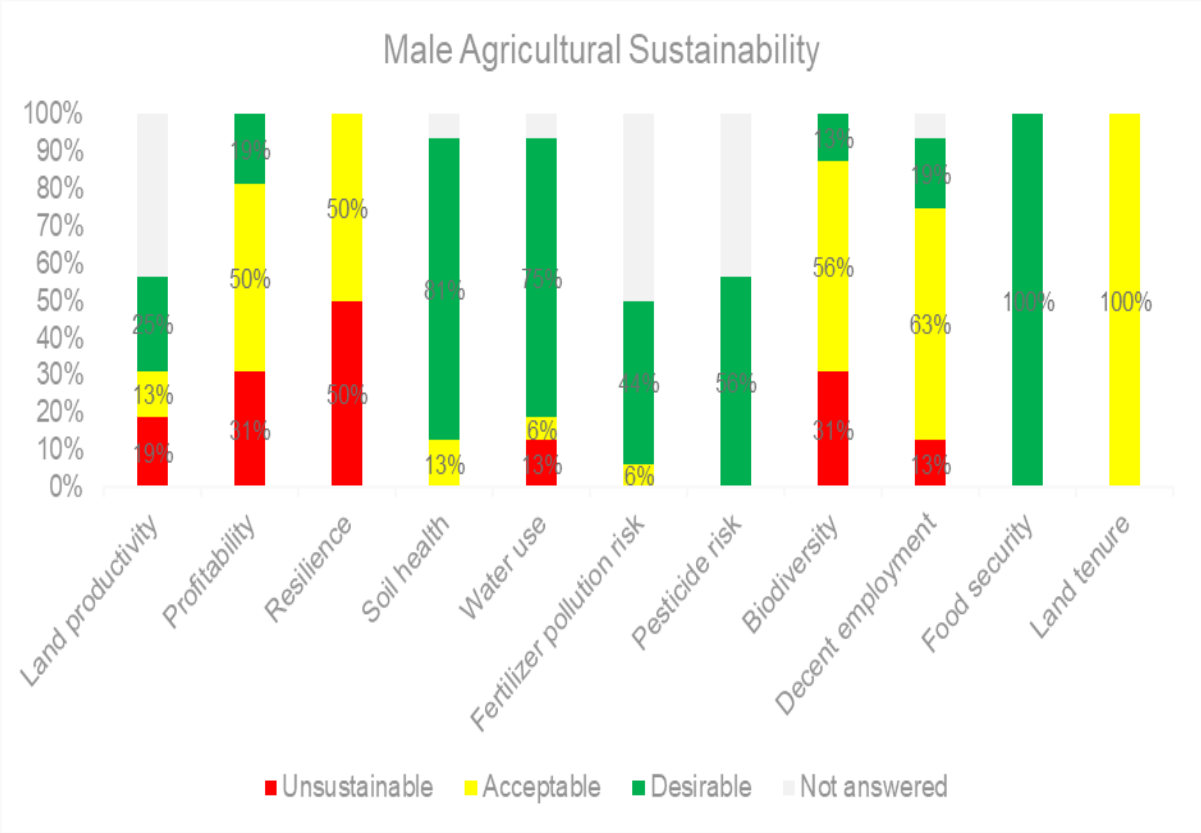

Figure 5.3: Male Agricultural Sustainability Levels

Unsustainable biodiversity implies that 31% of the male farmers' agricultural holdings meet less than two of the six criteria stipulated for biodiversity sustainability. The farm's economic viability, which is primarily determined by its profitability, which is determined by the net revenue that the farmer may earn from farming operations, is also a crucial component of sustainability in agriculture. When a farmer's net farm revenue has been zero for four or more years in a row, that farmer has unsustainable profitability, and 31% of the male participants have unsustainable profitability.

Both female and male participants were unsustainable in resilience, and it meant no access to the listed mitigation mechanisms. On-farm diversification (the share of a single agricultural commodity not exceeding 66% of the total value of production of the

holding) and access to or use of financing or insurance are among the stated mitigating strategies. This sub-indicator refers to the properties of a system that allows farms to deal with shocks and stresses, to persist, and to continue to be well functioning (in the sense of providing stability, predictable rules, security, and other benefits to its members), is compromised in this case. It shows that 50% of male and 48% of female participants have unsustainable resilience. The results show that co-integrating the various functions can be a major step towards sustainable agriculture only if a resilient system is designed around the social, economic, and environmental dimensions.

5.7. CONCLUSION

In conclusion, this chapter presented the findings on women farmers' agricultural sustainability levels in the Gauteng Province. The study also employed AGRIS to quantify how much economic, environmental, and social factors contributed to the agricultural sustainability of commercial women farmers under the commercialisation project in Gauteng. The findings show that 87% of women participants are sustainable regarding food security, while 96% of women farmers have acceptable levels of agricultural sustainability in land tenure. Female participants in Gauteng are unsustainable on the social, environmental, and economic dimension sub-indicators of decent employment, water use, and resilience. These results are encouraging and can be used as a building block towards the sustainability of agriculture from a women empowerment perspective. This implies that the focal point must build on these strengths and push the transformations toward more resilient agricultural systems. To achieve this, policy should support practice to find a sustainable mix of social, economic, and environmental dimensions so that both female and male farmers can collaborate on a platform where resources and opportunities are shared in a healthy operating environment.

CHAPTER 6: CHALLENGES FACED BY FARMERS IN THE GAUTENG PROVINCE, SOUTH AFRICA

6.1. INTRODUCTION

The final part of the research aims to answer the research question on the challenges women commercial farmers in Gauteng face. To answer this question, it is necessary to identify these farmers' challenges and consider potential strategies to address any challenges. The latter required mixed research methods, including quantitative data collection in the form of questionnaires and qualitative data collection through the application of the Logistical Framework Analysis (LFA) as described in Chapter 3.

The selection process was built two-fold around understanding the diversity of commercial farmers' outcomes in terms of the challenges they face, empowerment and sustainability levels. Firstly, information from commercial farmers was gathered using a questionnaire (Appendix A). All interviews were conducted voluntarily with interviewees providing informed consent. Before beginning the interviews, approval was granted by the University of the Free State Ethics Committee.

Secondly, the study applied Logical Framework Analysis (LFA) as another methodology for problem analysis and translating the causes and effects of the problems that women farmers face into objectives and future strategies. A group of LFA experts from academia and the public sector were interviewed in a group session. The information and experiences that participants shared during the session is summarised in a diagram, representing the schematic of a problem and objective tree. Ultimately, strategic solutions were easily tracked from the LFA to achieve empowerment and sustainability levels for women farmers in GP.

6.2. CHALLENGES FACED BY FARMERS IN THE GAUTENG PROVINCE, SOUTH AFRICA

According to Koehler (2016), despite human rights, gender equality, and the specific convention on eradicating discrimination, women continue to face systematic disadvantages, both in the sense of deliberate exclusion from access to assets and in the sense of persistent attitudes and beliefs that women are weak, or inferior to men. Women face a lack of power in both the public and private spheres and control over

their bodies. Furthermore, they are marginalised in terms of political, social, and economic leadership.

Njuki and Sanginga (2013) also support the idea that although women make significant contributions to the agricultural economy, they are hampered by several factors that prevent them from producing at optimal levels. The main obstacles include limited land, water, and credit access and a lack of information from extension agents on the costs of marketing systems. Following the initial run of the data through the WEAI tool, the average profile revealed the appropriate number of indicators that outlined the challenges faced by farmers in agriculture in the Gauteng Province, as indicated in Figure 6.1 below. Figure 6.1 supports the literature by demonstrating that the major challenge faced by 85% of the farmers in the study was limited access to capital, which was greater for men (87%) than women (83%), albeit by small margins. Women were more likely than men to have limited access to productive resources and unequal access to land. Women faced challenges such as unequal access to education and food insecurity that men did not face. This can be caused by the continued marginalisation of women from mainstream economic activities in most African communities. However, the small difference from the study results is a positive indicator of successful women empowerment initiatives in South Africa's commercial farming set-up.

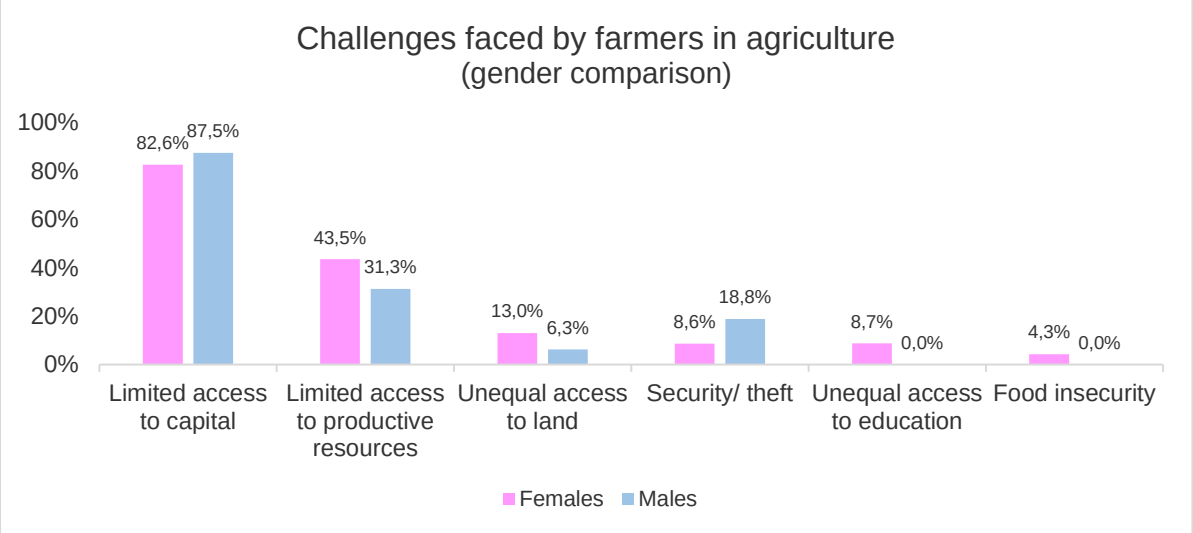

Figure 6.1: Challenges Faced by Male and Female Farmers in Agriculture GP

Limited access to capital was identified as a challenge by 82% of female participants and 87% of male participants. This was the most common agricultural challenge faced by both male and female farmers. Individual challenges faced by female participants

were recorded as unequal access to education, whereas unequal access to education was not indicated as a challenge for male participants. Only 4% of female participants identified food insecurity as a challenge, while male participants did not identify food insecurity as a challenge. Only 13% of female participants identified unequal access to land as a challenge, while only 6% of male participants identified unequal access to land as a challenge.

Limited access to productive resources was identified as a challenge by 43% of female participants and 31% of male participants. Another challenge mentioned by 9% of female participants and 19% of male participants was security/theft. Most female participants' families were supportive (83%), and 87% of male participants' families were supportive of them pursuing agriculture as a career. Finally, neither female nor male participants identified gender division of unpaid care and domestic work as a challenge. According to Figure 6.1, 87% of male participants face capital access challenges, compared to 83% of female participants. 4% of female participants reported food insecurity, while none of the male participants experienced food insecurity.

The challenge of gender inequality can be seen in the results of these factors mentioned above. But again, the magnitude is smaller than those reported in previous studies, for example, by Ndiritu *et al.* (2016) in Kenya and Mutenje *et al.* (2016) in Malawi. This can be attributed to the effectiveness of the women's empowerment program in South Africa. However, the study also observes that there is a need to further reduce these gaps, given the importance of food security and education to the empowerment drive. Furthermore, according to Koehler (2016), despite human rights, gender equality, and the specific convention on eradicating discrimination, women continue to face systematic disadvantages, both in the sense of deliberate exclusion from access to assets, for example, and in the sense of persistent attitudes and beliefs that women are weak, or inferior, to men. Women face a lack of power in both the public and private spheres and control over their bodies.

Furthermore, they are marginalized in terms of political, social, and economic leadership. These are fundamental gaps in the South African women's empowerment drive towards sustainable agriculture. Njuki and Sanginga (2013) also support the idea that although women make significant contributions to the agricultural economy, they are hampered by several factors that prevent them from producing at optimal levels.

The main obstacles include limited access to land, water, and credit as well as a lack of information from extension agents on the costs of marketing systems.

Table 6.1: Independent Sample T-Test Based on Gender-Indicated Challenges

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total number of indicated challenges	Equal variances assumed	1,448	0,236	0,947	37	0,350	0,272	0,287	-0,310	0,853
	Equal variances not assumed			1,012	37,000	0,318	0,272	0,269	-0,272	0,816

There was no statistically significant difference in the total number of indicated challenges between the male and female participants, as shown in the table above, which shows the independent samples of the t-test for the total number of indicated challenges, t (37) = 0,947, p > 0,05, and d = 0.31. To determine whether there were any gender differences in the overall number of indicated issues, an independent sample t-test was conducted. The number of difficulties faced by male and female farmers was compared using an independent t-test to determine whether there was a statistical difference. A boxplot assessment and assumption testing showed two outliers in the data. These were considered in the analysis since they were legitimate data points and not wildly outliers. According to Shapiro-test Wilk's (p 0,05), the number of indicated challenges was not normally distributed. The P-value indicates the precise significance level; it specifies the lowest level of significance at which a null hypothesis can be rejected (Gujarati, 2003). The results were interpreted, however, because the independent-samples t-test is robust to deviations from normality. The variances were homogeneous, as determined by Levene's test for equality of variances (p = 0.24). Females had a higher mean total number of indicated challenges (1,52 0,99) than males (1,25 0,68), but this difference was not statistically significant, t (37) = 0,947, p > 0,05, d = 0.31. As a result, the difference was most likely due to chance rather than a genuine gender difference. In other words, gender did not affect the challenges farmers faced in the Gauteng Province.

The study, however, cautiously makes policy recommendations based on these and further suggests developing a more rigorous index to show the nature and diversity of these challenges as opposed to the summation method used here. However, important lessons for policy can be extracted here, and indications show that males and females are both exposed to challenges that need different approaches to manage. The idea is to generate gendered strategies that can isolate female and male pathways given their conditions and contexts. Shiferaw *et al.* (2015) also made similar suggestions using a market imperfection study in Uganda, where a composite index was developed for the market challenges faced by males and females.

6.2.1. Disempowerment Factors from Women Empowerment in Agriculture Index Tool

As discussed in Chapter 4, addressing the empowerment of women farmers in GP, the workload under the time domain was the only factor contributing to women's disempowerment. According to the decomposition of the disempowerment measure, the sample's temporal domain has the greatest impact on female disempowerment: workload and leisure. The area where men experience the most disempowerment is time (workload) and resources (access to and credit decisions).

6.2.2. Unsustainable Factors from Agricultural Integrated Survey Tool

As discussed in Chapter 5, addressing women's sustainability in agriculture, the unsustainability factors for women in the study under the economic, environmental, and social dimensions were resilience, water use, and decent employment. Resilience meant having access to insurance/financial instrument and off-farm IGA, and the fact that they are unsustainable in this indicator means their risk mitigation strategy is compromised. They do not have access to insurance to mitigate against unforeseen circumstances.

The second unsustainable sub-indicator is water use; it shows variation in water availability, assesses farmers' water scarcity knowledge and behaviour, and assigns them to one of three levels of sustainability, as stated in Section 3.9.3 of the study. This means that the farmers are unaware of the water availability around their area of operation. Lastly, decent employment is also unsustainable; it is desirable when one does not hire labour/wage rate at about minimum wage; however, the undesirable

condition, as in this case, means the wage rate paid to unskilled labour is less than the national minimum wage or the agricultural sector minimum wage.

In summary, the challenges discussed above were the significant findings from the tools in Chapter 4 and Chapter 5. Consequently, the study implored the LFA as a foundation for problem analysis and translating the causes and effects of women farmers' challenges through objectives and strategies.

6.3. LOGICAL FRAMEWORK ANALYSIS

The other analytic tool outlined in this chapter's introduction is the LFA, which assisted in analysing the problems women farmers face in the Province of Gauteng discussed above and seeking strategic interventions to address these issues. This section will briefly overview the LFA methodology, the findings from the LFA group session, and the strategies identified to assist in achieving the study's goal.

6.3.1. Methodology

According to Ammani *et al.* (2010), steps are recommended to capture the LFA, which this study adopted in drawing the problem tree technique to assess the issues surrounding agricultural sustainability and empowerment in Gauteng, specifically on women commercial farmers**.** The initial technique is to identify existing problems based on available information and select one core problem for the analysis. Once the core problem is identified and selected, one must identify and review the important and direct causes of the focal problem as constructed in the tree showing the relationships to verify the validity and completeness of the problem tree.

Similarly, Van Rooyen, D'Haese, and Anandajayasekeram (2002) provide guidelines for conducting an LFA and break down the process into three main phases. The first phase involves defining the strategic context, which the researcher completed by conducting the research in Chapters 4, 5, and the start of Chapter 6. The second phase of the LFA is the analytical phase, which is further subdivided into three steps: problem analysis (problem tree), objective analysis (objective tree), and strategy analysis. The third and last phase of the LFA is the planning phase, including the development of a Log frame Matrix or detailed summary table of the strategic interventions Van Rooyen, D'Haese and Anandajayasekeram (2002).

This is the second phase of the LFA, as the abovementioned is the analytical phase. This phase requires the involvement of a stakeholder group session, where participants are selected based on their knowledge and expertise on the topic. The first step of this phase, the problem tree analysis, involves identifying the cause-and-effect relationship around the core problem. This is illustrated through the schematic of a problem tree (Figure 6.3), where the tree's roots represent the causes of the core problem, the tree's trunk represents the core problem, and the branches represent the effects of the problem. Creating a problem tree was undertaken in a participatory group session with industry and academia experts in LFA.

The second step in the analytical phase, the objective analysis, involves the creation of an objective tree diagram. Like the problem tree, it is necessary to identify links between the roots to the branches of the tree, where the roots represent activities required to address the problems, the trunk the core objective, and the branches the ideal outcomes of implementing the activities and reaching the core objective. According to the European Integration Office (2011) report, the objective analysis is the positive reverse image of the problem analysis. It simply implies that the 'negative situations' of the problem tree are converted into solutions and expressed as 'positive achievements. After the completion of the objective tree, strategies are identified from the diagram with the potential to realise the objectives and overcome the problem and causes from the problem analysis.

Finally, the LFA is concluded by the planning phase, which involves further development of the strategies identified through a Log frame matrix summary table Van Rooyen, D'Haese & Anandajayasekeram, (2002). The results of the logical framework technique are shown in a logical framework matrix to track the indicators to ensure and demonstrate the measures to achieve the goal; the sources used to verify the information, and finally, the assumptions or hypotheses that describe strategies to occur for the project to succeed. The matrix simply gives a summary of the project to the activity level.

6.3.2. Findings of the LFA

The following section will discuss the LFA findings of the analytical phase, involving the problem analysis, the objective analysis, and the strategy analysis, followed by the final planning phase summarized in the Log frame Matrix.

6.3.2.1. Findings of the Analytical Phase

Based on the focal problem found in the survey, a problem tree was built, which assisted in determining the direct causes and effects of the focal problem (see Figure 6.3 below). The objective tree shown in Figure 6.4 below was created by transposing the developed problem tree into positive statements. The solutions were offered by the objective tree that was obtained. Practical solutions were advanced from the available root causes. The problem tree and the objective tree were constructed in the group session with the industry stakeholders from the academia and public sectors.

6.3.2.2. The Problem Analysis Findings

As previously stated, information on the main challenges that farmers are faced, derived from the quantitative questionnaire conducted via interviews, was used to carry out the problem analysis process. The causes were identified and selected from the quantitative questionnaire. The significant challenges in women commercial farmers in the Gauteng Province were access to capital and productive resources. The disempowering factor that negatively impacted the empowerment of women commercial farmers was control over their time use; this was identified through the WEAI tool. The factors that contributed to the unsustainability of women commercial farmers to be sustainable in the Gauteng province were resilience, water use, and decent employment identified through the AGRIS tool.

The problems were then depicted during the LFA group session as causes in the problem tree to a core problem. The researcher used individual cards with different colours for coding to write individual problem statements, which were recorded as the cause/roots of the problem tree on the wall in the meeting room. Thereafter, the participants were asked to identify the core problem of the tree from the causes displayed in the session, as illustrated in Figure 6.2 below.

Figure 6.2: The Core Problem as Identified by the LFA Expert Participants

Following the identification of the core problem, the participants were tasked with identifying the effect of each root cause on the farmers. The findings of each cause-and-effect are discussed below, while the link between the causes and effects is illustrated through similar shapes as outlined in Figures 6.3:

- Cause 1 Effect 1: Limited access to capital

The LFA expert session identified the effects of cause one, limited access to capital. The effects were identified as not having the capital to improve on their poor soils, which will limit farmers in terms of resources resulting in low-quality breeding animals, which participants stated will impact no production at the farms. Consequently, ineffective operations and delayed technology adoption will affect farmers' contribution to creating employment opportunities. This cause of limited access to capital would mean not being able to access or attain the required and necessary resources for proper farming, and lack of financing cannot grow the enterprise which will translate into agriculture becoming unprofitable to the farmers.

- Cause 2 Effect 2: Limited access to productive resources

The experts identified various effects for cause two relating to the production and operational constraints. The participants outlined capital and natural disasters as effects resulting in no production or low yields, which could lead to losses of income and stock in the enterprise. Moreover, without production resources, the farmers will be farming backwards or not farming at all, making them unable to compete in the markets.

- Cause 3 Effect 3: Inadequate control over time use

The experts identified spending more time in one area, which would result in less family time and can also lead to burnout, guilt, and negativity as effects that could eventually lead to loss of interest in agriculture. This cause will affect the farmer's health, impacting productivity and household livelihood. The negative impact on productivity would be products arriving late to the markets, low productivity creating wastage of outputs and resulting in low income for the farmer. The household livelihood will be stressful as the farmer spends less time with family.

- Cause 4 Effect 4: Unsustainable water use

The experts argued that overuse of water creates water wastage, resulting in low yields, and contributes to higher input costs. Consequently, reducing motivation for farmers. This overuse of water will result in unstainable farming practices such as dry cropping and depletion of water as a resource.

- Cause 5 Effect 5: Indecent employment

The participants argued that cause five could expose the farm to theft and strikes resulting in the farmer's income loss. The experts argued that once the employees feel undervalued, they would experience a loss of personal value, lack of interest, and show low commitment because they are unhappy employees. This would mean high staff turnover resulting in low productivity, and can negatively affect the support source for funding, such as access to loans. The unmotivated staff can damage or sabotage the resources of the farm.

- Cause 6 Effect 6: Inadequate mitigation mechanisms

According to the experts, cause six could result in the cessation of farming. They argued that inadequate records could be a high investment risk and cause monetary losses and no funding from banks. If the farmers have no mitigation mechanisms, they will subsequently face limited access to funding and capital. This can pose a high risk

because they do not have coping strategies for challenges that might arise and will be unable to make changes (low adaptation) in time.

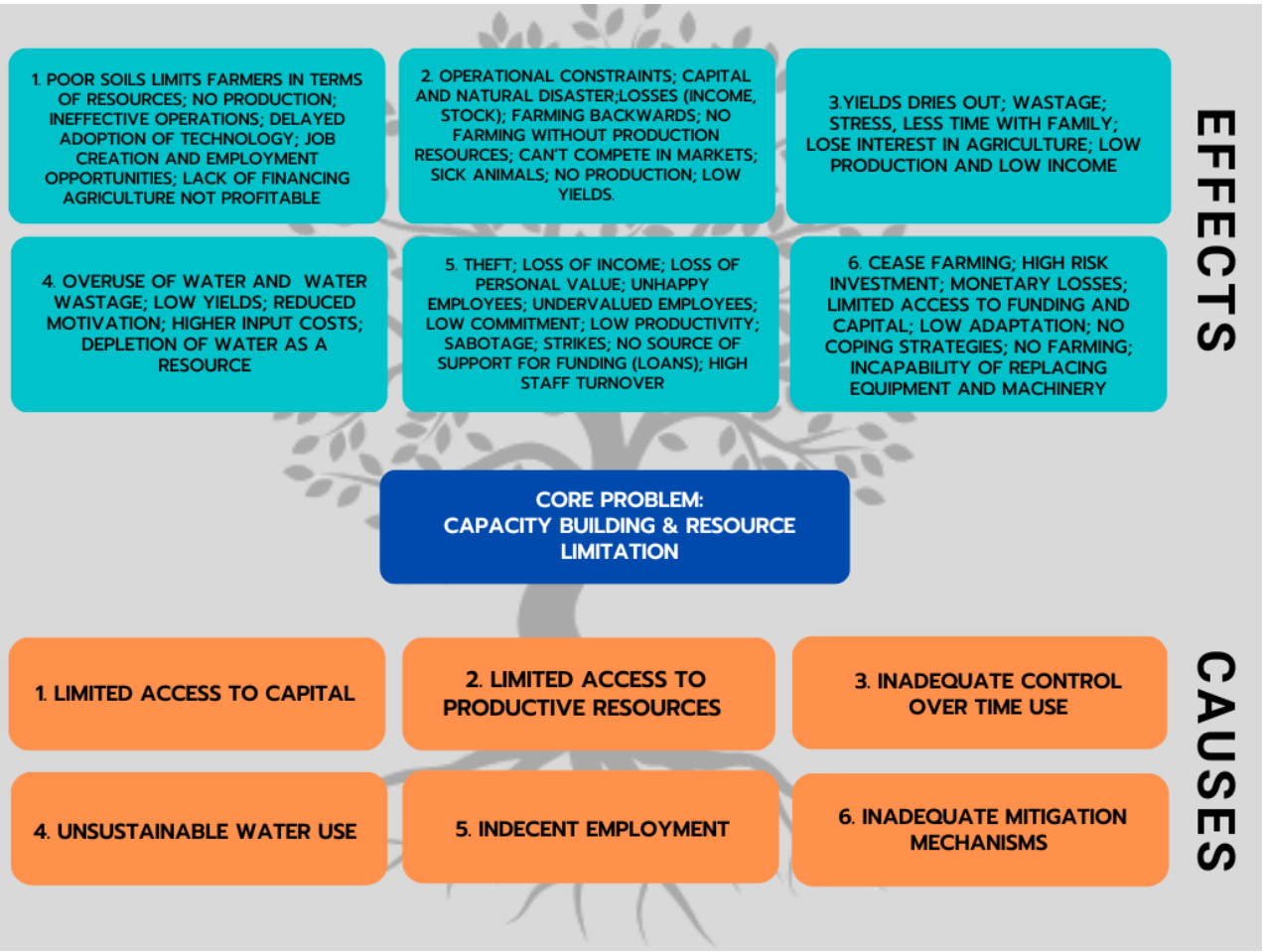

Figure 6.3: Problem Tree

6.3.2.3. Objective Analysis Findings

Once the problem tree was completed during the group session, the problem tree was converted into an objectives tree by rephrasing each problem into desirable positive outcomes and following the same process as described with the problem analysis**.** This part will discuss the activity and outcomes of the objectives as identified by the participants and illustrated in Figure 6.3.

- Activity 1 and Outcome 1: Access to capital

The activities identified by experts for access to capital included getting commercial banks on board to plan and apply for funding, such as loans and grants. They advised that the farmers must therefore have registered title deeds to access resources and financial advice from financial institutions.

The outcomes identified are that farmers can increase resources and collaborate with stakeholders, enabling better and increased productivity. These interventions can be critical in reducing the financial resources access gap. But it is also important to report that there is an imminent need to restructure the lending portfolios to accommodate the diverse needs of the farmers in South Africa. This should enhance sustainability while also empowering women to access these financial resources. Similar conclusions were made by Angelucci *et al.* (2010) in a study on how appropriate financial models in institutions can enhance risk management.

- Activity 2 and Outcome 2: Access to productive resources

The participants identified the following activities for access to productive resources as the use of resources efficiently will translate into sufficient capital for the farmer. They advise on group/cooperatives' joint negotiations and private sector support for proper and appropriate farming.

The outcomes identified skills development to apply for resources, production effectiveness, and public-private partnerships to ensure quality products and profitable farming. The other identified outcomes were more productivity and higher yields resulting in more sustainability, and farmers will become part of a value chain. Capacity building has also widely been reported as a critical ingredient in empowerment programming across the globe (Bahta *et al.*, 2017). If these strategies are then blended with partnerships, this will have multiplicative effects on sustainable agricultural activities by women farmers due to the shared resources component.

- Activity 3 and Outcome 3: Adequate control over time use

For the activity, adequate control over time use, the experts identified time management strategies and creating work schedules and calendars as better managerial skills. Also, the participants identified focusing on the most productive enterprise and introducing a clock system as ways to increase productivity. Finally, they advised that hiring skilled labour with formal contracts will encourage produce to be on time.

The outcomes identified are higher productivity, more money will be made, and it will mean more balance between work and family. This will create a positive farming environment because farmers will work smart, acquire better skills, and be more time efficient, resulting in production efficiency. These critical time management competencies were also noted by Mabuza *et al.* (2016). They argued that women

spend too much time attempting to make money out of agriculture while missing opportunities for family and community networking, which is also important in facilitating sustainable agriculture. This lesson is a key step in allowing networks to support sustainable agriculture in South Africa by blending indigenous knowledge with modern science.

- Activity 4 and Outcome 4: Sustainable water use

The participants identified the following activities, getting weather information, practising adequate irrigation, and conducting water analysis for the objective of sustainable water use. Planning on using water timeously and calculating and managing water usage contributes to sustainable farming practices. The farmer must have scheduled times as to when water is used to be able to measure and monitor the water usage will provide the negative and positive effects of water pollution.

The outcomes identified are better health as the farmers can work more efficiently and improve productivity. This will ensure cost savings, increase crop yields and result in profitable farming and water conservation. The outcomes of sustainable water use will mean better quality produce, sustainable water usage, and less wastage. Understanding these interfaces is critical, especially since water resources is almost always limiting in southern African agriculture. Enhancing water productivity has also been reported by Mujeyi *et al.* (2021) as an important consideration especially given the effects of climate change, which have further worsened water availability for agriculture. They also said this should be viewed from a broader context where soil conservation also becomes an important factor.

- Activity 5 and Outcome 5: Adequate mitigation mechanisms

The experts listed the following activities: conducting soil samples, acquiring insurance, and learning about coping and adaptation strategies for the objective of resilience. They also encouraged skilled stakeholders to be brought on board, and extension services must guide the farmers; this will assist them in acquiring access to capital.

The outcomes identified were a better working environment that will create positive energy. Some outcomes included insurance for stock and risk mitigation to secure productivity, which will mean secured farming as the farmer will be more resilient and can adapt to changes and challenges. These results point to the need for dealing with unsustainability in agriculture and thus attempting to climate all possible issues that

can ultimately compromise resilience in the long term. Emerging practices have been noted in, for example, climate-smart agriculture practices as reported by Musara *et al.* (2022). These cocktails allow the farmers to be socially, economically, and environmentally conscious and empowered in these dimensions in the process by seeking and using the right information for mitigation

- Activity 6 and Outcome 6: Decent employment

The participants outlined the following activities: having employment contracts in place to better implement labour contracts and policies and creating a happy farm environment. The experts advised activities such as rewarding good work, offering better income/rewarding the workers, and increasing wages to lower theft rates.

The outcomes identified are that employee satisfaction can lead to more productive workers, and happy, valued employees mean less theft, strikes and more productive workers. This will also mean low staff turnover and loyal, satisfied, and productive employees that will work hard.

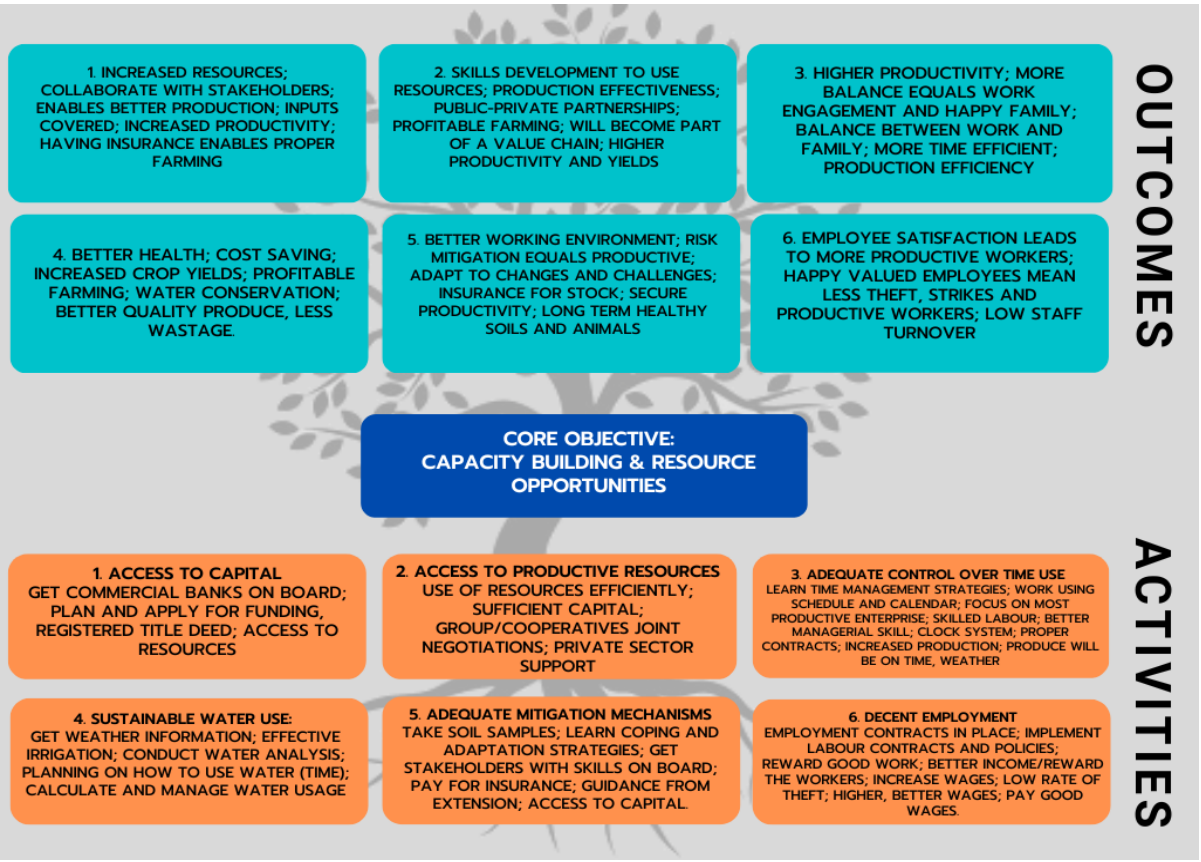

Figure 6.4: Objective Tree

6.3.2.4. The Strategy Analysis Findings

Completing the objectives served as the foundation for additional decision-making regarding interventions that might be useful steps forward, such as enhancing women farmers' empowerment and agricultural sustainability in GP. The two main strategies identified from the tree to implement the activities and realise the core objective was (1) training and partnerships and (2) awareness to support gender roles. The strategies are further developed and discussed in greater detail in the final planning phase.

6.3.2.5. Planning phase

Strategies were identified to achieve the core objective of empowering commercial women to be sustainable in agriculture. The two main strategies outlined include training and partnerships and creating awareness to support gender roles. The LFA's overall goal, purpose, and main strategies are deliberated below in Table 6.2. The overall goal is to empower women commercial farmers to be more sustainable in agriculture. The indicators to ensure empowerment are production autonomy, access to resources, control over income use, participation in leadership positions in their sector or communities, and control over the use of time. The elements that will indicate sustainability include having balanced economic, environmental, and social factors in agriculture. The sources of verification will be audit reports illustrating the empowerment and sustainability of women commercial farmers in the Gauteng Province.

The overall purpose of the LFA is to build capacity and create resource opportunities along the identified strategies. The verifiable indicators include having access to resources and capacitating the empowered farmers to be sustainable.

6.3.2.6. The two main strategies

Training and partnerships are the first intervention strategy to achieve the goal and purpose. This intervention strategy requires agricultural industry stakeholders to cooperate to achieve relevant economic, environmental, and social justice objectives as a unit. The OVI for this strategy is multidisciplinary stakeholders increased partnership links with farmers for knowledge transfer with the assumption that there are signed partnership agreements for skills transfer and support. The resources

required are trainers, mentors, a venue knowledge transfer plan by stakeholders involved, and signed partnership agreements. The second intervention strategy is creating awareness to support gender roles. To reduce the workload on female farmers and give them more control over their own time is also important to create awareness of reporting indicators that will impact the sector's support for farmers. The indicator for this intervention is increased income to afford more leisure time, assuming that gender audits are in place to ensure sustainable empowerment of women commercial farmers in GP.

The cross-cutting nature of these strategies strongly indicates that the capacity to execute functions cannot be eliminated as a tool for supporting resilience. The study further shows the need for well-designed partnerships in, for example, collaborative procurement of resources, a feat currently missing in most farming communities. Individualism still dominates the decision-making process in South African agriculture. If women are empowered to be active in platforms such as cooperatives, then the sustainability of agriculture can be achieved. Ortmann and King (2007) reported the potential of cooperatives in South African agriculture while also focusing on the input and output markets. Oduol and Mithöfer (2014) further expanded this recommendation by focusing on wider value chains and supporting collaborations and capacity building as key in supporting sustainable agriculture.

The results from this study further reinforce the above observations and contribute by suggesting the need for awareness about the gender-sensitive and time-managed allocation of functions as a missing pillar in sustainable agriculture. This is critical at this stage of South Africa’s women empowerment drive, where stakeholders need to be constantly reminded about how gendered decision-making can be instrumental in enhancing the performance of agriculture. This will not only re-ignite the political will towards transformation, which places women's empowerment at the centre but also cascade to the practice levels of the farms where the existing barriers are broken.

Table 6.2: Logical Framework Matrix for Empowerment and Agricultural Sustainability of Women Farmers in the Gauteng Province

		Intervention Logic (IL)	**Objectively verifiable indicators (OVI)**	**Source of Verification (SV)**	**Assumption (A)**
Goal		Empower women, and commercial farmers, to be more sustainable in agriculture	The following empowerment domains must be met: production, resources, income, leadership & time Dimensions of sustainability should be balanced: Economic, social, environment	Questionnaire analysis composed of the two tools of empowerment and sustainability (WEAI and AGRIS)	Assuming that women commercial farmers want to be empowered and be sustainable
Purpose/Mission		Build capacity and resource opportunities	Access to capital & productive resources, adequate control over time use & mitigation mechanisms, sustainable water use, decent employment		Assuming that there is equal access to resources
Results/Outputs	Strategy 1	Assuming that there is equal access to resources	Multidisciplinary stakeholders increased partnership links with farmers for knowledge transfer	Surveys	Assuming there are signed partnership agreements for skills transfer and support
	Strategy 2	Create awareness to support gender roles	Increased income to afford more leisure time	Surveys; Workshops	Gender audits system in place
		Activity Details	**Resources**	**Costs**	
Strategy 1: **Training and partnerships**	Access to Capital	Get commercial banks on board for financial advice. Apply for funding e.g., soft loans, registered title deeds, access to resources	Trainers, mentors, venue state owned enterprises' knowledge transfer plan	Government support funds Agribusiness grants Financial Institutions e.g., soft loans/loans	
	Access to productive resources	Sufficient capital, private sector support, appropriate farming practices, use of resources efficiently, cooperative/group joint negotiations			

	Sustainable water use	Attain weather information, practice effective irrigation methods, conduct water analysis, plan a schedule on the best times to use water, calculate and manage water usage, monitor the use of water, provide negative and positives effects of water pollution	Partnership agreement	
	Adequate mitigation mechanisms	Conduct soil samples, learn coping and adaptation strategies, invite stakeholders with skills on board, pay for insurance, guidance from extension, access to capital		
Strategy 2: **Creating awareness to support gender roles**	Adequate control over time use	Learn time management strategies, acquire better managerial skills, work using schedules and calendars, focus on the most productive enterprise, hire skilled labour, and have proper contracts, introduce a clock system, increased production, produce will be on time, aligned to weather patterns.	Gender budgeting strategy, awareness campaigns, venue logistical arrangements, e.g., transport, material	Government and private sector to sponsor
	Decent employment	Ensure employment contracts are in place, implement labour contracts according to policies, understand labour laws, happy farm environment, reward good work, better income, increase wages, low rate of theft, pay minimum/higher wages, pay good wages		

The log frame findings support the reports from the farmers and practitioners as it recommended the two strategies of training and partnerships and creating awareness to support gender roles. The study discovered that women's empowerment has an equal impact on resource allocation, contributing to increased awareness of women's participation in the mainstream economy. The two strategies identified from the log frame matrix encourage collaboration and skill development to motivate women's agencies in empowerment and agricultural sustainability in the Gauteng province. The second strategy focuses on creating awareness to support gender roles. It requires stakeholders to collaborate and commit to ensuring that the plans for women's empowerment on paper are translated into actions to aid in developing a gender audit tool to measure the impact of women's empowerment in the sector.

6.4. CONCLUSION

In conclusion, the study supports the view that empowering women is essential to sustainable development and that agriculture offers the right platform since it employs almost half of the rural women in the developing world (Murugani, 2016). The study's findings were that there was no statistically significant difference in the total number of indicated challenges between female and male participants. In other words, gender did not influence the number of challenges faced by commercial farmers in GP. In the domains of empowerment that were used, more than 80% of the farmers in this study felt empowered (5DE). However, based on the deconstruction of the disempowerment measure, the domain in the sample that contributes most to women's disempowerment is time. Jointly, women and male participants in Gauteng are unsustainable on the environmental and economic dimension under the sub-indicators biodiversity, profitability, and resilience. However, the findings of the LFA showed that the strategies identified will positively ensure women's empowerment in agriculture is sustainable.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1. INTRODUCTION

To address the aim of the study, which seeks to generate information that will support the empowerment of women commercial farmers in the Gauteng province to be more sustainable in agriculture. The study will first answer the research questions according to the findings to achieve the study's objectives. Secondly, make recommendations for possible new areas of research. Lastly, propose strategies for empowerment and sustainability of women in agriculture in the Gauteng province of South Africa.

7.2. BACKGROUND

Even though the department of agriculture nationally has been implementing the women empowerment project since 1999, the findings reveal that it is impossible to quantify the impact of agriculture on empowering women in the sector. The analysis noted that it is challenging, if not impossible, to monitor how much of the previous Department of Agriculture's budget was allotted for women or gender-sensitive programs and how much was spent on men (DoW, 2013). The sector does not have a gender policy to assist with implementing programs around the empowerment and sustainability of agriculture for women farmers. The unique requirements of women and the challenges they confront when requesting help are not considered by gender-neutral criteria. The research also suggested creating a gender policy requiring the agricultural industry to incorporate the gender dimension into pertinent policies and actions instead of addressing gender through a distinct and isolated procedure.

7.3. FINDINGS FROM THE LITERATURE STUDY

A significant achievement for the people of South Africa is the country's peaceful and successful democratic transition. Unfortunately, democracy has not been followed by policies that significantly raise the standard of living for all inhabitants of the nation or that result in significant economic growth. South Africa needs to balance the realities of the economy's potential and challenges with the expectations that came with the establishment of democracy. Given the situation mentioned above, it should be no surprise that twenty-eight years of democratic administration and reform initiatives have only marginally improved women's lives, especially women farmers in the agricultural sector. The sector continues to struggle with issues related to women's

empowerment, which is still one of its most significant problems. There is no gender policy requiring the implementation of programs in the agricultural sector. The atmosphere is not favourable for creating and implementing assistance programs meant to raise the standard of living and quality of life for women working in the industry.

The Department of Agriculture's White Paper on Agriculture (1995), a sector-specific policy document with direct and indirect implications for the provision of gender transformation in agriculture, land reform, and rural development sectors, hindered the government's efforts to address women's empowerment through its policies and programs. Despite the white paper policy document, the sector still lacks an effective framework for gender policy that would enable women's empowerment while maintaining productivity and production efficiency to ensure national food security and economic growth in South Africa's agriculture, land reform, and rural development sectors. Despite the assertion that agricultural policy is gender-sensitive, Sadie and Loots (1998) noted that farmers in the sector request assistance on a first-come, first-served basis, and those eligibility requirements are gender-neutral. The unique requirements of women and the challenges they confront when requesting help are not considered by gender-neutral criteria.

According to Farnworth *et al.* (2013), any changes to agriculture in Africa depend on women's involvement. Investments in women's economic empowerment have significant returns and multiplier effects on the continent's productivity, efficiency, and inclusive growth (Lay, 2012). Seguino (2013) also affirms that government commitment to attaining gender equality and pro-poor policy goals is vital evidence of investment in women's economic empowerment.

Although the department has been implementing the women empowerment project since 1999, the findings in Chapter 2 reveal that it is impossible to quantify the impact of agriculture on empowering women in the sector. The analysis noted that it is challenging, if not impossible, to monitor how much of the previous Department of Agriculture's budget was allotted for women or gender-sensitive programs and how much was spent on men (DoW, 2013). The research also suggested creating a gender policy requiring the agricultural industry to incorporate the gender dimension into pertinent policies and actions instead of addressing gender through a distinct and isolated procedure.

According to Ignaciuk and Chit Tun (2019), achieving sustainable agriculture necessitates tackling gender inequality and necessitates that industry stakeholders cooperate to achieve relevant economic, environmental, and social justice objectives. Data on women-owned farms (number, hectares, types of enterprises of operation, income, etc.) is urgently needed because the roles of women in farming and, as a result, their opportunities and limits are unknown due to the dearth of gender-disaggregated data (Farnworth & Hutchings, 2009). Effective collection and analysis of sex-disaggregated data are essential to ensure women are empowered to participate in all aspects of the economy. By doing so, we stand a better chance of strengthening our nation's economy and ultimately advancing the two most pressing global goals of equity and sustainability.

7.4. METHODOLOGY

To understand the respondents' perceptions, quantitative data was collected in the MS Excel package and statistically analysed using the WEAI and AGRIS. Hand-written notes were also taken during the commercial farmers' interviews. Depending on whether the farmers were working, some interviews were performed at their homes or farms, but the majority were conducted over the phone due to COVID-19 regulations. Typically, the farmer or another person in charge of operations responded. Practitioners were individually questioned in the second round of interviews by email and telephone to gain insight into how they integrate empowerment and sustainability in their day-to-day interactions with farmers.

The interview guidelines ensured that topics related to empowerment and sustainability were covered, and the open-ended questions made it easier to acquire data on the demographics of the farmers to better understand their knowledge of empowerment and agricultural sustainability. A questionnaire was created to gather general information about the respondents, such as names, contact information, and the names of the farm where the respondent worked. Critical demographic information on age, experience, and education level was gathered in addition to the basic information. Then, questions like empowerment, sustainability, and farmers' perceptions of things like infrastructure, inputs, land, and decision-making were included in the instrument. The open-ended questions were designed so the

respondents could check the relevant boxes and freely express themselves. The primary target population for the questionnaire was a total of 60 farmers, 41% of the responders were men, and 59% were women.

A logical framework approach was applied to dissect the problem and objective tree, which will outline the logical framework matrix to assist with the planning and monitoring of women empowerment programmes to be sustainable in agriculture.

7.5. KEY FINDINGS

7.5.1. Empirical Findings

This section was created using insightful data derived from the study population's primary qualitative and quantitative data. It acts as a comprehensive affirmation of the study's established research questions. These results show the empirical data needed to address the study issues. The key research topic was women farmers' empowerment and agricultural sustainability in the Gauteng Province.

7.5.2. Findings of the Study

The study sought to comprehend the impact of the women's empowerment program on previously unexplored pillars of sustainable agriculture. To investigate further the missing links and factors sustaining the status quo, such as the inability to quantify the impact of agriculture on empowering women farmers and sustainable agriculture processes. The study makes policy and practice recommendations to improve the empowerment and sustainability of women commercial farmers in GP.

According to the women empowerment report on the government's primary post-settlement program, the Comprehensive Agricultural Support Program (CASP), female farmers in Gauteng receive more significant financial and infrastructural help from the department than their male counterparts (Nesamvuni *et al.*, 2016). The research reiterates that women are more prevalent than males and are generally more actively involved in agricultural activities than men, which is one of the reasons why more funding has been given to women's projects. Additionally, it was noticed that the current administration actively encourages women to participate in the agriculture sector. This is praiseworthy and needs to be advocated even for future project activities.

7.5.2.1. To What Extent Are Women Farmers in the Gauteng Province of South Africa Empowered

The study's goal was first to evaluate the extent to which women commercial farmers in the province of Gauteng are empowered across the five areas of empowerment (5DE). The Women Empowerment Agriculture Index was used to understand the domains and indicators of empowerment that impact women farmers' empowerment to be sustainable in agriculture. The results demonstrated that women's empowerment significantly increased in the four domains of empowerment except for the time domain. In the five areas of empowerment that the study used, more than 80% of the farmers in this study felt empowered (5DE). However, based on the deconstruction of the disempowerment measure, the domain in the sample that contributes most to women's disempowerment is time. This was supported by literature from Haug *et al.* (2021) and OECD (2021); these studies found that women suffer from a lack of time due to the responsibilities of household work and childcare. This leaves women with little time to attend training programs or engage in learning opportunities outside the household. They then tend to over-compensate to catch up and give up their leisure time.

The study found that commercial women farmers appear to be more empowered in agriculture than what was expected from the existing literature on small-scale women farmers in agriculture. This study demonstrated that sufficiency in the production, leadership, assets, income, and time usage categories was more closely associated with empowerment than demographic variables. Except for the workload, leisure domain, and access to and decisions regarding credit indicators, most of the study's factors significantly influenced women's empowerment. The study's low leisure satisfaction scores demonstrate that women carry out most agricultural work with little assistance from their male counterparts because of their heavier workloads, easier access to credit, and more influence over credit decisions.

In the study, about 85% of participants (commercial farmers), with the help of GDARD, felt empowered, and these empowered participants specified that they had been given support and encouragement. The main reasons for not feeling empowered among the 15% of participants were a lack of access to resources and, in particular, no assistance from the DALRRD. This lends support to the literature by Santra and Kundu (2001),

which adds to our understanding that access to assets is the single most pressing need for women's empowerment in general and specifically for women in agriculture.

7.5.2.2. The Agricultural Sustainability of Women Farmers in the Gauteng Province of South Africa

The study evaluated the sustainability of women farmers in Gauteng. Women are more vulnerable to hunger than men, and the negative effects of environmental damage caused by unsustainable agricultural practices will have a negative impact on them. According to Agenda 21, which claims that the concept of agricultural sustainability is multi-dimensional and denotes interdependency that includes economic, environmental, and social attributes, agricultural sustainability is, therefore, measured through the three dimensions of economic, environmental, and social. Sustainable development is viewed as a better balance between all three dimensions. Indicators of sustainability aim to explain and measure key links between economic, social, and environmental concerns. In addition, indicators provide an early warning of potential economic, social, or environmental damage.

The findings were that women farmers in Gauteng are unsustainable in water usage, decent employment, and resilience. 75% of women experience water use unsustainability, followed by 52% of women being unsustainable in decent employment and 48% of women being unsustainable in resilience. Compared to the male participants, who experienced 50% unsustainability in resilience, followed by 31% profitability and 31% biodiversity agricultural unsustainability. The findings also highlighted that 87% of women participants are sustainable in terms of food security, and 100% of male farmers are food secure, while 96% of women farmers, as compared to 100% of male farmers, have acceptable levels of agricultural sustainability in land tenure

To be sustainable, agriculture must meet the needs of current and future generations for its products and services while also ensuring profitability and environmental, social, and economic equality (Haug *et al.*, 2021). Inequality can disrupt the ecosystem; for instance, unsustainable water use frequently leads to groundwater levels dropping over time, springs and rivers drying up, and more water-user conflicts. Sustainability is an important concept in agriculture for food security and is directly related to using natural resources. Haug *et al.* (2021) add that the trending climate change and

environmental degradation, combined with rising socioeconomic inequalities, undermine the ability of ecological systems to interrelate with social and economic systems in the future to support food production and agricultural livelihoods.

7.5.2.3. The Challenges Faced by Women Farmers in the Gauteng Province of South Africa

This study focused on the six challenges farmers faced in Gauteng and made a gender comparison to get an accurate picture of the challenges. The challenges were limited access to capital, limited access to productive resources, unequal access to land, security/theft, unequal access to education, and food insecurity.

The study's findings were that the number of challenges faced by commercial farmers in Gauteng Province was unaffected by gender; both male and female farmers encounter similar challenges. Furthermore, demographic status was not significantly related to empowerment levels; for example, the education level of female farmers did not affect empowerment levels; even with limited education, they were empowered. Because of this, it contends that discrimination against women can hamper economic growth by lowering family food security and obstructing women's and girls' access to better educational possibilities.

Buvinic and Furst-Nichols (2014) note that whereas no male farmers are affected by food security, a few female farmers experience it in peripheral communities. This is an important policy lesson in that there can be a need to empower both male and female farmers but also streamline specific issues such as access to credit which remain topical in sustainable agriculture and empowerment of women literature. The take-home message, therefore, becomes that there is no one size fits all intervention in women empowerment programming in modern-day agricultural systems. This can be attributed to other external programs outside the agriculture domain that have empowered women while leaving spillover effects on the agriculture sector.

This study employed the LFA to develop the monitoring tool to assess the impact of support programmes to empower women to be sustainable in agriculture. To thoroughly identify the problems, a problem tree technique was applied to analyse the problems of empowerment and agricultural sustainability for Gauteng farmers, particularly women farmers. The strategy entailed analysing the situation, creating a hierarchy of goals, and deciding on the best execution strategy through the log frame

matrix. The matrix provided an overview of the project's goals and methods, major presuppositions, and monitoring and evaluation procedures (Hamsphere,1999). The two main strategies identified to implement the activities and realise the core objective was (1) training and partnerships and (2) awareness to support gender roles.

The main issue was that both male and female farmers lacked access to capital. Farmers, as a result, lost control over how they spent their time, had limited access to resources for productivity, used unsustainable amounts of water, and had indecent employment. As a result, the industry needs to create a gender budgeting policy to address issues with access to capital and financial products like insurance. To reduce the workload on female farmers and provide them more control over their own time, it is also important to develop standard reporting indicators on the impact of the sector's support for farmers. Creating a framework to help with the collection of data that has been gender-disaggregated to provide precise information on gender that can be used to gauge the amount of support given to farmers.

7.6. STUDY CONCLUSIONS

To address the primary study question of determining women farmers' level of empowerment and agricultural sustainability in the Gauteng Province, the following section synthesizes that data from several chapters. First, the main issues and conclusions were determined. Second, suggestions for gender budgeting policy adoption to carry out the duty to allocate budgetary funds to achieve women's empowerment and long-term solutions in the Gauteng Province of South Africa were made. The study's concluding remarks are provided in this chapter, which also gave ample opportunity to integrate the various theoretical threads that had been identified to model the parameters that serve as indicators of women's empowerment in agriculture and the sustainability of agriculture in women's empowerment. Finally, recommendations and suggestions for additional research are given based on the findings of practitioners and commercial farmers in the Gauteng Province.

7.7. RECOMMENDATIONS

The pattern of resource ownership, access to opportunities, and equal opportunities to exercise agency all show that women farmers typically have less agency than male farmers. It is known that women contribute to agricultural growth as workers and

farmers. However, it is unclear how much agriculture will contribute to women's empowerment and the sustainability of women farmers. Since over half of rural women in developing countries work in agriculture, it provides the ideal platform for empowering women, which is seen as fundamental to sustainable development (Murugani, 2016). Long portrayed as a surrogate for empowerment, women's empowerment to be sustainable requires both access to resources and the agency needed to convert those resources into outcomes that support their economic well-being.

According to Pretty (1996), the fundamental tenets of agricultural sustainability include integrating natural processes into the agricultural production process, promoting long-term sustainability of production levels, as well as profitable and efficient production with a focus on the preservation of natural resources like soil, water, energy, and biological resources.

The empowerment and agricultural sustainability of women farmers in the province of Gauteng were extensively discussed in this study. It gave the Gauteng province the foundation needed to encourage women's participation in decision-making and agricultural sustainability. It was discovered that women's empowerment affects resource distribution equitably and, as a result, increases awareness of women's engagement in the mainstream economy. This study suggests some recommendations for key stakeholders, and the government in particular as policymakers, to guarantee that the sector embraces women’s empowerment to achieve agricultural sustainability and provide an enabling environment for its citizens.

The Department of Agriculture, Land Reform, and Rural Development in South Africa is advised to create a gender policy as a starting point to direct the sector to incorporate the gender dimension into pertinent policies and activities rather than address gender through a separate and isolated process. The implementation of gender budgeting, mainstreaming, and sex-disaggregated data administration must be referenced in this policy, which must serve as the guiding principle for all programmes, initiatives, and action plans. Data collection was difficult for this study because fewer male and female commercial farmers were documented than those who farmed for subsistence or as smallholders.

This is supported by literature that shows two countries that have progressed in terms of committing to the sustainability of women's empowerment. They both agree that gender policy will address the gap between women's inclusion and achieving sustainability in agriculture. In Ethiopia, they realized that a strong gender policy is essential to integrating gender equality and empowerment into their agricultural and rural development plans. The Rwandan government adopted the Agriculture Gender Strategy to address this gap and ensure women's inclusion. The strategy lays out specific steps to ensure that agricultural programs and activities lay a solid foundation for equal rights and opportunities for both men and women in rural development.

This study suggests training and partnerships as strategy one; this will assist in strengthening institutional structures to partner, cooperate, work together, and expand support for women farmers. From a policy perspective, this calls to action the stakeholders involved in women's empowerment and sustainable agriculture innovations to realign their efforts with this critically needed pillar. Additionally, by implementing a gender audit for the industry to close gaps in all producer support programs offered by the public and private sectors, the goal is to establish an environment that will encourage sustainability. This will ensure that promises made to empower women on paper are followed through with deeds and contribute to creating a mechanism for monitoring and evaluating the sector's impact on women's empowerment. All governments have tried to address the oversight of women's empowerment, but it is challenging to assess the efficacy of their efforts.

The second strategy is creating awareness to support gender roles because the level of women's participation in the sector's intervention programs and how this participation affects their lives have received very little consideration. This makes it more challenging to develop instruments to gauge the department's support for gender empowerment or to establish relevant outcome indicators connected to that of women in the sector. Furthermore, the UNDP (2011) report supports the abovementioned view; despite women's strong participation in agriculture, there is still a need for better gender mainstreaming in agricultural policy, with one possible action being the collection of evidence on women's sustainable agricultural methods at the local level. Supporting such initiatives by breaking down legal and cultural barriers that limit women's ability to operate due to their gender and cultural roles. Developing gender-

sensitive place-based approaches that recognise women's roles in the sector will influence women's empowerment to be sustainable.

The strategies recommend that a gender auditing tool be created to help with the collection of data that is gender-disaggregated to provide precise information on gender that can be used to gauge the amount of support given to farmers and measure the impact of the sector's contribution to women's empowerment and sustainability. Additionally, this study suggests strengthening institutional structures to coordinate and expand support for women, as well as creating an atmosphere conducive to women's empowerment, to help empower women for sustainable agriculture in Gauteng Province.

The number of women who took part in the DAFF FEA project and those who received assistance from other sector-related programs currently serves as the sole indicator of the impact of women's empowerment. The level of women's participation in the sector's intervention programs and how this participation affects their lives have received very little consideration. This makes it more challenging to develop instruments to gauge the department's support for gender empowerment or to establish relevant outcome indicators connected to that of women in the sector.

As hinted at in the study, establishing the DAFF FEA into the departmental support programmes and policies is one way to start women's empowerment within the sector. By enhancing the institutional frameworks to coordinate and promote support for women in the agricultural sector, these initiatives will increase the sustainability of the DAFF FEA program. Additionally, by implementing a gender audit for the industry to close any gaps in all producer support programs offered by the public and private sectors, the goal is to establish an environment that will encourage sustainability. This will ensure that promises made to empower women on paper are followed through with deeds and contribute to creating a mechanism for monitoring and evaluating the sector's impact on women's empowerment. All governments have tried to address the oversight of women's empowerment, but it is challenging to assess the efficacy of their efforts.

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APPENDIX A: QUESTIONNAIRE

THE EMPOWERMENT AND AGRICULTURAL SUSTAINABILITY OF COMMERCIAL WOMEN FARMERS IN THE GAUTENG PROVINCE OF SOUTH AFRICA

PRACTITIONER QUESTIONNAIRE

K Thobejane

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South Africa

Sources: De Bruyn, M

Van Niekerk,J

Questionnaire no: ☐☐☐ Date:

INSTRUCTION: Ask to speak to the practitioner i.e. the person responsible for the day-to-day activities of farmer support

Annexure B

B.1 Do gender relations in any way influence the planning of programmes objectives?	Yes	
	No	

B.2 When you plan a programme to support farmers, does it have gender responsive objectives?	Yes	
	No	

B.3 Is the distribution of support taking gender roles and relations into account?	Yes	
	No	

B.4 Do you identify project for support through gender disaggregated statistics?	Yes	
	No	

B.5 Are gender issues clarified in the implementation of the project (e.g. in the workplans	Yes	
	No	

B.6 Circle the number that best represents your response to the question.

		Low	Average			High
1.	How do you rate your current knowledge and skills related to gender?	1	2	3	4	5
2.	How do you rate your willingness to examine gender issues in your work?	1	2	3	4	5
3.	How do you rate the demand within your department to address gender issues?	1	2	3	4	5

		Low	Average			High
4.	How do you rate your track record as a gender change agent in your department?	1	2	3	4	5
5.	How do you rate your ability to discuss issues concerning gender?	1	2	3	4	5
6.	How do you rate your efforts to incorporate gender issues in more technical areas of agriculture?	1	2	3	4	5
7.	How do you rate your openness to conflicting views on gender issues?	1	2	3	4	5
9.	How do you think your department/supervisor rates your performance with respect to addressing gender issues in your work?	1	2	3	4	5

THE EMPOWERMENT AND AGRICULTURAL SUSTAINABILITY OF COMMERCIAL WOMEN FARMERS IN THE GAUTENG PROVINCE OF SOUTH AFRICA

FARMER QUESTIONNAIRE

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South Africa

Sources: De Bruyn, M

Van Niekerk,J

Questionnaire no: ☐☐☐ Date:

INSTRUCTION: Ask to speak to the farmer i.e. the person responsible for the day-to-day activities of the farm.

SECTION A: DEMOGRAPHIC INFORMATION

Location		
Local municipality		
District/Region		
Province		
Cellphone number		
Email address		
Age		
Gender	Female	
	Male	
Marital Status		
Is your category of farming at commercial level?	Yes	
	No	
Are you enrolled on commercialization program?	Yes	
	No	
Type of farming	Animal breeding	
	Crop production	
	Agro-processing	
	Livestock production	
Type of production	Conventional	
	Organic	

A2. What is your highest educational qualification?

	Farmer	Spouse(s)	Child with highest qualification	Specify sex of child	Other household member - highest qualification	Specify relationship
None						
≤ Grade 5						
Grade 6-7						
Grade 8-9						
Grade 10						
Grade 11-12						
Diploma						
Degree						
Post-graduate						

A3. How did you end up being a farmer?	Recruited	
	Volunteered for it, and it was my first choice.	
	Volunteered for it, but it wasn't my first choice	
	It was the only option open to me after retirement/lost my job	
	Other	

A4. How long have you been farming? [ ] years

A.5 Were you interested in farming from the start?	Yes	
	No	

A5.1 If yes, why? (Select only the most important one please)	Easy to access government grants/support	
	Thought it would be a promising career track	
	Wanted to continue a family tradition in this field	
	Other: Please specify	

A6. What are your future plans?	I would like to stay in farming	
	I would like to stay in farming but explore into a different occupation/career field	
	I would like to leave farming	

A7. Has being in farming made you more or less interested in staying in the agricultural sector?	It has made little difference	
	It has made me less interested in staying in agriculture	
	It has made me more interested in staying in agriculture	

SECTION B: CHALLENGES FACED BY FARMERS IN AGRICULTURE

B1. What are the challenges that you face as a farmer in agriculture?	Limited access to capital	
	Unequal access to education	
	Food insecurity	
	Unequal access to land	
	Limited access to productive resources	
	Gender division of unpaid care and domestic work	
	Other, please specify	

B2. What is your family's reaction to your farming activities?	Positive	
	Neutral	
	Negative	
	I don't know	

B3. How did the community respond to your farming activities?	Positive	
	Neutral	
	Negative	
	I don't know	

B4. Do you believe you have been treated differently by your counterpart farmers because your gender?	Yes	
	No	

B5. If you believe you have been treated differently, how have you been treated differently? (Tick all that apply)	I have received more mentoring/instruction/support than the opposite gender farmers	
	I have received less mentoring/instruction/support than the opposite gender farmers	
	More is expected of me than the opposite gender farmers	
	Less is expected of me than the opposite gender farmers	
	I tend to receive overly positive evaluations	
	I tend to receive overly negative evaluations	
	I have a better chance of being selected for support than the opposite gender farmers	
	I have a worse chance of being selected for support than the opposite gender farmers	

SECTION C: EMPOWERMENT INDICATORS

C1. What do you think it means to be empowered?

_____
_____
_____
_____

C2. Do you feel you have been empowered?	Yes	
	No	

C2.1 Please explain your answer.

_____
_____
_____
_____

The five domains of Empowerment in Agriculture:

<u>Empowerment Domain 1: Production</u>

This domain concerns decisions over agricultural production and refers to sole or joint decision making over food and cash-crop/ livestock farming.

C3. Please indicate who makes the decision in the following cases:

	Decision taken by <u>male</u> alone	Decision taken jointly by <u>male and female</u>	Decision taken by <u>female</u> alone
Agriculture related activities			
3a. The selection of crops and variety			
3b. Management of production activities			
3c. Purchase of inputs			
3d. Rearing livestock			
3e. Selling of crop/ livestock			
3f. Homestead and gardening			
3g. Post-harvest operation of crops			

C4. Please indicate to what degree you agree or disagree with the following statements regarding the decisions you make:

	Strongly disagree	Disagree	Neutral	Agree	Strongly disagree
4a. I will get into trouble with someone if I act differently					

	Strongly disagree	Disagree	Neutral	Agree	Strongly disagree
4b. I do what I do so that others won't think poorly of me					
4c. I do what I do because I personally think it is the right thing to do					

Empowerment Domain 2: Resources

This domain concerns ownership, access to, and decision-making power over productive resources.

C5. Please indicate which assets/ resources you have?

5a	Real estate and land	
5b	Retirement accounts	
5c	Equipment, machinery and office supplies	
5d	Savings accounts (cash and currency)	
5e	Houses and cars	
5f	Other (please specify)	

C6. Who owns these assets?

	Owned by male alone	Owned jointly by male and female	Owned by female alone
Assets/ resources			
Real estate and land			
Retirement accounts			
Equipment, machinery and office supplies			
Savings accounts (cash and currency)			
Houses and cars			
Other (please specify)			

C7. Who uses the asset most of the time?

	Used by male alone	Used by male and female	Used by female alone
Assets/ resources			
Real estate and land			
Retirement accounts			
Equipment, machinery and office supplies			
Savings accounts (cash and currency)			
Houses and cars			
Other (please specify)			

C8. Who is in control of these assets (makes decisions regarding assets)

	Controlled by male alone	Controlled jointly by male and female	Controlled by female alone
Assets/ resources			
Real estate and land			
Retirement accounts			
Equipment, machinery and office supplies			
Savings accounts (cash and currency)			
Houses and cars			
Other (please specify)			

C9. Do you have access to credit/ loans?	Yes	
	No	

C9.1 If yes, from where?	Commercial Bank	
	Agricultural bank (Landbank)	
	Agricultural Cooperatives (registered and unregistered)	
	Savings group(stokvel)	
	Neighbours	
	Parents	
	Relatives	
	Other(specify)	

C10. Who decides whether to access credit/ loans?	Solely Male	
	Female and Male together	
	Solely Female	

C11. Have you ever borrowed money or taken out a loan?	Yes	
	No	

C11.1 If yes, from where?	Commercial Bank	
	Agricultural Bank (Landbank)	
	Agricultural Cooperatives (registered and unregistered)	
	Savings group(stokvel)	
	Neighbours	
	Parents	
	Relatives	
	Other(specify)	

C12. Have you made a loan or asked for a loan in the last 12 months?	Yes	
	No	

C12.1 If yes, has the entirety of the loan been reimbursed?	Yes	
	No	

C12.2 If you did not obtain the loan you requested, why did they refuse you the loan?	Lack of guaranty	
	Project not considered profitable	
	Did not meet the loan criteria	
	The lender didn't have enough credit	
	Other(specify)	

C13. Do you save/ invest any of your money?	Yes	
	No	

If yes, please answer the following questions: C13.1 Is saving a priority?	Yes	
	No	

C13.2 How often do you save/ invest your money?	Monthly	
	Annually	
	Other(specify)	

C13.3 Where do you save your money?	Private bank	
	Government bank	
	Cooperatives (registered and unregistered)	
	Savings group(stokvel)	
	Insurance company	
	Safe at home/deposit box	
	Other(specify)	

C13.3.1 Who decides where to save the money?	Solely Male	
	Female and Male together	
	Solely Female	

C13.4 What do you typically use the saved money on? [Multiple options allowed]	Start/expand OWN income generation activity	
	Education (own)	
	Personal expenses	
	Household use	
	Emergency use (own)	

	Emergency use (family)	
	Medicine/hospitalization (own)	
	Acquiring land/assets	
	Travel	
	For repayment of borrowed money	
	Other(specify)	

C13.4.1 Who decides how to use the saved the money?	Solely Male	
	Female and Male together	
	Solely Female	

Empowerment Domain 3: Income

This domain concerns sole or joint control over the use of income and expenditures.

C14. Please indicate who makes the decision in the following cases:

	Decision taken by male alone	Decision taken jointly by male and female	Decision taken by female alone
Household related activities			
14a Cash management			
14b Children's education			
14c Buying and selling of land			
14d Travel and recreation			
14e Voting in election			

C15. How much input did you have in making the following decisions:

	Most of the input	Half of the input	Some of the input	No input
Household related activities				
15a Cash management				

10

	Most of the input	Half of the input	Some of the input	No input
15b Children's education				
15c Buying and selling of land				
15d Travel and recreation				
15e Voting in election				

C16. Please indicate to what extent you could make your own personal decision regarding the following aspects (if you wanted to):

	To a large extent	To some extent	To no extent
16a. Your own wage/ salary			
16b. Minor household expenses			

Empowerment Domain 4: Leadership

This domain concerns leadership in the community, here measured by membership in economic or social groups and comfort in speaking in public.

C17. Do you participate in, or are you a member of any social, political, or religious organization?	Yes	
	No	

C17.1 If yes to question C17, which of these organizations do you belong to/participate in?	Women's self-help group	
	Religious group	
	NGO	
	Political party	
	Cooperative	
	Business or farmer association	
	Other(specify)	

C17.2 If no to question C17, what is the main	I don't have enough time	
	I don't think they are worthwhile	

reason why you don't participate?	I don't feel welcome/included	
	Other	

C17.2.1 If you don't feel welcome/included, please specify why don't you feel welcome/included?	Gender	
	Age	
	Religion	
	Political affiliation	
	Ethnicity/language	
	Other	

C18. Do you feel comfortable speaking up in public to help decide on infrastructure?	Yes	
	No	

C19. Do you ensure proper steps are taken when a payment needs to be made?	Yes	
	No	

C20. Do you protest against any misbehaviour of authorities or elected officials?	Yes	
	No	

C21. Do you intervene in a family dispute?	Yes	
	No	

Empowerment Domain 5: Time

This domain concerns the allocation of time to productive and domestic tasks and satisfaction with the available time for leisure activities.

C22. In a typical day, how much time (in hours) do you spend on the following?

	Time allocation (in hours)
17a. Agricultural activities	
17b. Household activities	
17c. Leisure activities (visiting neighbours, watching TV, listening to music, doing sports, etc)	
17d. Sleep	
17e. Other activities (please specify)	

C23. How satisfied are you with the time available for leisure activities?	Very satisfied	
	Satisfied	
	Neutral	
	Dissatisfied	
	Very dissatisfied	

SECTION D: AGRICULTURAL SUSTAINABILITY INDICATORS

D1. Economic dimension

D1.1 What is the size (in ha) of the land you have available for agriculture?

D1.2 How much of this land (in ha) do you use for agricultural purposes?

D1.3 How much of the land (in ha) is covered by natural or diverse vegetation (not cultivated)

D1.4 Please indicate whether your farming activities have made profit over the last three years?

Year	Yes, made a profit	No, did not make a profit
2019		
2018		
2017		

D1.5 Do you have any sort of insurance or financial instrument?	Yes	
	No	

D1.6 Please list any other on-farm activities apart from crops and livestock

1	
2	
3	
4	
5	

D1.7 Is farming your income generating activity (IGA)?	Yes	
	No	

D1.8. What is the annual income (in Rands) generated from the farm?

D1.9 Are you currently involved with other Income generating activity (IGA) outside of farming?

D1.9.1 What is the annual income (in Rands) generated from outside farm?

_____

_____

D2. Environmental dimension

If you farm with crops:

D2.1 How many different types of crops do you farm?

_____

_____

_____

_____

_____

D2.2 Do you rotate your crops?	Yes	
	No	

D2.3 Do you use fertilizer?	Yes	
	No	

D2.3.1 If you do use fertilizer, please complete the following table:

	Yes	No
Do you follow the recommended doses?		
Do you combine fertilizers with organic nutrients (manure/ compost)?		
Do you combine fertilizers with a cover crop?		
Do you distribute the fertilizer application over the whole growing period?		
Do you consider soil type and climate when applying fertilizer?		
Do you use soil sampling at least every 5 years to perform nutrient budget calculations?		
Do you perform site-specific nutrient management or precision farming?		
Do you use buffer strips along water courses?		

D2.4. Do you use pesticides?	Yes	
	No	

D2.4.1 If you do use pesticides, please complete the following table:

	Yes	No
Health		
Do you adhere to the label recommendations (use protective equipment)?		
Do you safely dispose of the waste (cartons, bottles, bags)?		
Environment		
Do you adhere to the label recommendations regarding application?		
Do you adjust planting time/ apply crop spacing/ crop rotation/ mixed cropping/ inter-cropping?		
Do you perform biological pest control?		
Do you use resistance/ tolerant cultivars		
Do you systematically remove plant parts attacked by pests?		
Do you maintain and cleanse spraying equipment after use?		

If you farm with livestock:

D2.5 How many different types of livestock do you farm?

_____

_____

_____

_____

D2.6 Do you vaccinate your livestock?	Yes	
	No	

D2.7 Do you make use of veterinary services?	Yes	
	No	

For all participants:

D2.8 Please indicate if you have experienced any of the following soil degradation threats on your farm:

Soil degradation threats	No, I have not experienced this threat	Yes, I have experienced this threat	If yes, what is the total area (in ha) affected
Soil erosion (loss of topsoil through wind or water erosion)			
Reduction in soil fertility			
Salinization of irrigated land			
Waterlogging			

D2.9 Do you use water to irrigate crops?	Yes	
	No	

D2.9.1 If yes, what is the total area (in hectare) irrigated?

_____

_____

_____

D2.9.2 If no, why?	Not required	
	Cannot afford	
	Other (please specify)	

D2.10 Are you aware of any issues of water availability in your area?	Yes	
	No	

D2.11 Have you noticed a reduction in water availability over time?	Yes	
	No	

D2.12 Are there any organisations in charge of allocating water among users?	Yes	
	No	

D12.12.1 If yes, are these organisations working effectively?	Yes	
	No	

D3. Social dimension

D3.1 Do you hire unskilled labour?	Yes	
	No	

D3.1.1 If yes, what do you pay them per hour?

_____

_____

D3.2 Please indicate if during the last 12 months there was a time when, because of lack of money or other resources:

	Yes	No
You were worried you would not have enough food to eat?		
You were unable to eat healthy and nutritious food?		
You ate only a few kinds of foods?		
You had to skip a meal?		
You ate less than you thought you should?		
Your household ran out of food?		
You were hungry but did not eat?		
You went without eating for a whole day?		

D3.3. Do you have a formal document issued by the Land Registry?	Yes	
	No	

D3.3.1 If yes, what type of formal document?

Title deed	
Certificate of customary tenure	
Certificate of occupancy	
Registered will	
Registered certificate of hereditary acquisitions	
Registered certificate of perpetual	
Long term lease	
Registered rental contract	

APPENDIX B: CERTIFICATE OF EDITING

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Certificate of Editing

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Date issued:

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APPENDIX C: TURN IT IN REPORT

Thesis

ORIGINALITY REPORT

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